in 1998. Much of the area that was identified by the HPPRCC as inadequately surveyed has now been surveyed in some way. New location data for many species has been gathered. Also, the HPPRCC identified areas as essential based on species clusters (areas that included listed species as well as candidate species, and species of concern) while we have only delineated areas that are essential for the conservation of the 99 listed species at issue. As a result, the proposed critical habitat designations in this proposed rule include not only some habitat that was identified as essential in the 1998 recommendation but also habitat that was not identified as essential in those recommendations.

C. Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas to propose as critical habitat, we are required to base critical habitat determinations on the best scientific and commercial data available and to consider those physical and biological features (primary consistent elements) that are essential to the conservation of the species and that may require special management considerations or protection. Such requirements include, but are not limited to, space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

In previous proposals (65 FR 66808, 65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 3939, 67 FR 9806, 67 FR 15856, 67 FR 16492), we determined that designation of critical habitat was prudent for 45 plants (*Adenophorus periens, Alectryon macrococcus, Bonamia menziesii, Cenchrus agrimonioides, Centaurium sebaeoides, Colubrina oppositifolia, Ctenitis squamigera, Cyanea grimesiana* ssp. *grimesiana, Cyperus trachysanthos, Diellia erecta, Diplazium molokaiense, Eugenia koolauensis, Euphorbia haeleeleana, Flueggea neowawraea, Gouania meyenii, Gouania vitifolia, Hedyotis coriacea, Hesperomannia arborescens, Hesperomannia arbuscula, Hibiscus brackenridgei, Isodendrion laurifolium, Isodendrion longifolium, Isodendrion pyrifolium, Lobelia niihauensis, Lysimachia filifolia, Mariscus pennatiformis, Marsilea villosa, Melicope pallida, Nototrichium humile, Peucedanum sandwicense, Phlegmariurus nutans, Phyllostegia mollis, Phyllostegia parviflora, Plantago princeps, Platanthera holochila, Pteris lidgatei, Sanicula purpurea, Schiedea hookeri, Schiedea nuttallii, Sesbania tomentosa, Silene lanceolata, Solanum sandwicense, Spermolepis hawaiiensis, Tetramolopium lepidotum* ssp. *lepidotum,* and *Vigna o-wahuensis*) that are reported from Oahu as well as from Kauai, Niihau, Maui, Kahoolawe, Lanai, and/or Molokai.

In this proposal, we have determined that designation of critical habitat is prudent for 54 plants (*Abutilon sandwicense, Alsinidendron obovatum, Alsinidendron trinerve, Chamaesyce celastroides* var. *kaenana, Chamaesyce deppeana, Chamaesyce herbstii, Chamaesyce kuwaleana, Chamaesyce rockii, Cyanea acuminata, Cyanea crispa, Cyanea grimesiana* ssp. *obatae, Cyanea humboltiana, Cyanea koolauensis, Cyanea longiflora, Cyanea pinnatifida, Cyanea st.-johnii, Cyanea superba, Cyanea truncata, Cyrtandra dentata, Cyrtandra polyantha, Cyrtandra subumbellata, Cyrtandra viridiflora, Delissea subcordata, Diellia falcata, Diellia unisora, Dubautia herbstobatae, Eragrostis fosbergii, Gardenia mannii, Hedyotis degeneri, Hedyotis parvula, Labordia cyrtandrae, Lepidium arbuscula, Lipochaeta lobata* var. *leptophylla, Lipochaeta tenuifolia, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia monostachya, Lobelia oahuensis, Melicope lydgatei, Melicope saint-johnii, Myrsine juddii, Neraudia angulata, Phyllostegia hirsuta, Phyllostegia kaalaensis, Sanicula mariversa, Schiedea kaalae, Schiedea kealiae, Silene perlmanii, Stenogyne kanehoana, Tetramolopium filiforme, Tetraplasandra gymnocarpa, Trematalobelia singularis, Urera kaalae, Viola chamissoniana* ssp. *chamissoniana,* and *Viola oahuensis*) reported only from Oahu.

Ten of the 99 species (*Adenophorus periens, Cyanea pinnatifida, Diplazium molokaiense, Hedyotis coriacea, Isodendrion pyrifolium, Mariscus pennatiformis, Platanthera holochila, Silene perlmanii, Solanum sandwicense,* and *Vigna o-wahuensis*) no longer occur on Oahu. Eight of these species (*Adenophorus periens, Diplazium molokaiense, Hedyotis coriacea, Isodendrion pyrifolium, Mariscus pennatiformis, Platanthera holochila, Solanum sandwicense,* and *Vigna o-wahuensis*) occur on one or more other Hawaiian Islands. *Cyanea pinnatifida* and *Silene perlmanii* are currently extant only in propagation. Based on the information available at this time, we have identified the physical and biological features that are considered essential to the conservation of all ten species on Oahu. Therefore, we were able to identify the specific areas outside the geographic areas occupied by these species at the time of their listing (unoccupied habitat) that are essential for the conservation of *Adenophorus periens, Cyanea pinnatifida, Diplazium molokaiense, Hedyotis coriacea, Isodendrion pyrifolium, Mariscus pennatiformis, Platanthera holochila, Silene perlmanii, Solanum sandwicense,* and *Vigna o-wahuensis.*

All areas proposed as critical habitat are within the historical range of one or more of the 99 species at issue and contain one or more of the physical or biological features (primary constituent elements) essential for the conservation of one or more of the species.

As described in the discussions for each of the 99 species for which we are proposing critical habitat, we are proposing to define the primary constituent elements on the basis of the habitat features of the areas in which the plant species are reported from, as described by the type of plant community, associated native plant species, locale information (*e.g.,* steep rocky cliffs, talus slopes, stream banks), and elevation. The habitat features provide the ecological components required by the plant. The type of plant community and associated native plant species indicates specific microclimate conditions, retention and availability of water in the soil, soil microorganism community, and nutrient cycling and availability. The locale provides information on soil type, elevation, rainfall regime, and temperature. Elevation indicates information on daily and seasonal temperature and sun intensity. Therefore, the descriptions of the physical elements of the locations of each of these species, including habitat type, plant communities associated with the species, location, and elevation, as described in the *Supplementary Information-Discussion of the Plant Taxa* section above, constitute the primary constituent elements for these species on Oahu.

D. Criteria Used To Identify Critical Habitat

Based on the comments received during the public comment periods following publication of the four proposals to designate critical habitat for Hawaiian plants on Kauai and Niihau (65 FR 66808), Maui and Kahoolawe (65 FR 79192), Lanai (65 FR 82086), and Molokai (65 FR 83158), we have reevaluated the manner in which

we delineated proposed critical habitat. In addition, we met with members of the HPPRCC, and State and Federal agencies to discuss criteria and methods to delineate critical habitat units for these Hawaiian plants.

The lack of detailed scientific data on the life history of these plant species makes it impossible for us to develop a robust quantitative model (e.g., population viability analysis) to identify the optimal number, size, and location of critical habitat units to achieve recovery (Beissinger and Westphal 1998; Burgman *et al.* 2001; Ginzburg *et al.* 1990; Karieva and Wennergren 1995; Menges 1990; Murphy *et al.* 1990; Taylor 1995). At this time, and consistent with the listing of these species and their recovery plans, the best available information leads us to conclude that the current size and distribution of the extant populations are not sufficient to expect a reasonable probability of long-term survival and recovery of these plant species. Therefore, we used the best available information, including expert scientific opinion to identify potentially suitable habitat within the known historic range of each species.

We considered several factors in the selection and proposal of specific boundaries for critical habitat for these 99 species. For each of these species, the overall recovery strategy outlined in the approved recovery plans includes the following components: (1) Stabilization of existing wild populations, (2) protection and management of habitat, (3) enhancement of existing small populations and reestablishment of new populations within historic range, and (4) research on species' biology and ecology (Service 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999). Thus, the long-term recovery of these species is dependent upon the protection of existing population sites and potentially suitable unoccupied habitat within historic range.

The overall recovery goal stated in the recovery plans for each of these species includes the establishment of 8 to 10 populations with a minimum of 100 mature individuals per population for long-lived perennials, 300 mature individuals per population for short-lived perennials, and 500 mature individuals per population for annuals. There are some specific exceptions to this general recovery goal of 8 to10 populations for multi-island species (see discussion below on *Marsilea villosa*) and for species that are believed to be very narrowly distributed on a single island, and the proposed critical habitat designations reflect this exception for these species. To be considered recovered, each population of a species endemic to the island of Oahu should occur on the island to which it is endemic, and likewise the populations of a multi-island species should be distributed among the islands of its known historic range (Service 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999). A population, for the purposes of this discussion and as defined in the recovery plans for these species, is a unit in which the individuals could be regularly cross-pollinated, and influenced by the same small-scale events (such as landslides), and containing 100, 300, or 500 mature individuals, depending on whether the species is a long-lived perennial, short-lived perennial, or annual.

Marsilea villosa, a short-lived perennial aquatic fern, was historically known from six populations on three different islands, Molokai, Oahu, and Niihau. This species is now extant only on Oahu and Molokai. Delisting objectives for this species include protection and stabilization of at least six (rather than 8 to 10) geographically distinct, self-sustaining populations (either three on Oahu and three on Molokai or three on Oahu, two on Molokai, and one on Niihau), stable or increasing population sizes, no active management needed, and self-maintenance of each population through two successive floods resulting in sexual reproduction. Delisting objectives for *Marsilea villosa* do not include a specific number of mature individuals per population because of its clonal nature (it is extemely difficult to distinguish between individuals in clonal plant species) (Service 1996c).

By adopting the specific recovery objectives enumerated above, the adverse effects of genetic inbreeding and random environmental events and catastrophes, such as landslides, hurricanes, or tsunamis that could destroy a large percentage of the species at any one time may be reduced (Menges 1990; Podolsky 2001). These recovery objectives were initially developed by the HPPRCC and are found in all of the recovery plans for these species. While they are expected to be further refined as more information on the population biology of each species becomes available, the justification for these objectives is found in the current conservation biology literature addressing the coonservation of rare and endangered plants and animals (Beissinger and Westphal 1998; Burgman *et al.* 2001; Falk et al. 1996; Ginzburg *et al.* 1990; Hendrix and Kyhl 2000; Karieva and Wennergren 1995; Luijten *et al.* 2000; Meffe and Carroll 1997; Menges 1990; Murphy *et al.* 1990; Quintana-Ascencio and Menges 1996; Taylor 1995; Tear *et al.* 1995; Wolf and Harrison 2001). The overall goal of recovery in the short-term is a successful population that can carry on basic life-history processes, such as establishment, reproduction, and dispersal, at a level where the probability of extinction is low. In the long-term, the species and its populations should be at a reduced risk of extinction and be adaptable to environmental change through evolution and migration.

The long-term objectives, as reviewed by Pavlik, range from 50 to 2,500 individuals per population, based largely on research and theoretical modeling on endangered animals. Many aspects of species life history are typically considered to determine guidelines for species interim stability and recovery, including longevity, breeding system, growth form, fecundity, ramet (a plant that is an independent member of a clone) production, survivorship, seed duration, environmental variation, and successional stage of the habitat. Hawaiian species are poorly studied, and the only one of the afore-mentioned characteristics that can be uniformly applied to all Hawaiian plant species is longevity (*i.e.*, long-lived perennial, short-lived perennial, and annual). In general, long-lived woody perennial species would be expected to be viable at population levels of 50 to 250 individuals per population, while short-lived perennial species would be viable at population levels of 1,500 to 2,500 individuals or more per population. These population numbers were refined for Hawaiian plant species by the HPPRCC (1994) due to the restricted distribution of suitable habitat typical of Hawaiian plants and the likelihood of smaller genetic diversity of several species that evolved from one single introduction. For recovery of Hawaiian plants, the HPPRCC recommended a general recovery guideline of 100 mature individuals per population for long-lived perennial species, 300 mature individuals per population for short-lived perennial species, and 500 mature individuals per population for annual species.

The HPPRCC also recommended the conservation and establishment of 8 to10 populations to address the numerous risks to the long-term survival and conservation of Hawaiian plant species. Although absent the detailed information inherent to the types of PVA models described above (Burgman *et al.* 2001), this approach nevertheless

employs two widely recognized and scientifically accepted goals for promoting viable populations of listed species: (1) Creation or maintenance of multiple populations so that a single or series of catastrophic events cannot destroy the whole listed species (Luijten *et al.* 2000; Menges 1990; Quintana-Ascencio and Menges 1996); and (2) increasing the size of each population in the respective critical habitat units to a level where the threats of genetic, demographic, and normal environmental uncertainties are diminished (Hendrix and Kyhl 2000; Luijten et al. 2000; Meffe and Carroll 1997; Service 1997; Tear *et al.* 1995; Wolf and Harrison 2001). In general, the larger the number of populations and the larger the size of each population, the lower the probability of extinction (Raup 1991; Meffe and Carroll 1997). This basic conservation principle of redundancy applies to Hawaiian plants. By maintaining 8 to10 viable populations in the several proposed critical habitat units, the threats represented by a fluctuating environment are alleviated and the species has a greater likelihood of achieving long-term survival and conservation. Conversely, loss of one or more of the plant populations within any critical habitat unit could result in an increase in the risk that the entire listed species may not survive and recover.

