

**DEPARTMENT OF THE INTERIOR****Fish and Wildlife Service****50 CFR Part 17**

[FWS-R1-ES-2008-0046; MO 9221050083-B2]

RIN 1018-AV48

**Endangered and Threatened Wildlife and Plants; Listing 48 Species on Kauai as Endangered and Designating Critical Habitat****AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Proposed rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), propose to list 48 species on the island of Kauai in the Hawaiian Islands as endangered under the Endangered Species Act of 1973, as amended (Act). We also propose to designate critical habitat for 47 of these species totaling 27,674 acres (ac) (11,199 hectares (ha)). Critical habitat designation is not prudent for one species, *Pritchardia hardyi*, which is threatened by overcollection, vandalism, or other human activity. This proposed rule, if made final, would extend the Act's protections to these species.

**DATES:** We will accept comments received on or before December 22, 2008. We must receive requests for public hearings, in writing, at the address shown in the **FOR FURTHER INFORMATION CONTACT** section by December 5, 2008.

**ADDRESSES:** You may submit comments by one of the following methods:

- Federal eRulemaking Portal: <http://www.regulations.gov>. Follow the instructions for submitting comments.

- U.S. mail or hand-delivery: Public Comments Processing, Attn: FWS-R1-ES-2008-0046; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, Suite 222; Arlington, VA 22203.

We will not accept e-mail or faxes. We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see the "Public Comments" section below for more information).

**FOR FURTHER INFORMATION CONTACT:**

Patrick Leonard, Field