Due to the reduced size of suitable habitat areas for these Hawaiian plant species, they are now more susceptible to the variations and weather fluctuations affecting quality and quantity of available habitat, as well as direct pressure from hundreds of species of non-native plants and animals. Establishing and conserving 8 to 10 viable populations on one or more islands(s) within the historic range of the species will provide each species with a reasonable expectation of persistence and eventual recovery, even with the high potential that one or more of these populations will be eliminated by normal or random adverse events, such as hurricanes, fires, and alien plant invasions (HPPRCC 1994; Luijten *et al.* 2000; Mangel and Tier 1994; Pimm *et al.* 1998; Stacey and Taper 1992). We conclude that designation of adequate suitable habitat for 8 to 10 populations as critical habitat will help give the species a reasonable likelihood of long-term survival and recovery, based on currently available information.

In summary, the long-term survival and recovery requires the designation of critical habitat units on one or more of the Hawaiian islands with suitable habitat for 8 to 10 populations of each plant species, with the exceptions discussed above. Some of this habitat is currently not known to be occupied by these species. To recover the species, it will be necessary to conserve suitable habitat in these unoccupied units, which in turn will allow for the establishment of additional populations through natural recruitment or managed reintroductions. Establishment of these additional populations will increase the likelihood that the species will survive and recover in the face of normal and stochastic events (*e.g.*, hurricanes, fire, and non-native species introductions) (Pimm *et al.* 1998; Stacey and Taper 1992; Mangel and Tier 1994).

In this proposal, we have defined the primary constituent elements on the basis of the habitat features of the areas in which the plants are reported from such as the type of plant community, the associated native plant species, the physical location (*e.g.*, steep rocky cliffs, talus slopes, stream banks), and elevation. The areas we are proposing to designate as critical habitat provide some or all of the habitat components essential for the conservation of one or more of the 99 plant species.

We have delineated proposed critical habitat units in the following manner:

1. We focused on designating units representative of the known current and historical geographic and elevational range of each species;

2. Proposed critical habitat units would allow for expansion of existing wild populations and reestablishment of wild populations within historic range, as recommended by the recovery plans for each species; and

3. Critical habitat boundaries were delineated in such a way that areas with overlapping occupied or potentially suitable unoccupied habitat could be depicted clearly (multi-species units).

We began by creating rough models for each species by screen digitizing polygons (map units) using ArcView (ESRI), a computer GIS program. The polygons were created by overlaying current and historic plant location points onto a digital map of the island's elevation range and vegetation types.

The resulting shape files (delineating historic range and potential, suitable habitat) were then evaluated. Elevation ranges were further refined and land areas identified as not suitable for a particular species (*i.e.,* not containing the primary constituent elements) were avoided. The resulting shape files for each species then were considered to define all suitable habitat on the island, including occupied and unoccupied habitat.

These shape files of potentially suitable habitat were further evaluated. Several factors were then used to delineate the proposed critical habitat units from these land areas. We reviewed the recovery objectives as described above and in recovery plans for each of the species to determine if the number of populations and population size requirements needed for full recovery would be available within the critical habitat units identified as containing the appropriate primary constituent elements for each species. If more than the area needed for the number of recovery populations was identified as potentially suitable, only those areas within the least disturbed suitable habitat were designated as proposed critical habitat. A population for this purpose is defined as a discrete aggregation of individuals located a sufficient distance from a neighboring aggregation such that the two are not affected by the same small-scale events and are not believed to be consistently cross-pollinated. In the absence of more specific information indicating the appropriate distance to assure limited cross-pollination, we are using a distance of 1,000 m (3,281 ft) based on our review of current literature on gene flow (Barret and Kohn 1991; Fenster and Dudash 1994; Havens 1998; Schierup and Christiansen 1996).

Using the above criteria, we delineated the proposed critical habitat for each species. When species units overlapped, we combined units for ease of mapping. Such critical habitat units encompass a number of plant communities. Using satellite imagery and parcel data we then eliminated areas that did not contain the appropriate vegetation, associated native plant species, or features such as cultivated agriculture fields, housing developments or other areas that are unlikely to contribute to the conservation of one or more of the 99 plant species. Geographic features (ridge lines, valleys, streams, coastlines, etc.) or man-made features (roads or obvious land use) that created an obvious boundary for a unit were used as unit area boundaries. We also used watershed delineations to dissect very large proposed critical habitat units in order to simplify the unit mapping and their descriptions.

Within the critical habitat boundaries, adverse modification under section 7 generally would occur only if the primary constituent elements are affected. Therefore, not all activities within critical habitat would trigger an adverse modification conclusion. In defining critical habitat boundaries, we made an attempt to avoid areas, such as towns and other similar lands that are unlikely to contribute to the

conservation of the 99 species. However, the minimum mapping unit that we used to approximate our delineation of critical habitat for these species did not allow us to exclude all such developed areas. In addition, existing features and structures within the boundaries of the mapped units, such as buildings, roads, aqueducts, telecommunications equipment, telemetry antennas, radars, missile launch sites, arboreta and gardens, heiau (indigenous places of worship or shrines), airports, other paved areas, and other rural residential areas do not contain one or more of the primary constituent elements and would be excluded under the terms of this proposed regulation. Federal actions limited to those areas, therefore, would not trigger a section 7 consultation, unless they affect the species and/or primary constituent elements in adjacent critical habitat.

In summary, for most of these species we utilized the approved recovery plan guidance to identify appropriately sized land units containing suitable occupied and unoccupied habitat. These areas are our best estimation of the habitat necessary to provide for the recovery of these 99 species.

E. Managed Lands

Currently occupied or historically known sites containing one or more of the primary constituent elements considered essential to the conservation of these 99 plant species were examined to determine if additional special management considerations or protection are required above those currently provided. We reviewed all available management information on these plants at these sites, including published reports and surveys; annual performance and progress reports; management plans; grants; memoranda of understanding and cooperative agreements; DOFAW planning documents; internal letters and memos; biological assessments and environmental impact statements; and section 7 consultations.

Pursuant to the definition of critical habitat in section 3 of the Act, the primary constituent elements as found in any area so designated must also require ''special management considerations or protections.'' Adequate special management or protection is provided by a legally operative plan that addresses the maintenance and improvement of the essential elements and provides for the long-term conservation of the species. We consider a plan adequate when it: (1) Provides a conservation benefit to the species (*i.e.*, the plan must maintain or provide for an increase in the species' population or the enhancement or restoration of its habitat within the area covered by the plan); (2) provides assurances that the management plan will be implemented (*i.e.*, those responsible for implementing the plan are capable of accomplishing the objectives, have an implementation schedule and/or have adequate funding for the management plan); and, (3) provides assurances the conservation plan will be effective (*i.e.*, it identifies biological goals, has provisions for reporting progress, and is of a duration sufficient to implement the plan and achieves the plan's goals and objectives). If an area is covered by a plan that meets these criteria, it does not constitute critical habitat as defined by the Act because the primary constituent elements found there are not in need of special management.

In determining and weighing the relative significance of the threats that would need to be addressed in management plans or agreements, we considered the following:

(1) The factors that led to the listing of the species, as described in the final rules for listing each of the species. Effects of clearing and burning for agricultural purposes and of invasive non-native plant and animal species have contributed to the decline of nearly all endangered and threatened plants in Hawaii (Smith 1985; Howarth 1985; Stone 1985; Wagner *et al.* 1985; Scott *et al.* 1986; Cuddihy and Stone 1990; Vitousek 1992; Service 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999; Loope 1998).

Current threats to these species include non-native grass and shrub-carried wildfire; browsing, digging, rooting, and trampling from feral ungulates (including goats, deer, and pigs); direct and indirect effects of non-native plant invasions, including alteration of habitat structure and microclimate; and disruption of pollination and gene-flow processes by adverse effects of mosquito-borne avian disease on forest bird pollinators, direct competition between native and non-native insect pollinators for food, and predation of native insect pollinators by non-native hymenopteran insects (ants). In addition, physiological processes such as reproduction and establishment continue to be stifled by fruit and flower eating pests such as non-native arthropods, mollusks, and rats, and photosynthesis and water transport affected by non-native insects, pathogens and diseases. Many of these factors interact with one another, thereby compounding effects. Such interactions include non-native plant invasions altering wildfire regimes, feral ungulates vectoring weeds and disturbing vegetation and soils thereby facilitating dispersal and establishment of non-native plants, and numerous non-native insects feeding on native plants, thereby increasing their vulnerability and exposure to pathogens and disease (Howarth 1985; Smith 1985; Scott *et al.* 1986; Cuddihy and Stone 1990; Mack 1992; D'Antonio and Vitousek 1992; Tunison *et al.* 1992; Service 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999; Bruegmann *et al.* 2001).

(2) The recommendations from the HPPRCC in their 1998 report to us (''Habitat Essential to the Recovery of Hawaiian Plants''). As summarized in this report, recovery goals for endangered Hawaiian plant species cannot be achieved without the effective control of non-native species threats, wildfire, and land use changes.

(3) The management actions needed for assurance of survival and ultimate recovery of Hawaii's endangered plants. These actions are described in our recovery plans for these 99 species (Service 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999), in the 1998 HPPRCC report to us (HPPRCC 1998), and in various other documents and publications relating to plant conservation in Hawaii (Mueller-Dombois 1985; Smith 1985; Stone 1985; Cuddihy and Stone 1990; Stone *et al.* 1992). In addition to monitoring the plant populations, these actions include, but are not limited to: (1) Feral ungulate control; (2) non-native plant control; (3) rodent control; (4) invertebrate pest control; (5) fire management; (6) maintenance of genetic material of the endangered and threatened plants species; (7) propagation, reintroduction, and/or augmentation of existing populations into areas deemed essential for the recovery of these species; (8) ongoing management of the wild, outplanted, and augmented populations; and (9) habitat management and restoration in areas deemed essential for the recovery of these species.

In general, taking all of the above recommended management actions into account, the following management actions are ranked in order of importance (Service 1994, 1995a, 1995b, 1996a, 1996b, 1996c, 1996d, 1997, 1998a, 1998b, 1999). It should be noted, however, that, on a case-by-case basis, some of these actions may rise to a higher level of importance for a particular species or area, depending on the biological and physical requirements of the species and the

location(s) of the individual plants: feral ungulate control; wildfire management; non-native plant control; rodent control; invertebrate pest control; maintenance of genetic material of the endangered and threatened plant species; propagation, reintroduction, and/or augmentation of existing populations into areas deemed essential for the recovery of the species; ongoing management of the wild, outplanted, and augmented populations; maintenance of natural pollinators and pollinating systems, when known; habitat management and restoration in areas deemed essential for the recovery of the species; monitoring of the wild, outplanted, and augmented populations; rare plant surveys; and control of human activities/access.

As shown in Table 2, the proposed critical habitat designations for 99 species of plants are found on Federal, State, and private lands on the island of Oahu. Information received in response to our public notices, meetings, and information in our files indicated that there is some on-going conservation management action for these plants, as noted below. However, without management plans and assurances that the plans will be implemented, we are unable to find that the land in question does not require special management or protection.

Federal Lands

The Sikes Act Improvements Act of 1997 (Sikes Act) requires each military installation that includes land and water suitable for the conservation and management of natural resources to complete, by November 17, 2001, an INRMP. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found there. Each INRMP includes an assessment of the ecological needs on the installation, including needs to provide for the conservation of listed species; a statement of goals and priorities; a detailed description of management actions to be implemented to provide for these ecological needs; and a monitoring and adaptive management plan. We consult with the military on the development and implementation of INRMPs for installations with listed species. We believe that bases that have completed and approved INRMPs that address the needs of the species generally do not meet the definition of critical habitat discussed above, because they require no additional special management or protection. Therefore, we do not include these areas in critical habitat designations if they meet the following three criteria: (1) A current INRMP must be complete and provide a conservation benefit to the species; (2) the plan must provide assurances that the conservation management strategies will be implemented; and (3) the plan must provide assurances that the conservation management strategies will be effective, by providing for periodic monitoring and revisions as necessary. If all of these criteria are met, then the lands covered under the plan would not meet the definition of critical habitat.

Lands Under U.S. Army Jurisdiction

The Army has six installations under its jurisdiction on Oahu-Dillingham Military Reservation (DMR), Kawailoa Training Area (KLOA), Kahuku Training Area (KTA), Makua Military Reservation (MMR), Schofield Barracks Military Reservation (SBMR) and Schofield Barracks East Range (SBER). All of these lands are administered by the Army Garrison, Hawaii for various types of routine military training. The Army has written an Integrated Natural Resources Management Plan (INRMP) for all of the Oahu training areas (Army 2001b), Ecosystem Management Plan (Army 1998), an Endangered Species Management Plan (Research Corporation of Hawaii (RCUH) 1998), a Wildland Fire Management Plan (which is finalized only for MMR at this time) (Army 2000), monthly summary reports (Col. W.E. Ryan III, Army, *in litt.* 2000–2002), and annual reports on the natural resources management projects performed under the Ecosystems Management Program for all of these installations (RCUH 1998, 1999, and 2000). These documents indicate that some of the management actions identified in these plans, including their 2001 INRMP, have been implemented and have proven beneficial to populations of some species. However, current management is not sufficient to address the on-going threats to the listed plant species on these lands. In addition, there is currently no guarantee of long-term funding for management actions that are ongoing or future management actions. The Army is currently engaged in or will begin discussions with the Service to identify training-related impacts to the listed plant species at SBMR, SBER, KLOA, KTA, and DMR and develop measures that avoid, minimize and offset those impacts. However, more comprehensive management documents have not been completed at this time. Therefore, we can not, at this time, find that management on these lands under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat.

Dillingham Military Reservation

Four species, *Cyperus trachysanthos, Hibiscus brackenridgei* ssp. *mokuleianus, Nototrichium humile,* and *Schiedea kealiae* are reported from the Army's Dillingham Military Reservation, though only *Schiedea kealiae* is currently known to occur on this land (Army 2001b; HINHP Database 2001). We believe this land is needed for the recovery of one or more of these four species. Currently, the Army is not implementing any management actions for these listed species at the Dillingham Military Reservation (HINHP Database 2001; Army 2001b). In addition, proposed management actions identified for *Schiedea kealiae* in the 2001 INRMP are ''subject to available funding''. We do not believe that appropriate conservation management strategies have been adequately funded or effectively implemented. Therefore, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for the listed plant species reported from Dillingham Military Reservation, and provides for their long-term conservation and assurances that it will is completed and implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude these military lands under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Kahuku Training Area

Ten species, *Adenophorus periens, Chamaesyce rockii, Cyanea grimesiana* ssp. *grimesiana, Cyanea koolauensis, Cyanea longiflora, Eugenia koolauensis, Gardenia mannii, Hesperomannia arborescens, Phyllostegia hirsuta,* and *Tetraplasandra gymnocarpa,* are reported from the Army's Kahuku Training Area though only *Cyanea koolauensis, Eugenia koolauensis, Gardenia mannii, Hesperomannia arborescens,* and *Tetraplasandra gymnocarpa* are currently known to occur on this land (HINHP Database 2001; Army 2001b). We believe this land is needed for the recovery of one or more of these 10 species. Currently, management actions for listed plants at Kahuku Training Area consists of weed control around known populations of *Eugenia koolauensis* and collection of

propagules for propagation and eventual outplanting (Army 2001b). Proposed management actions identified for listed plant species in the 2001 INRMP are ''subject to available funding''. We do not believe that there are sufficient assurances that appropriate conservation management strategies will be adequately funded or effectively implemented. Therefore, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for the listed plant species reported from Kahuku Training Area, and provides for their long-term conservation and assurances that it will is completed and implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude these military lands under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Kawailoa Training Area

Twenty-nine species, *Adenophorus periens, Chamaesyce rockii, Cyanea acuminata, Cyanea crispa, Cyanea grimesiana* ssp. *grimesiana, Cyanea humboldtiana, Cyanea koolauensis, Cyanea longiflora, Cyanea st.-johnii, Cyrtandra dentata, Cyrtandra viridiflora, Delissea subcordata, Eugenia koolauensis, Gardenia mannii, Hesperomannia arborescens, Labordia cyrtandrae, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia oahuensis, Melicope lydgatei, Myrsine juddii, Phlegmariurus nutans, Phyllostegia hirsuta, Phyllostegia parviflora, Plantago princeps, Platanthera holochila, Pteris lidgatei, Sanicula purpurea, Tetraplasandra gymnocarpa,* and *Viola oahuensis,* are reported from the Army's Kawailoa Training Area, and 23 of the 29 plant species (*Chamaesyce rockii, Cyanea acuminata, Cyanea crispa, Cyanea humboldtiana, Cyanea koolauensis, Cyanea st.-johnii, Cyrtandra dentata, Cyrtandra viridiflora, Eugenia koolauensis, Gardenia mannii, Hesperomannia arborescens, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia oahuensis, Melicope lydgatei, Myrsine juddii, Phlegmariurus nutans, Phyllostegia hirsuta, Phyllostegia parviflora, Plantago princeps, Pteris lydgatei, Sanicula purpurea, Tetraplasandra gymnocarpa,* and *Viola oahuensis*) are currently known to occur on this land (HINHP Database 2001; Army 2001b). We believe this land is needed for the recovery of one or more of these 29 species. Currently, management for listed plant species at Kawailoa Training area includes monitoring to examine population health, the collection of propagules for ex-situ propagation, and the identification of threats to these populations. The populations of *Cyanea st.-johnii* and *Cyrtandra viridiflora* have been intensely monitored since 1999. The Army plans to construct a fenced exclosure around the *Cyrtandra viridiflora* population to protect the individuals from browsing by feral ungulates. *Gardenia mannii* has been actively monitored for threats and competition from exotic plants but no fences have been erected to prevent browsing from feral pigs (Army 2001b). Proposed management actions identified for listed plant species in the 2001 INRMP are ''subject to available funding''. We do not believe that the current management measures are sufficient to address the primary threats to these species, nor do we believe that there are appropriate assurances that appropriate conservation management strategies will be adequately funded or effectively implemented. Therefore, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for the listed plant species reported from Kawailoa Training Area, and provides for their long-term conservation and assurances that it will be implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude these military lands under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Makua Military Reservation

Thirty-one species, *Alectryon macrococcus, Alsinidendron obovatum, Bonamia menziesii, Cenchrus agrimonioides, Chamaesyce celastroides var. keanana, Ctenitis squamigera, Cyanea superba, Cyrtandra dentata, Delissea subcordata, Diellia falcata, Dubautia herbstobatae, Euphorbia haeleeleana, Flueggea neowawraea, Hedyotis degeneri, Hedyotis parvula, Hibiscus brackenridgei, Lepidium arbuscula, Lipochaeta tenuifolia, Lobelia niihauensis, Lobelia oahuensis, Neraudia angulata, Nototrichium humile, Plantago princeps, Sanicula mariversa, Schiedea hookeri, Schiedea nuttallii, Silene lanceolata, Spermolepis hawaiiensis, Tetramolopium filiforme, Tetramolopium lepidotum* ssp. *lepidotum,* and *Viola chamissoniana* ssp. *chamissoniana,* are reported from the Army's Makua Military Reservation, and all but *Tetramolopium lepidotum* ssp. *lepidotum* are currently known to occur on this land (HINHP Database 2001; Army 2001b). We believe this land is needed for the recovery of one or more of these 31 species. Currently, management for listed plant species at Makua Military Reservation includes monitoring to examine population health, the collection of propagules for ex-situ propagation, and the identification of threats to these populations. Seeds of *Alectryon macroccocus, Alsinidendron obovatum, Cenchrus agrinomioides, Cyanea superba* ssp. *superba, Hedyotis degeneri, Hedyotis parvula, Sanicula mariversa, Silene lanceolata,* and *Viola chamissoniana* ssp. *chamissoniana* have been collected and propagated for future reintroduction into protected habitat. Slug control has been initiated on populations of *Alsinidendron obovatum* and intensive rat control has been implemented for *Euphorbia haeleeleana.* Erosion barriers have been constructed to protect *Sanicula mariversa* populations. Fenced exclosures have been constructed around populations of *Cenchrus agrinomioides, Cyanea superba* ssp. *superba, Cyrtandra dentata, Delissea subcordata,* and *Diellia falcata* to protect them from browsing by feral ungulates. Fenced exclosures for some species are not possible due to unexploded ordnance hazards near individual plants, for example, of *Flueggea neowawraea* (Army 2001b). While we believe that some of these species specific actions may control threats in the short term, we do not believe that these measures are sufficient to address the primary threats to all of the species reported from Makua Military Reservation at this time. The Army has completed a programmatic section 7 consultation with the Service for Makua Military Reservation. We issued a biological opinion of no jeopardy for the Army's routine training on June 23, 1999. Part of the Army's proposed action included the development and implementation of an Implementation Plan (IP) to outline detailed steps needed to stabilize the species impacted by Army training. The IP is still in the development phase and may not be completed for another year.

If the implementation plan addresses the maintenance and improvement of the essential elements for the listed plant species reported from Makua Military Reservation, and provides for their long-term conservation and assurances that it will be implemented, we will reassess the critical habitat boundaries in light of the Implementation Plan. However, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. In addition, we may exclude these military lands under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Schofield Barracks East Range

Seventeen species, *Chamaesyce rockii, Cyanea acuminata, Cyanea koolauensis, Cyanea longiflora, Cyanea st.johnii, Cyrtandra subumbellata, Gardenia mannii, Hesperomannia arborescens, Isodendrion laurifolium, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia oahuensis, Plegmariurus nutans, Phyllostegia hirsuta, Pteris lidgatei, Sanicula pupurea, Tetraplasandra gymnocarpa*, and *Viola oahuensis*, are reported from the Army's Schofield Barracks East Range, and all but *Cyanea longiflora, Cyanea st.johnii*, and *Lobelia oahuensis* are currently known to occur on this land (HINHP Database 2001; Army 2001b). We believe this land is needed for the recovery of one or more of these 17 species. Currently, management for listed plant species at Schofield Barracks East Range includes monitoring of some plant populations, the collection of propagules for ex-situ propagation, and the identification of threats to the rare plant populations. *Phlegmariurus nutans* is the only species at Schofield Barracks East Range that has been collected for ex-situ propagation and results have been unsuccessful (Army 2001b). Proposed management actions identified for listed plant species in the 2001 INRMP are ''subject to available funding''. We do not believe that the current management measures are sufficient to address the primary threats to these species, nor do we believe that there are sufficient assurances that appropriate conservation management strategies will be adequately funded or effectively implemented. Therefore, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for the listed plant species reported from Schofield Barracks East Range, and provides for their long-term conservation and assurances that it will be implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude these military lands under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Schofield Barracks Military Reservation

Thirty-four species, *Abutilon sandwicense, Alectryon macrococcus, Alsinidendron trinerve, Cenchrus agriminioides, Ctenitis squamigera, Cyanea acuminata, Cyanea grimesiana* ssp. *grimesiana, Cyanea grimesiana* ssp. *obatae, Cyanea superba, Delissea subcordata, Diellia falcata, Diplazium molokaiense, Eragrostis fosbergii, Flueggea neowawraea, Gardenia mannii, Isodendrion longifolium, Labordia cyrtandrae, Lepidium arbuscula, Lipochaeta lobata* var. *leptophylla, Lipochaeta tenuifolia, Lobelia niihauensis, Lobelia oahuensis, Neraudia angulata, Nototrichium humile, Phyllostegia hirsuta, Phyllostegia mollis, Plantago princeps, Schiedea hookeri, Schiedea nuttalii, Solanum sandwicense, Stenogyne kanehoana, Tetramolopium lepidotum* ssp. *lepidotum, Urera kaalae*, and *Viola chamissoniana* ssp. *chamissoniana*, are reported from the Army's Schofield Barracks Military Reservation and 23 of the 34 plant species are currently known to occur on this land (HINHP Database 2001; Army 2001b). Eleven species, *Cenchrus agriminioides, Ctenitis squamigera, Cyanea grimesiana* ssp *obatae, Cyanea superba, Diplazium molokaiense, Eragrostis fosbergii, Neraudia angulata, Nototrichium humile, Schiedea nuttalii, Solanum sandwicense*, and *Stenogyne kanehoana* are only known from historical records. We believe this land is needed for the recovery of one or more of these 34 species. Currently, management for listed plant species at Schofield Barracks Military Reservation includes rare plant surveys and the identification and monitoring of threats to the rare plant species. Propagules of *Alectryon macrococcus, Flueggea neowawraea, Gardenia mannii, Phyllostegia hirsuta, Urera kaalae*, and *Viola chamissoniana* ssp. *chamissoniana* have been collected and are being propagated for outplanting into protected habitat. Propagated individuals of *Flueggea neowawraea*, and *Urera kaalae* have already been outplanted into habitat that is protected by ungulate exclosure fences and is regularly monitored for alien plant species. Monitoring for many of the rare plants at Schofield Barracks Military Reservation is restricted due to unexploded ordnance hazards (Army 2001b). Proposed management actions identified for listed plant species in the 2001 INRMP are ''subject to available funding''. We do not believe that the current management measures are sufficient to address the primary threats to these species, nor do we believe that there are sufficient assurances that appropriate conservation management strategies will be adequately funded or effectively implemented. Therefore, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for the listed plant species reported from Schofield Barracks Military Reservation, and provides for their long-term conservation and assurances that it will be implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude these military lands under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Hawaii Army National Guard

One plant species, *Cyperus trachysanthos*, occurs on HIARNG lands at Diamond Head Crater (HINHP Database 2001). We conducted surveys and prepared management plans for all HIARNG lands in Hawaii, including Diamond Head Crater (Service 1998c and 2001). Current management on HIARNG lands at Diamond Head include rare plant seed collection for off-site propagation, fire control, some weed control, and some habitat restoration. However, these actions are not sufficient to address the on-going threats to this species on this land. In addition, currently there is no guarantee that appropriate conservation management strategies will be adequately funded or effectively implemented. Therefore, we cannot, at this time, find that management on these lands is adequate to preclude a proposed designation of critical habitat.

Naval Magazine Pearl Harbor Lualualei Branch and Naval Computer and Telecommunication Area Master Station Pacific Transmitting Facility at Lualualei

The U.S. Navy (Navy) owns or leases much of Lualualei Valley, which is operated as a naval magazine and transmitting facility. One species, *Marsilea villosa*, occurs on land at the Naval Computer and Telecommunications Area Master Station Pacific Radio Transmitting Facility at Lualualei and we believe this land is needed for the recovery of this species. Some management actions to protect and maintain the population are included in the 2001 INRMP but these actions have not been adequately funded or effectively implemented (HINHP Database 2001; Navy 2001a). Therefore, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for *Marsilea villosa*, and provides for its long-term conservation and assurances that it will be implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude this military land under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the area within critical habitat, provided the exclusion will not result in extinction of the species.

Twenty-three species, *Abutilon sandwicense, Alectryon macrococcus, Bonamia menziesii, Chamaesyce kuwaleana, Diellia falcata, Flueggea neowawraea, Hedyotis parvula, Lepidium arbuscula, Lipochaeta lobata, Lipochaeta tenuifolia, Lobelia niihauensis, Marsilea villosa, Melicope saint-johnii, Neraudia angulata, Nototrichium humile, Phyllostegia hirsuta, Plantago princeps, Sanicula mariversa, Schiedea hookeri, Tetramolopium filiforme, Tetramolopium lepidotum, Urera kaalae*, and *Viola chamissoniana* ssp. *chamissoniana*, are reported from the Naval Magazine Pearl Harbor Lualualei Branch land and we believe this land is needed for the recovery of one or more of these 23 species (HINHP Database 2001; Navy 2001b). One fenced exclosure at the Halona management area has been erected to protect *Abutilon sandwicense* from feral ungulates, and another exclosure at Puu Hapapa protects *Abutilon sandwicense, Bonamia menziesii, Fleuggea neowawraea, Lipochaeta lobata* var. *leptophylla*, and *Nototrichium humile* from browsing by feral ungulates. Other management actions include some monitoring of rare plants, surveying for rare plants and controlling some invasive plants in rare plant habitats (The Traverse Group 1988; Navy 1997, 2001a, 2001b). We do not believe that these measures are sufficient to address the primary threats to these species on this land, nor do we believe that appropriate conservation management strategies have been adequately funded or effectively implemented. Therefore, we cannot at this time find that management of this land under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for these plant species, and provides for their long-term conservation and assurances that it will be implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude this military land under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the area within critical habitat, provided the exclusion will not result in extinction of the species.

Oahu Forest National Wildlife Refuge

The Oahu Forest National Wildlife Refuge was established to protect and manage a portion of some of the best remaining native forest in the northern Koolau Mountains of Oahu. The southern portion of the refuge is owned by the Service, while the northern portion is private land leased by the Army as part of Schofield Barracks Military Reservation and included as an overlay refuge. Sixteen plant species (*Chamaesyce rockii, Cyanea acuminata, Cyanea koolauensis, Cyanea humboldtiana, Cyrtrandra subumbellata, Cyrtrandra viridiflora, Gardenia mannii, Hesperomannia arborescens, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia oahuensis, Phlegmariurus nutans, Phyllostegia hirsuta, Pteris lydgatei, Sanicula purpurea, Tetraplasandra gymnocarpa*, and *Viola oahuensis*) are reported from the refuge lands (HINHP Database 2001). The refuge was established in December 2000 and no management plan has been developed yet. We have included this area within the critical habitat proposal.

State of Hawaii Lands

The State lands on the island of Oahu include ceded and leased lands, and those that are administered by the Department of Hawaiian Home Lands (DHHL), the Division of State Parks, and the Department of Land and Natural Resources (DLNR). Eighty-six plants are reported from State lands (*Abutilon sandwicense, Alectryon macrococcus, Alsinidendron obovatum, Alsinidendron trinerve, Bonamia menziesii, Cenchrus agrimonioides, Centaurium sebaeoides, Chamaesyce celastroides* var. *kaenana, Chamaesyce deppeana, Chamaesyce herbstii, Chamaesyce kuwaleana, Chamaesyce rockii, Colubrina oppositifolia, Ctenitis squamigera, Cyanea acuminata, Cyanea crispa, Cyanea grimesiana* ssp. *grimesiana, Cyanea grimesiana* ssp. *obatae, Cyanea humboldtiana, Cyanea koolauensis, Cyanea longiflora, Cyanea st.-johnii, Cyanea superba, Cyanea truncata, Cyperus trachysanthos, Cyrtandra dentata, Cyrtandra polyantha, Cyrtandra subumbellata, Cyrtandra viridiflora, Delissea subcordata, Diellia erecta, Diellia falcata, Diellia unisora, Dubautia herbstobatae, Eragrostis fosbergii, Eugenia koolauensis, Euphorbia haeleeleana, Flueggea neowawraea, Gardenia mannii, Gouania meyenii, Gouania vitifolia, Hedyotis degeneri, Hedyotis parvula, Hesperomannia arborescens, Hesperomannia arbuscula, Hibiscus brackenridgei, Isodendrion laurifolium, Isodendrion longifolium, Labordia cyrtandrae, Lepidium arbuscula, Lipochaeta lobata* var. *leptophylla, Lipochaeta tenuifolia, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia monostachya, Lobelia niihauensis, Lobelia oahuensis, Lysimachia filifolia, Marsilea villosa, Melicope lydgatei, Melicope pallida, Myrsine juddii, Neraudia angulata, Nototrichium humile, Peucedanum sandwicense, Phlegmariurus nutans, Phyllostegia hirsuta, Phyllostegia kaalaensis, Phyllostegia parviflora, Plantago princeps, Pteris lydgatei, Sanicula mariversa, Sanicula purpurea, Schiedea hookeri, Schiedea kaalae, Schiedea kealiae, Schiedea nuttallii, Sesbania tomentosa, Silene lanceolata, Spermolepis hawaiiensis, Tetramolopium filiforme, Tetramolopium lepidotum* ssp. *lepidotum, Tetraplasandra gymnocarpa, Trematolobelia singularis, Urera kaalae, Viola chamissoniana* ssp. *chamissoniana, and Viola oahuensi*). DLNR lands on Oahu are made up of Forest Reserves, Game Hunting Units, and Natural Area Reserves (NAR). Within DLNR, DOFAW administers all of these lands.

Many of DLNR's programs provide beneficial effects to endangered species and their habitat. Hawaii DOFAW

management actions on Oahu include fences that have been built to exclude feral ungulates from rare plant sites, propagation and dissemination of native tree species that help restore native plant assemblages around the island, participation in a cooperative watershed management partnership with other Federal and State agencies and private land owners, and administration of programs that either directly or indirectly benefit endangered species and their habitats.

DOFAW has four fenced areas on Oahu for the protection of rare plants. An area of approximately 101 ha (250 ac) is fenced in Pahole Gulch within Pahole NAR for the protection of numerous endangered plant species and the endangered land snail *Achatinella mustelina*. DOFAW is currently seeking funding for an additional large fence within Pahole NAR in adjacent Kapuna Gulch. In addition, DOFAW has constructed three other, small rare plant exclosures for the protection of extant rare plant populations and reintroduction of propagated material (Marie Bruegmann, Service, pers. comm., 2001).

DOFAW's Natural Area Reserves System (NARS) was established in 1970 with the intent to preserve and maintain unique Hawaiian ecosystems and geological features. The island of Oahu has three NARs that encompass a total of 728 ha (1,799 ac). All three of these NARs harbor endangered species and are managed primarily to maintain the native ecosystems that support these species. Management plans have been developed for these NARs and intensive management actions that have occurred in the NARs include construction of feral ungulate exclosure fences around particularly unique plant communities and endangered species; treatment of endangered tree species for invasive alien insects, physical and chemical control of alien plant populations, rat baiting, and feral cat trapping (DLNR 1988a and b, 1990).

The other DOFAW-administered program on the island that has indirect benefits to endangered plant species is the Hawaii Forest Stewardship Program (FSP). Forest Stewardship projects are designed to be implemented over a 1-year period where private landowners are provided funds to establish forestry projects over a 4-year period and maintain these projects over the subsequent 10 years. Projects can be variable in nature and use native and non-native species. A few of these projects that have focused on native forest habitat restoration in areas that harbor endangered plant species have demonstrated success in restoring native forest habitat suitable for the maintenance and recovery of endangered plant species. We believe that private landowners in this program have the potential to contribute to the recovery of endangered plant species. However, no FSP projects have been implemented on Oahu to date (Vickie Caraway, DOFAW, pers. comm., 2001).

Numerous efforts by the State of Hawaii on Oahu contribute to the conservation of listed plant species, including their rare plant management activities and administration of the NARs. However, these programs do not adequately address the threats to the listed plant species on their lands. In addition, there are no comprehensive management plans for the long-term conservation of endangered and threatened plants on these lands, no updated detailed reports on management actions conducted, and no assurances that management actions will be implemented. Therefore, we cannot, at this time, find that management on these State lands is adequate to preclude a proposed designation of critical habitat.

Partnership (Federal-State-Private) Lands

Koolau Mountains Watershed Partnership

Thirty-five species (*Bonamia menziesii, Chamaesyce deppeana, Chamaesyce rockii, Cyanea acuminata, Cyanea crispa, Cyanea grimesiana* ssp. *grimesiana, Cyanea humboldtiana, Cyanea koolauensis, Cyanea st.-johnii, Cyanea truncata, Cyrtandra dentata, Cyrtandra polyantha, Cyrtandra subumbellata, Cyrtandra viridiflora, Diellia erecta, Eugenia koolauensis, Gardenia mannii, Hesperomannia arborescens, Isodendrion longifolium, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia monostachya, Lobelia oahuensis, Lysimachia filifolia, Melicope lydgatei, Myrsine juddii, Phlegmariurus nutans, Phyllostegia hirsuta, Phyllostegia parviflora, Plantago princeps, Pteris lidgatei, Sanicula purpurea, Schiedea kaalae, Tetraplasandra gymnocarpa, Trematolobelia singularis*, and *Viola oahuensis*) are reported from the Koolau Mountains Watershed Management lands owned by State, Federal, and private entities on Oahu (GDSI Database 2001; HINHP Database 2001). In an effort to better protect native biological resources, landowners and other interested parties established a voluntary partnership to cooperatively manage some of the lands within the Koolau Mountains. The partnership cooperative agreement, signed in 1999, indicates the shared interest in the joint management of threats shared by the landowners involved. The partnership is completing a natural resources management plan that will include, feral animal and alien plant control measures, collaborative research projects, and habitat protection and restoration (Craig Rowland, Service, pers. comm., 2001). Because no management plan is developed yet, management has been implemented only in small areas, and there is no long-term commitment of funding, we cannot, at this time, find that management on these lands is adequate to preclude a proposed designation of critical habitat.

Opaeula Watershed Protection Project

The partners in this effort are Kamehameha Schools, the Army, DOFAW, and the Service. The project, located on land owned by Kamehameha Schools in the Koolau Mountains, entails construction of an ungulate exclusion fence and removal of ungulates from within the 61 ha (150 ac) enclosure. The wet summit crest shrubland and forest within the enclosure contains four of the 99 species: *Chamaesyce rockii, Cyrtandra viridiflora, Myrsine juddii*, and *Viola oahuensis* (C. Rowland, pers. comm., 2002). Because there is no management plan and no long-term commitment of funding, we cannot, at this time, find that management on this land is adequate to preclude a proposed designation of critical habitat.

Waianae Mountains Feral Goat Management Group

The Waianae Mountains Feral Goat Management Group is a voluntary group composed of 12 Federal, State, and county agencies and private organizations with the mission of ''* * * working together cooperatively to manage feral goats for the protection of Hawaiian plants, animals, watersheds, and ecosystems.'' The group has developed short-term goals and has ongoing projects regarding feral goat control in the Waianae Mountains, but has no detailed plan and no long-term funding, or jurisdiction other than on the lands of each participating agency or organization. In addition, the group is only addressing one of the many threats to endangered plants in the Waianae Mountains. Therefore, we cannot, at this time, find that management on these lands is adequate to preclude a proposed designation of critical habitat.

Private Lands

Honouliuli Preserve

The Honouliuli Preserve is a 1,494 ha (3,692 ac) preserve managed by TNCH through a long-term lease with the landowner, the Estate of James Campbell. Several rare native plant communities and endangered animals, along with 25 plant species (*Abutilon sandwicense*, *Alectryon macrococcus*, *Cenchrus agrimonioides*, *Chamaescye herbstii*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea grimesiana* ssp. *obatae*, *Delissea subcordata*, *Diellia falcata*, *Diellia unisora*, *Flueggea neowawraea*, *Gardenia mannii*, *Hesperomannia arbuscula*, *Lipochaeta lobata* var. *leptophylla*, *Melicope saint-johnii*, *Neraudia angulata*, *Phyllostegia hirsuta*, *Phyllostegia kaalaensis*, *Phyllostegia mollis*, *Phyllostegia parviflora*, *Plantago princeps*, *Schiedea hookeri*, *Schiedea kaalae*, *Stenogyne kanehoana*, *Tetramolopium lepidotum* ssp. *lepidotum*, and *Urera kaalae*). TNCH has developed a management plan for the preserve that includes ungulate control, rodent control, weed control, fire control, and reintroduction of endangered and other rare plant species (TNCH 1997). Some of the management actions identified have been implemented and have proven beneficial to populations of some species, and a new plan is currently being developed to incorporate more rare plant management and reintroduction actions (TNCH, *in litt.* 2000; Trae Menard, TNCH, pers. comm., 2001). However, these actions do not adequately address the on-going threats to the listed plant species on this land. In addition, there is currently no guarantee of long-term funding for ongoing or future management actions. Therefore, we cannot, at this time, find that management on these private lands is adequate to preclude a proposed designation of critical habitat.

Ihiihilauakea Preserve

TNCH also manages the Ihiihilauakea Preserve on Oahu, through a conservation agreement with the City and County of Hawaii. This preserve harbors one endangered species, *Marsilea villosa*. There is an existing management plan for the site (TNCH 1990), and a new site restoration plan is being developed that will involve turning the preserve over to a local community group for volunteer management. TNCH has conducted periodic weed control efforts at this site, but there is no long-term commitment of funds for adequate management (T. Menard, pers. comm., 2001). Therefore, for these reasons we cannot, at this time, find that management on these lands is adequate to preclude a proposed designation of critical habitat.

If we receive information during the public comment period that any of the lands within the proposed designations are actively managed to promote the conservation and recovery of the 99 listed species at issue in this proposed designation, in accordance with long term conservation management plans or agreements, and there are assurances that the proposed management actions will be implemented and effective, we can consider this information when making a final determination of critical habitat.

In addition, we are aware that other private landowners and the State of Hawaii are considering the development of land management plans or agreements that may promote the conservation and recovery of endangered and threatened plant species on the island of Oahu. We support these efforts and provide technical assistance whenever possible. We are also soliciting comments on whether future development and approval of conservation measures (*e.g.,* Habitat Conservation Plans, Conservation Agreements, Safe Harbor Agreements) should trigger revision of designated critical habitat to exclude such lands and, if so, by what mechanism.

The proposed critical habitat units described below constitute our best assessment of the physical and biological features needed for the conservation of the 99 plant species, and the special management needs of these species, and are based on the best scientific and commercial information available and described above. We put forward this proposal acknowledging that we may have incomplete information regarding many of the primary biological and physical requirements for these species. However, both the Act and the relevant court order requires us to proceed with designation at this time based on the best information available. As new information accrues, we may reevaluate which areas warrant critical habitat designation. We anticipate that comments received through the public review process and from any public hearings, if requested, will provide us with additional information to use in our decision making process and in assessing the potential impacts of designating critical habitat for one or more of these species.

The approximate areas of proposed critical habitat by landownership or jurisdiction are shown in Table 4.

TABLE 4.—APPROXIMATE PROPOSED CRITICAL HABITAT AREA BY UNIT AND LAND OWNERSHIP OR JURISDICTION, HONOLULU COUNTY, OAHU [1].

Unit name	State/local	Private	Federal	Total
Oahu A	5,778 ha (14,278 ac)	1,901 ha (4,698 ac)	824 ha (2,036 ac)	8,503 ha (21,013 ac)
Oahu B	34 ha (83 ac)			34 ha (83 ac)
Oahu C	14 ha (35 ac)			14 ha (35 ac)
Oahu D	110 ha (271 ac)			110 ha (271 ac)
Oahu E	38 ha (94 ac)			38 ha (94 ac)
Oahu F	44 ha (109 ac)		37 ha (91 ac)	81 ha (200 ac)
Oahu G			16 ha (40 ac)	16 ha (40 ac)
Oahu H			28 ha (68 ac)	28 ha (68 ac)
Oahu I	1,138 ha (2,813 ac)	3,056 ha (7,552 ac)	914 ha (2,258 ac)	5,109 ha (12,623 ac)
Oahu J			10 ha (25 ac)	10 ha (25 ac)
Oahu K			7 ha (18 ac)	7 ha (18 ac)
Oahu L	7,938 ha (19,617 ac)	21,170 ha (52,313 ac)	960 ha (2,371 ac)	30,068 ha (74,301 ac)
Oahu M	<1 ha (<1 ac)	99 ha (245 ac)		100 ha (246 ac)
Oahu N	5 ha (12 ac)			5 ha (12 ac)
Oahu O	184 ha (455 ac)	247 ha (611 ac)		431 ha (1,066 ac)
Oahu P	2 ha (3 ac)			2 ha (3 ac)

TABLE 4.—APPROXIMATE PROPOSED CRITICAL HABITAT AREA BY UNIT AND LAND OWNERSHIP OR JURISDICTION, HONOLULU COUNTY, OAHU [1].—Continued

Unit name	State/local	Private	Federal	Total
Oahu Q	1 ha (3 ac)			1 ha (3 ac)
Oahu R	6 ha (15 ac)			6 ha (15 ac)
Oahu S	4 ha (12 ac)			4 ha (12 ac)
Oahu T	4 ha (9 ac)			4 ha (9 ac)
Oahu U	27 ha (67 ac)			27 ha (67 ac)
Oahu V	4 ha (10 ac)			4 ha (10 ac)
Oahu W	339 ha (839 ac)	<1 ha (<1 ac)		340 ha (840 ac)
Oahu X1	117 ha (290 ac)			117 ha (290 ac)
Oahu X2	8 ha (21 ac)			8 ha (21 ac)
Total	15,797 ha (39,037 ac)	26,474 ha (65,420 ac)	2,796 ha (6,907 ac)	45,067 ha (111,364 ac)

[1] Area differences due to digital mapping discrepancies between TMK data (GDSI 2000) and USGS coastline, or differences due to rounding.

Proposed critical habitat includes habitat for 99 species under private, State, and Federal jurisdiction (owned and leased lands), with Federal lands including lands managed by the Department of Defense and the Service. Lands proposed as critical habitat have been divided into 25 units (Oahu A through Oahu X) on the island of Oahu. A brief description of each unit is presented below.

Descriptions of Critical Habitat Units

Oahu A

The proposed unit Oahu A provides occupied habitat for 58 species: *Abutilon sandwicense, Alectryon macrococcus, Alsinidendron obovatum, Alsinidendron trinerve, Bonamia menzeisii, Cenchrus agrimonioides, Centaurium sebaeoides, Chamaesyce celastroides* var. *kaenana, Chamaesyce herbstii, Colubrina oppositifolia, Ctenitis squamigera, Cyanea acuminata, Cyanea grimesiana* ssp. *obatae, Cyanea longiflora, Cyanea superba, Cyperus trachysanthos, Cyrtandra dentata, Delissea subcordata, Diellia falcata, Dubautia herbstobatae, Eragrostis fosbergii, Eugenia koolauensis, Euphorbia haeleeleana, Fluggea neowawraea, Gardenia mannii, Gouania meyenii, Gouania vitifolia, Hedyotis degeneri, Hedyotis parvula, Hesperomannia arborescens, Hesperomannia arbuscula, Hibiscus brackenridgei, Isodendrion laurifolium, Isodendrion longifolium, Labordia cyrtandrae, Lepidium arbuscula, Lipochaeta lobata* var. *leptophylla, Lipochaeta tenuifolia, Lobelia niihauensis, Melicope pallida, Neraudia angulata, Nototrichium humile, Peucedanum sandwicense, Phyllostegia hirsuta, Phyllostegia kaalaensis, Phyllostegia mollis, Plantago princeps, Sanicula mariversa, Schiedea hookeri, Schiedea kaalae, Schiedea kealiae, Schiedea nuttallii, Sesbania tomentosa, Silene lanceolata, Spermolepis hawaiiensis, Tetramolopium filiforme, Urera kaalae,* and *Viola chamissoniana* ssp. *chamissoniana.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Oahu and provides habitat to support one or more of the 8 to 10 populations and 100 mature individuals per population for *Alectryon macrococcus, Colubrina oppositifolia, Flueggea neowawraea, Hesperomannia arborescens, Hesperomannia arbuscula, Melicope pallida, Schiedea nuttallii,* and *Vigna o-wahuensis;* or 300 mature individuals per population for *Abutilon sandwicense, Alsinidendron obovatum, Alsinidendron trinerve, Bonamia menzeisii, Cenchrus agrimonioides, Centaurium sebaeoides, Chamaesyce celastroides* var. *kaenana, Chamaesyce herbstii, Ctenitis squamigera, Cyanea acuminata, Cyanea grimesiana* ssp. *obatae, Cyanea longiflora, Cyanea superba, Cyperus trachysanthos, Cyrtandra dentata, Delissea subcordata, Diellia falcata, Dubautia herbstobatae, Eragrostis fosbergii, Eugenia koolauensis, Euphorbia haeleeleana, Gardenia mannii, Gouania meyenii, Gouania vitifolia, Hedyotis degeneri, Hedyotis parvula, Hibiscus brackenridgei, Isodendrion laurifolium, Isodendrion longifolium, Labordia cyrtandrae, Lepidium arbuscula, Lipochaeta lobata* var. *leptophylla, Lipochaeta tenuifolia, Lobelia niihauensis, Neraudia angulata, Nototrichium humile, Peucedanum sandwicense, Phyllostegia hirsuta, Phyllostegia kaalaensis, Phyllostegia mollis, Plantago princeps, Sanicula mariversa, Schiedea hookeri, Schiedea kaalae, Schiedea kealiae, Sesbania tomentosa, Silene lanceolata, Tetramolopium filiforme, Urera kaalae,* and *Viola chamissoniana* ssp. *chamissoniana;* or 500 mature individuals per population for *Spermolepis hawaiiensis,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for seven species: *Diplazium molokaiense, Isodendrion pyrifolium, Mariscus pennatiformis, Solanum sandwicense, Stenogyne kaneohoana, Tetramolopium lepidotum* ssp. *lepidotum,* and *Vigna o-wahuense.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for these species of 8 to 10 populations and 100 mature individuals per population for *Vigna o-wahuense,* or 300 mature individuals per population for *Diplazium molokaiense, Isodendrion pyrifolium, Mariscus pennatiformis, Solanum sandwicense, Stenogyne kaneohoana,* and *Tetramolopium lepidotum* ssp. *lepidotum,* throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Oahu A).

This unit contains a total of 8,503 ha (21,013 ac) on State (Kuaokala Game Management Area, Kaena Point Natural Area Reserve and State Park, Kaala Natural Area Reserve, Waianae Kai Forest Reserve, Makua Keauu Forest Reserve, Mokuleia Forest Reserve, and Pahole Natural Area Reserve), Federal (Makua Military Reservation, Schofield Barracks Military Reservation, and Dillingham Military Reservation), and private lands. The natural features found in this unit are Kaneana Cave, Manini Pali, Alei Pali, Kauhao Pali, Mahoe Pali, Peacock Flat, Kamaileunu

Ridge, Kaala, Kamaile Heiau summit, Kaupakuhale summit, Puu Pueo, Puu Iki, Puu Pane, Kamaohanui summit, Puu Kamaileunu, Puu Kawiwi, Puu Kepauala, Puu Keaau, Alau Gulch, Haili Gulch, Uluhulu Gulch, and Nihoa Gulch.

The following key should be used for critical habitat units Oahu A through Oahu X tables:

Key:

1. This unit is needed to meet the recovery plan objectives of 8 to 10 viable populations (self perpetuating and sustaining for at least 5 years) with 100 to 500 mature, reproducing individuals per species throughout its historical range as specified in the recovery plans.

2. Island endemic.

3. Multi-island species with current locations on other islands.

4. Multi-island species with no current locations on other islands.

5. Current locations do not necessarily represent viable populations with the required number of mature individuals.

6. Several current locations may be affected by one naturally occurring, catastrophic event.

7. Species with variable habitat requirements, usually over wide areas. Wide ranging species require more space per individual over more land area to provide needed primary constituent elements to maintain healthy population size.

8. Not all currently occupied habitat was determined to be essential to the recovery of the species.

9. Life history, long-lived perennial–100 mature, reproducing individuals per population.

10. Life history, short-lived perennial–300 mature, reproducing individuals per population.

11. Life history, annual–500 mature, reproducing individuals per population.

12. Narrow endemic, the species probably never naturally occurred in more than a single or a few populations.

13. Species has extremely restricted, specific habitat requirements.

14. Hybridization is possible so distinct populations of related species should not overlap, requiring more land area.

BILLING CODE 4310–55–P

Table for Oahu A

Species	Abutilon sandwicense	Alectryon macrococcus	Alsinidendron obovatum	Alsinidendron trinerve	Bonamia menziesii
1. 8–10 pop. guidelines	X	X *	X *	X *	X *
2. Island endemic.	X		X	X	
3. Multi-island/current other islands.		X			X
4. Multi-island/no current other islands.					
5. Non-viable populations.	X	X	X	X	X
6. Several occ. vulnerable to destruction	X	X	X	X	
7. Species with variable habitats.	X	X	X	X	X
8. Not all occupied habitat needed	X	X			X
9. Long-lived perennial–100/pop.		X			
10. Short-livedperennial–300/pop.	X		X	X	X
11. Annual–500/pop.					
12. Narrow endemic.				X	
13. Restricted habitat requirements					
14. Hybridization is possible.	X				
Notes		*Species is wide ranging, each island was probably one large, population.	*Not enough suitable habitat for 8 to 10 pops	*Not enough suitable habitat for 8 to 10 pops	*Species is wide ranging, each island was probably one large, population.

Cenchrus agrimonioides	X *		X		X	X	X		X			*Species is wide ranging, each island was probably one large, population.
Centaurium sebaeoides	X *		X		X	X				X	X**	*Species is wide ranging, each island was probably one large, population. **volcanic or clay soils
Chamaesyce celastroides var. kaenana	X *	X			X	X	X	X	X			*Not enough suitable habitat for 8 to 10 pops
Chamaesyce herbstii	X *	X			X	X	X		X			*Not enough suitable habitat for 8 to 10 pops
Colubrina oppositifolia	X *		X		X	X	X	X				*Species is wide ranging, each island was probably one large, population.
Ctenitis squamigera	X *		X		X	X	X		X			*Species is wide ranging, each island was probably one large, population.
Cyanea acuminata	X	X			X	X	X	X	X			
Cyanea grimesiana ssp. obatae	X	X			X	X	X		X			
Cyanea longiflora	X	X			X	X	X		X			
Cyanea superba	X *	X			X	X	X		X			*Not enough suitable habitat for 8 to 10 pops

Cyperus trachysanthos	X*		X		X					X			X**		*Species is wide ranging, each island was probably one large, population. **wet sites (mud flats, wet clay soil, seasonal ponds, or wet cliff seeps) on coastal cliffs or talus slopes
Cyrtandra dentata	X	X			X	X	X			X				X	
Delissea subcordata	X	X			X	X	X	X		X					
Diellia falcata	X*	X			X	X	X	X		X				X	*Species is wide ranging, each island was probably one large, population.
Diplazium molokaiense	X*		X**		X**					X			X***		*Species is wide ranging, each island was probably one large, population. **Historical on Oahu ***Steep rocky wooded gulch walls in wet forests.
Dubautia herbstobatae	X*	X			X	X	X			X				X	*Not enough suitable habitat for 8 to10 pops.
Eragrostis fosbergii	X*	X			X	X	X			X		X			*Species is wide ranging, each island was probably one large, population.

Eugenia koolauensis	X *			X	X	X	X		X					*Species is wide ranging, each island was probably one large, population.
Euphorbia haeleeleana	X *		X		X	X	X			X				*Species is wide ranging, each island was probably one large, population.
Flueggea neowawraea	X *		X		X	X	X	X	X					*Species is wide ranging, each island was probably one large, population.
Gardenia mannii	X *	X			X	X	X	X		X			X	*Species is wide ranging, each island was probably one large, population.
Gouania meyenii	X		X		X	X	X			X				
Gouania vitifolia	X *		X		X	X	X			X				*Species is wide ranging, each island was probably one large, population.
Hedyotis degeneri	X *	X			X	X				X			X**	*Not enough suitable habitat for 8 to 10 pops **Ridge crests.
Hedyotis parvula	X	X			X	X				X			X*	*On and at the base of cliff faces, rock outcrops, and ledges.
Hesperomannia arborescens	X *		X		X	X	X	X	X					*Species is wide ranging, each island was probably one large, population.

Hesperomannia arbuscula	X*		X		X	X	X		X						*Species is wide ranging, each island was probably one large, population.
Hibiscus brackenridgei	X*		X		X	X	X			X					*Species is wide ranging, each island was probably one large, population.
Isodendrion laurifolium	X		X		X	X	X			X				X	
Isodendrion longifolium	X		X		X	X	X			X				X	
Isodendrion pyrifolium	X		X*		X*		X			X					*Historical on Oahu
Labordia cyrtandrae	X	X			X	X	X			X					
Lepidium arbuscula	X	X			X	X		X		X			X*		*Exposed ridge tops and cliff faces.
Lipochaeta lobata var. leptophylla	X	X			X	X	X			X					
Lipochaeta tenuifolia	X	X			X	X		X		X			X*		*Ridgetops and bluffs.
Lobelia niihauensis	X*		X		X	X		X			X		X**		*Species is wide ranging, each island was probably one large, population. **Exposed mesic or dry cliffs and ledges.
Mariscus pennatiformis	X		X*		X*		X			X					*Historical on Oahu
Melicope pallida	X		X		X	X			X				X*		*Steep rock faces.
Neraudia angulata	X	X			X		X	X		X					

Nototrichium humile	X			X	X	X	X	X		X					
Peucedanum sandwicense	X *		X		X	X	X	X		X					*Species is wide ranging, each island was probably one large, population.
Phyllostegia hirsuta	X	X			X	X	X	X		X				X	
Phyllostegia kaalaensis	X	X			X	X	X			X				X	
Phyllostegia mollis	X		X		X	X	X	X		X				X	
Plantago princeps	X		X		X					X			X*		*Sides of waterfalls and wet rock faces.
Sanicula mariversa	X *	X			X	X	X			X					*Not enough suitable habitat for 8 to 10 pops
Schiedea hookeri	X *			X	X	X	X	X		X					*Not enough suitable habitat for 8 to 10 pops (not done on other island in historic range)
Schiedea kaalae	X	X			X	X	X	X		X					
Schiedea kealiae	X *	X			X	X				X		X	X** *		*Not enough suitable habitat for 8 to 10 pops **Steep slopes and cliff faces and bases in dry remnant Erythrina sandwicensis forest.
Schiedea nuttallii	X		X		X	X	X			X					
Sesbania tomentosa	X *		X		X	X	X	X		X					*Species is wide ranging, each island was probably one large, population.

Silene lanceolata	X		X		X	X				X			X*		*Cliff faces and ledges of gullies in dry to mesic shrubland and cliff communities.
Solanum sandwicense	X		X*										X**		*Historical on Oahu **Talus slopes and in streambeds in open, sunny areas.
Spermolepis hawaiiensis	X*		X		X	X					X		X**		*Species is wide ranging, each island was probably one large, population. **Steep–vertical cliffs or at the base of cliffs and ridges in coastal dry cliff vegetation.
Stenogyne kanehoana	X*	X			X	X	X			X					*Not enough suitable habitat for 8 to 10 pops
Tetramolopium filiforme	X*	X			X	X		X		X				X	*Not enough suitable habitat for 8 to 10 pops
Tetramolopium lepidotum ssp. lepidotum	X*			X	X	X	X	X		X				X	*Not enough suitable habitat for 8 to 10 pops (not done on other island in historic range)
Urera kaalae	X	X			X	X	X			X					

Vigna o–wahuensis	X *		X* *	X **				X		X* **		*Species is wide ranging, each island was probably one large, population. **Historical on Oahu ***Open dry fossil reef, climbing over shrubs and grasses on limestone deposit and on fairly steep slopes.
Viola chamissoniana ssp. chamissoniana	X	X		X	X	X	X		X			

Oahu B

The proposed unit Oahu B provides occupied habitat for three species: *Bonamia menzeisii, Euphorbia haeleeleana,* and *Nototrichium humile.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population for these species throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for four species: *Gouania vitifolia, Hibiscus brackenridgei, Isodendrion pyrifolium,* and *Neraudia angulata.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for these species of 8 to 10 populations and 300 mature individuals per population throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Oahu B).

This unit contains a total of 34 ha (83 ac) on State lands (Kuaokala Forest Reserve and Kaena Point State Park). The natural features found in this unit are the cliffs below Kuaokala Ridge.

Table for Oahu B

Species	Bonamia menziesii	Euphorbia haeleeleana	Gouania vitifolia	Hibiscus brackenridgei	Isodendrion pyrifolium	Neraudia angulata	Nototrichium humile
Notes	*Species is wide ranging, each island was probably one large, population.	*Species is wide ranging, each island was probably one large, population.	*Species is wide ranging, each island was probably one large, population.	*Species is wide ranging, each island was probably one large, population.	*Historical on Oahu		
14. Hybridization is possible.							
13. Restricted habitat requirements							
12. Narrow endemic.							
11. Annual–500/pop.							
10. Short-livedperennial–300/pop.	X	X	X	X	X	X	X
9. Long-lived perennial–100/pop.							
8. Not all occupied habitat needed	X					X	X
7. Species with variable habitats.	X	X	X	X	X	X	X
6. Several occ. vulnerable to destruction		X	X	X			X
5. Non-viable populations.	X	X	X	X	X *	X	X
4. Multi-island/no current other islands.							X
3. Multi-island/current other islands.	X	X	X	X	X*		
2. Island endemic.						X	
1. 8–10 pop. guidelines	X *	X *	X *	X *	X	X	X

Oahu C

The proposed unit Oahu C provides occupied habitat for one species: *Bonamia menzeisii*. It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population for *Bonamia menzeisii,* throughout its known historical range considered by the recovery plan to be necessary for the conservation of this species (see the discussion of conservation requirements in Section D, and in the table for Oahu C).

This unit contains a total of 14 ha (35 ac) on State lands (Kuaokala Forest Reserve and Kuaokala Game Management Area).

Table for Oahu C

Species	Bonamia menziesii
1. 8–10 pop. guidelines	X *
2. Island endemic.	
3. Multi-island/current other islands.	X
4. Multi-island/no current other islands.	
5. Non-viable populations.	X
6. Several occ. vulnerable to destruction	
7. Species with variable habitats.	X
8. Not all occupied habitat needed	X
9. Long-lived perennial–100/pop.	
10. Short-livedperennial–300/pop.	X
11. Annual–500/pop.	
12. Narrow endemic.	
13. Restricted habitat requirements	
14. Hybridization is possible.	
Notes	*Species is wide ranging, each island was probably one large, population.

Oahu D

The proposed unit Oahu D provides occupied habitat for five species: *Bonamia menzeisii, Euphorbia haeleeleana, Neraudia angulata, Nototrichium humile*, and *Schiedea hookeri*. It is proposed for designation because it contains the physical and biological features that are considered

essential for their conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population for these species throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for four species: *Chamesyce celastroides* var. *kaenana*, *Hibiscus brackenridgei, Isodendrion pyrifolium*, and *Gouania vitifolia*. Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for these species of 8 to 10 populations and 300 mature individuals per population for these species throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Oahu D).

This unit contains a total of 110 ha (271 ac) on State (Kuaokala Forest Reserve and Kaena Point State Park) and Federal (Makua Military Reservation) lands. The natural features found in this unit are Kaluakauila Stream and Punapohaku Stream.

Table for Oahu D

Species	Bonamia menziesii	Chamaesyce celastroides var. kaenana	Euphorbia haeleeleana	Gouania vitifolia
1. 8–10 pop. guidelines	X *	X *	X *	X *
2. Island endemic.		X		
3. Multi-island/current other islands.	X		X	X
4. Multi-island/no current other islands.				
5. Non-viable populations.	X	X	X	X
6. Several occ. vulnerable to destruction		X	X	X
7. Species with variable habitats.	X	X	X	X
8. Not all occupied habitat needed	X	X		
9. Long-lived perennial–100/pop.				
10. Short-livedperennial–300/pop.	X	X	X	X
11. Annual–500/pop.				
12. Narrow endemic.				
13. Restricted habitat requirements				
14. Hybridization is possible.				
Notes	*Species is wide ranging, each island was probably one large, population.	*Not enough suitable habitat for 8 to 10 pops	*Species is wide ranging, each island was probably one large, population.	*Species is wide ranging, each island was probably one large, population.

Hibiscus brackenridgei	X *		X		X	X	X		X				*Species is wide ranging, each island was probably one large, population.
Isodendrion pyrifolium	X		X*		X *		X		X				*Historical on Oahu
Neraudia angulata	X	X			X		X	X		X			
Nototrichium humile	X			X	X	X	X	X	X				
Schiedea hookeri	X *			X	X	X	X	X	X				*Not enough suitable habitat for 8 to 10 pops (not done on other island in historic range)

Oahu E

The proposed unit Oahu E provides occupied habitat for one species: *Chamaesyce kuwaleana*. It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population, throughout its known historical range considered by the recovery plan to be necessary for the conservation of the species (see the discussion of conservation requirements in Section D, and in the table for Oahu E).

This unit contains a total of 38 ha (94 ac) on State land. The natural features found in this unit are Mauna Kuwale and Paheehee Ridge.

Table for Oahu E

Species	Chamaesyce kuwaleana
1. 8–10 pop. guidelines	X *
2. Island endemic.	X
3. Multi-island/current other islands.	
4. Multi-island/no current other islands.	
5. Non-viable populations.	X
6. Several occ. vulnerable to destruction	X
7. Species with variable habitats.	X
8. Not all occupied habitat needed	
9. Long-lived perennial–100/pop.	
10. Short-livedperennial–300/pop.	X
11. Annual–500/pop.	
12. Narrow endemic.	
13. Restricted habitat requirements	
14. Hybridization is possible.	
Notes	*Not enough suitable habitat for 8 to 10 pops

Oahu F

The proposed unit Oahu F provides occupied habitat for one species: *Chamaesyce kuwaleana*. It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population, throughout its known historical range considered by the recovery plan to be necessary for the conservation of the species. This unit also provides unoccupied habitat for one species: *Isodendrion pyrifolium*. Designation of this unit is essential to the conservation of this species because it contains the physical and biological features that are considered essential for its conservation on Oahu, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for this species of 8 to 10 populations and 300 mature individuals throughout its known historical range (see the discussion of conservation requirements in Section D, and in the table for Oahu F).

This unit contains a total of 81 ha (200 ac) on State (Waianae Kai Forest Reserve) and Federal (Lualualei Naval Magazine) lands. The natural feature found in this unit is Kauaopuu.

Table for Oahu F

Species	Chamaesyce kuwaleana	Isodendrion pyrifolium
1. 8–10 pop. guidelines	X *	X
2. Island endemic.	X	
3. Multi-island/current other islands.		X*
4. Multi-island/no current other islands.		
5. Non-viable populations.	X	X *
6. Several occ. vulnerable to destruction	X	
7. Species with variable habitats.	X	X
8. Not all occupied habitat needed		
9. Long-lived perennial–100/pop.		
10. Short-livedperennial–300/pop.	X	X
11. Annual–500/pop.		
12. Narrow endemic.		
13. Restricted habitat requirements		
14. Hybridization is possible.		
Notes	*Not enough suitable habitat for 8 to 10 pops	*Historical on Oahu

Oahu G

The proposed unit Oahu G provides occupied habitat for two species: *Tetramolopium filiforme* and *Viola chamissoniana* ssp. *chamissoniana*. It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population for these species throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species (see the discussion of conservation requirements in Section D, and in the table for Oahu G).

This unit contains a total of 16 ha (40 ac) on Federal land (Lualualei Naval Magazine and Schofield Barracks Military Reservation). The natural feature found in this unit is Puu Ku Makalii.

Table for Oahu G

Species	Tetramolopium filiforme	Viola chamissoniana ssp. chamissoniana
1. 8–10 pop. guidelines	X *	X
2. Island endemic.	X	X
3. Multi-island/current other islands.		
4. Multi-island/no current other islands.		
5. Non-viable populations.	X	X
6. Several occ. vulnerable to destruction	X	X
7. Species with variable habitats.		X
8. Not all occupied habitat needed	X	X
9. Long-lived perennial–100/pop.		
10. Short-livedperennial–300/pop.	X	X
11. Annual–500/pop.		
12. Narrow endemic.		
13. Restricted habitat requirements		
14. Hybridization is possible.	X	
Notes	*Not enough suitable habitat for 8 to 10 pops	

Oahu H

The proposed unit Oahu H provides occupied habitat for one species: *Chamaesyce kuwaleana*. It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population, throughout its known historical range considered by the recovery plan to be necessary for the conservation of the species (see the discussion of conservation requirements in Section D, and in the table for Oahu H).

This unit contains a total of 28 ha (68 ac) on Federal land (Lualualei Naval Magazine). The natural feature found in this unit is Puu Kailio.

Table for Oahu H

Species	Notes
Chamaesyce kuwaleana	1. 8–10 pop. guidelines X *
	2. Island endemic. X
	3. Multi-island/current other islands.
	4. Multi-island/no current other islands.
	5. Non-viable populations. X
	6. Several occ. vulnerable to destruction X
	7. Species with variable habitats. X
	8. Not all occupied habitat needed
	9. Long-lived perennial–100/pop.
	10. Short-livedperennial–300/pop. X
	11. Annual–500/pop.
	12. Narrow endemic.
	13. Restricted habitat requirements
	14. Hybridization is possible.
	*Not enough suitable habitat for 8 to 10 pops

Oahu I

The proposed unit Oahu I provides occupied habitat for 32 species: *Abutilon sandwicense, Alectryon macrococcus, Bonamia menzeisii, Cenchrus agrimonioides, Chamaesyce herbstii, Cyanea grimesiana* ssp. *obatae, Cyrtandra dentata, Delissea subcordata, Diellia falcata, Diellia unisora, Fluggea neowawraea, Gardenia mannii, Hedyotis parvula, Hesperomannia arbuscula, Lepidium arbuscula, Lipochaeta lobata* var. *leptophylla, Lobelia niihauensis, Melicope saint-johnii, Neraudia angulata, Phyllostegia hirsuta, Phyllostegia kaalaensis, Phyllostegia mollis, Phyllostegia parviflora, Plantago princeps, Sanicula mariversa, Schiedea hookeri, Schiedea kaalae, Schiedea nuttallii, Stenogyne kanehoana, Tetramolopium lepidotum* ssp. *lepidotum, Urera kaalae,* and *Viola chamissoniana* ssp. *chamissoniana.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 100 mature individuals per population for *Alectryon macrococcus, Flueggea neowawraea, Hesperomannia arbuscula, Melicope saint-johnii,* and *Schiedea nuttallii;* or 300 mature individuals per population for *Abutilon sandwicense, Bonamia menzeisii, Cenchrus agrimonioides, Chamaesyce herbstii, Cyanea grimesiana* ssp. *obatae, Cyrtandra dentata, Delissea subcordata, Diellia falcata, Diellia unisora, Gardenia mannii, Hedyotis parvula, Lepidium arbuscula, Lipochaeta lobata* var. *leptophylla, Lobelia niihauensis, Neraudia angulata, Phyllostegia hirsuta, Phyllostegia kaalaensis, Phyllostegia mollis, Phyllostegia parviflora, Plantago princeps, Sanicula mariversa, Schiedea hookeri, Schiedea kaalae, Stenogyne kanehoana, Tetramolopium lepidotum* ssp. *lepidotum, Urera kaalae,* and *Viola chamissoniana* ssp. *chamissoniana,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for 10 species: *Alsinidendron obovatum, Chamaesyce kuwaleana, Cyanea pinnatifida, Gouania meyenii, Hedyotis coriacea, Hibiscus brackenridgei, Isondendrion pyrifolium, Melicope pallida, Silene perlmanii, and Solanum sandwicense.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for these species of 8 to 10 populations and 100 mature individuals per population for *Melicope pallida;* or 300 mature individuals per population for *Alsinidendron obovatum, Chamaesyce kuwaleana, Cyanea pinnatifida, Gouania meyenii, Hedyotis coriacea, Hibiscus brackenridgei, Isondendrion pyrifolium, Silene perlmanii,* and *Solanum sandwicense,* throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Oahu I).

This unit contains a total of 5,109 ha (12,623 ac) on State (Nanakuli Forest Reserve), Federal (Lualualei Naval Magazine and Schofield Barracks Military Reservation), City and County of Honolulu, and private (Honouliuli Preserve) lands. The natural features found in this unit are Pohakea Pass, Akupu, Palehua, Palikea Ridge, Maunauna summit, Palikea summit, Mauna Kapu, Puu Heleakala, Puu Kaua, Puu Hapapa, Puu Kuua, Puu Kanehoa, Puu Manawahua, Puu Poulihale, and Puu Moopuna.

Table for Oahu I

Species					
Abutilon sandwicense	X				
Alectryon macrococcus	X *	X		X	X
Alsinidendron obovatum	X *		X		
Bonamia menziesii	X *	X		X	X
Cenchrus agrimonioides	X *	X		X	X
1. 8–10 pop. guidelines	X				
2. Island endemic.	X		X		
3. Multi-island/current other islands.		X		X	X
4. Multi-island/no current other islands.					
5. Non-viable populations.	X	X	X	X	X
6. Several occ. vulnerable to destruction	X	X	X		X
7. Species with variable habitats.	X	X	X	X	X
8. Not all occupied habitat needed	X	X		X	
9. Long-lived perennial–100/pop.		X			
10. Short-livedperennial–300/pop.	X		X	X	X
11. Annual–500/pop.					
12. Narrow endemic.					
13. Restricted habitat requirements					
14. Hybridization is possible.	X				
Notes		*Species is wide ranging, each island was probably one large, population.	*Not enough suitable habitat for 8 to 10 pops	*Species is wide ranging, each island was probably one large, population.	*Species is wide ranging, each island was probably one large, population.

Chamaesyce herbstii	X *	X			X	X	X			X				*Not enough suitable habitat for 8 to 10 pops
Chamaesyce kuwaleana	X *	X			X	X	X			X				*Not enough suitable habitat for 8 to 10 pops
Cyanea grimesiana ssp. obatae	X	X			X	X	X			X				
Cyanea pinnatifida	X *	X			X **		X			X				*Not enough suitable habitat for 8 to 10 pops **Extirpated in wild but genetic material available
Cyrtandra dentata	X	X			X	X	X			X				X	
Delissea subcordata	X	X			X	X	X	X		X					
Diellia falcata	X *	X			X	X	X	X		X				X	*Species is wide ranging, each island was probably one large, population.
Diellia unisora	X *	X			X	X	X			X				X	*Species is wide ranging, each island was probably one large, population.
Flueggea neowawraea	X *		X		X	X	X	X	X						*Species is wide ranging, each island was probably one large, population.
Gardenia mannii	X *	X			X	X	X	X		X				X	*Species is wide ranging, each island was probably one large, population.
Gouania meyenii	X		X		X	X	X			X					

Hedyotis coriacea	X		X*		X*					X			X**		*Historical on Oahu **Steep, rocky, slopes.
Hedyotis parvula	X	X			X	X				X			X*		*On and at the base of cliff faces, rock outcrops, and ledges.
Hesperomannia arbuscula	X*		X		X	X	X		X						*Species is wide ranging, each island was probably one large, population.
Hibiscus brackenridgei	X*		X		X	X	X			X					*Species is wide ranging, each island was probably one large, population.
Isodendrion pyrifolium	X		X*		X*		X			X					*Historical on Oahu
Lepidium arbuscula	X	X			X	X		X		X			X*		*Exposed ridge tops and cliff faces.
Lipochaeta lobata var. leptophylla	X	X			X	X	X			X					
Lobelia niihauensis	X*		X		X	X		X			X		X**		*Species is wide ranging, each island was probably one large, population. **Exposed mesic or dry cliffs and ledges.
Melicope pallida	X		X		X	X			X				X*		*Steep rock faces.
Melicope saint-johnii	X*	X			X	X	X		X						*Species is wide ranging, each island was probably one large, population.
Neraudia angulata	X	X			X		X	X		X					

Phyllostegia hirsuta	X	X		X	X	X	X					X		
Phyllostegia kaalaensis	X	X		X	X	X		X					X	
Phyllostegia mollis	X		X	X	X	X	X	X					X	
Phyllostegia parviflora	X *			X	X	X		X					X	*Not enough suitable habitat for 8 to 10 pops (not done on other island in historic range)
Plantago princeps	X		X		X			X				X*		*Sides of waterfalls and wet rock faces.
Sanicula mariversa	X *	X			X	X		X						*Not enough suitable habitat for 8 to 10 pops
Schiedea hookeri	X *			X	X	X	X	X						*Not enough suitable habitat for 8 to 10 pops (not done on other island in historic range)
Schiedea kaalae	X	X			X	X	X	X						
Schiedea nuttallii	X		X		X	X		X						
Silene perlmanii	X *	X *			X *			X		X		X* *		*Not enough suitable habitat for 8 to 10 pops **Extirpated but genetic material available. ***Steep rocky slopes.
Solanum sandwicense	X		X*									X* *		*Historical on Oahu **Talus slopes and in streambeds in open, sunny areas.
Stenogyne kanehoana	X *	X			X	X		X						*Not enough suitable habitat for 8 to 10 pops
Tetramolopium lepidotum ssp. lepidotum	X *			X	X	X	X	X					X	*Not enough suitable habitat for 8 to 10 pops (not done on other island in historic range)
Urera kaalae	X	X			X	X		X						
Viola chamissoniana ssp. chamissoniana	X	X			X	X	X	X						

Oahu J

The proposed unit Oahu J provides occupied habitat for one species: *Marsilea villosa.* It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Oahu, and provides habitat to support one or more of the 6 populations throughout its known historical range considered by the recovery plan to be necessary for the conservation of the species (see the discussion of conservation requirements in Section D, and in the table for Oahu J).

This unit contains a total of 10 ha (25 ac) on Federal land (Lualualei Naval Magazine).

Table for Oahu J

Species	Notes
Marsilea villosa	*Recovery goal is 6 populations **Seasonal wetlands in cinder craters, vernal pools surrounded by lowland dry forest vegetation, mud flats, and lowland grasslands.
1. 8–10 pop. guidelines	X *
2. Island endemic.	
3. Multi-island/current other islands.	X
4. Multi-island/no current other islands.	
5. Non-viable populations.	X
6. Several occ. vulnerable to destruction	X
7. Species with variable habitats.	
8. Not all occupied habitat needed	
9. Long-lived perennial–100/pop.	
10. Short-livedperennial–300/pop.	
11. Annual–500/pop.	X
12. Narrow endemic.	
13. Restricted habitat requirements	X**
14. Hybridization is possible.	

Oahu K

The proposed unit Oahu K provides occupied habitat for one species: *Marsilea villosa.* It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Oahu, and provides habitat to support one or more of the 6 populations throughout its known historical range considered by the recovery plan to be necessary for the conservation of the species (see the discussion of conservation requirements in Section D, and in the table for Oahu K).

This unit contains a total of 7 ha (18 ac) on Federal land (Lualualei Naval Magazine).

Table for Oahu K

Species	Notes
Marsilea villosa	*Recovery goal is 6 populations. **Seasonal wetlands in cinder craters, vernal pools surrounded by lowland dry forest vegetation, mud flats, and lowland grasslands.
1. 8–10 pop. guidelines	X *
2. Island endemic.	
3. Multi-island/current other islands.	X
4. Multi-island/no current other islands.	
5. Non-viable populations.	X
6. Several occ. vulnerable to destruction	X
7. Species with variable habitats.	
8. Not all occupied habitat needed	
9. Long-lived perennial–100/pop.	
10. Short-livedperennial–300/pop.	
11. Annual–500/pop.	X
12. Narrow endemic.	
13. Restricted habitat requirements	X**
14. Hybridization is possible.	

BILLING CODE 4310–55–C

Oahu L

The proposed unit Oahu L provides occupied habitat for 35 species: *Bonamia menzeisii, Chamaesyce deppeana, Chamaesyce rockii, Cyanea acuminata, Cyanea crispa, Cyanea grimesiana* ssp. *grimesiana, Cyanea humbotiana, Cyanea koolauensis, Cyanea st.-johnii, Cyanea truncata, Cyrtandra dentata, Cyrtandra polyantha, Cyrtandra subumbellata, Cyrtandra viridiflora, Diellia erecta, Eugenia koolauensis, Gardenia mannii, Hesperomannia arborescens, Isodendrion longifolium, Labordia cyrtandrae, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia monostachya, Lysimachia filifolia, Melicope lydgatei, Myrsine juddii, Phlegmariurus nutans, Phyllostegia hirsuta, Phyllostegia parviflora, Plantago princeps, Pteris lydgatei, Sanicula purpurea, Schiedea kaalae, Tetraplasandra gymnocarpa, Trematalobelia singularis,* and *Viola oahuensiis.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more of the 8 to 10 populations and 100 mature individuals per population for *Hesperomannia arborescens, Melicope lydgatei,* and *Tetraplasandra gymnocarpa;* or 300 mature individuals per population for *Bonamia menzeisii, Chamaesyce deppeana, Chamaesyce rockii, Cyanea acuminata, Cyanea crispa, Cyanea grimesiana* ssp. *grimesiana, Cyanea humbotiana, Cyanea koolauensis, Cyanea st.-johnii, Cyanea truncata, Cyrtandra dentata, Cyrtandra polyantha, Cyrtandra subumbellata, Cyrtandra viridiflora, Diellia erecta, Eugenia koolauensis, Gardenia mannii, Isodendrion longifolium, Labordia cyrtandrae, Lobelia gaudichaudii* ssp. *koolauensis, Lobelia monostachya, Lysimachia filifolia, Myrsine juddii, Phlegmariurus nutans, Phyllostegia hirsuta, Phyllostegia parviflora, Plantago princeps, Pteris lydgatei, Sanicula purpurea, Schiedea kaalae, Trematalobelia singularis,* and *Viola oahuensiis,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for 10 species: *Adenophorus periens, Chamaesyce celastroides* var. *kaenana, Cyanea longiflora, Cyanea superba, Delissea subcordata, Hedyotis coriacea, Isodendrion laurifolium, Lobelia oahuensis, Platanthera holochila,* and *Solanum sandwicense.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Oahu, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for these species of 8 to 10 populations and 300 mature individuals per population for these species throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Oahu L).

This unit contains a total of 30,068 ha (74,301 ac) on State (Pupukea-Paumalu Forest Reserve, Hauula Forest Reserve, Sacred Falls State Park, Kaipapau Forest Reserve, Kahana Valley State Park, Ewa Forest Reserve, Waiahole Forest Reserve, Kaneohe Forest Reserve, Keaiwa Heiau State Recreation Area, Honolulu Watershed Forest Reserve, Kuliouou Forest Reserve, and Waahila Ridge State Park), Federal (Fort Shafter, Oahu Forest National Wildlife Refuge, Schofield Barracks Military Reservation, Kawailoa Training Area, and Kahuku Training Area), City and County of Honolulu, and private lands. The natural features found in this unit are Nuuanu Pali, Kaau Crater, Waipuhia Falls, Sacred Falls, Manoa Falls, Pauoa Flats, Waahila Ridge, Kulepiamoa Ridge, Mauumae Ridge, Kaumala Ridge, Wiliwilinui Ridge, Waiakeakua Stream, Naniuapo Stream, Waaloa Stream, Luaalaea Stream, Konahuanui summit, Mount Kawela, Kainawaaunui summit, Nanaikaalaea summit, Napuumaia summit, Puu Kaaumakua, Palikea summit, Puu Kainapuaa, Puu Kamana, Puu Kapu, Puu Kawipoo, Puu Keahia Kahoe, Puu Lanihuli, Puu Lanipo, Puu Nukohe, Puu o Kona, Puu Pauao, Puu Peahinaia, Puu Pia, Puu Uau, Puu Kahuauli, Eleao summit, Ulimakoli summit, Mount Olympus, and Laulaupoe Gulch.

BILLING CODE 4310–55–P

Table for Oahu L

Species	Adenophorus periens	Bonamia menziesii	Chamaesyce celastroides var. kaenana	Chamaesyce deppeana
1. 8–10 pop. guidelines	X *	X *	X *	X *
2. Island endemic.			X	X
3. Multi-island/current other islands.	X* *	X		
4. Multi-island/no current other islands.				
5. Non-viable populations.	X **	X	X	X
6. Several occ. vulnerable to destruction			X	X
7. Species with variable habitats.		X	X	X
8. Not all occupied habitat needed		X	X	
9. Long-lived perennial–100/pop.				
10. Short-livedperennial–300/pop.	X	X	X	X
11. Annual–500/pop.				
12. Narrow endemic.				
13. Restricted habitat requirements	X* **			
14. Hybridization is possible.				
Notes	*Species is wide ranging, each island was probably one large, population. **Historical on Oahu ***epiphytically on trees	*Species is wide ranging, each island was probably one large, population.	*Not enough suitable habitat for 8 to 10 pops	*Not enough suitable habitat for 8 to 10 pops

Chamaesyce rockii	X	X			X	X	X	X		X					
Cyanea acuminata	X	X			X	X	X	X		X					
Cyanea crispa	X	X			X	X	X	X		X					
Cyanea grimesiana ssp. grimesiana	X *		X		X	X	X	X		X					*Species is wide ranging, each island was probably one large, population.
Cyanea humboltiana	X	X			X	X	X	X		X					
Cyanea koolauensis	X	X			X	X	X			X					
Cyanea longiflora	X	X			X	X	X			X					
Cyanea st.-johnii	X	X			X	X	X			X					
Cyanea superba	X *	X			X	X	X			X					*Not enough suitable habitat for 8 to 10 pops
Cyanea truncata	X	X			X	X	X			X					
Cyrtandra dentata	X	X			X	X	X			X				X	
Cyrtandra polyantha	X *	X			X	X	X			X				X	*Not enough suitable habitat for 8 to 10 pops
Cyrtandra subumbellata	X *	X			X	X	X			X				X	*Not enough suitable habitat for 8 to 10 pops
Cyrtandra viridiflora	X	X			X	X		X		X			X*	X	*Wind-blown ridge tops in cloud-covered wet forest.
Delissea subcordata	X	X			X	X	X	X		X					

Diellia erecta	X*		X		X	X	X			X				*Species is wide ranging, each island was probably one large, population.
Eugenia koolauensis	X*			X	X	X	X		X					*Species is wide ranging, each island was probably one large, population.
Gardenia mannii	X*	X			X	X	X	X		X			X	*Species is wide ranging, each island was probably one large, population.
Hedyotis coriacea	X		X*		X*					X			X**	*Historical on Oahu **Steep, rocky, slopes.
Hesperomannia arborescens	X*		X		X	X	X	X	X					*Species is wide ranging, each island was probably one large, population.
Isodendrion laurifolium	X		X		X	X	X			X			X	
Isodendrion longifolium	X		X		X	X	X			X			X	
Labordia cyrtandrae	X	X			X	X	X			X				
Lobelia gaudichaudii ssp. koolauensis	X	X			X	X	X			X				
Lobelia monostachya	X	X			X	X			X				X*	*Steep, sparsely vegetated cliffs in mesic shrubland.
Lysimachia filifolia	X		X		X	X				X			X*	*Mossy banks at the base of cliff faces within the spray zone of waterfalls or along streams.

Melicope lydgatei	X*	X			X	X	X	X	X						*Species is wide ranging, each island was probably one large, population.
Myrsine juddii	X	X			X	X	X		X						
Phlegmariurus nutans	X*			X	X	X				X			X**		*Species is wide ranging, each island was probably one large, population. **Tree trunks
Phyllostegia hirsuta	X	X			X	X	X	X		X				X	
Phyllostegia parviflora	X*			X	X	X	X			X				X	*Not enough suitable habitat for 8 to 10 pops (not done on other island in historic range)
Plantago princeps	X		X		X					X			X*		*Sides of waterfalls and wet rock faces.
Platanthera holochila	X		X*		X*		X			X					*Historical on Oahu
Pteris lydgatei	X*		X		X	X				X			X*		*Species is wide ranging, each island was probably one large, population. **Steep stream banks and cliffs.
Sanicula purpurea	X		X		X					X			X*		*Open Metrosideros polymorpha mixed montane bogs and windswept shrublands within the cloud zone.

Schiedea kaalae	X	X		X	X	X	X		X				
Solanum sandwicense	X		X*								X* *		*Historical on Oahu **Talus slopes and in streambeds in open, sunny areas.
Tetraplasandra gymnocarpa	X *	X			X	X	X	X					*Species is wide ranging, each island was probably one large, population.
Trematalobelia singularis	X	X			X				X			X *	
Viola oahuensis	X	X			X	X	X		X				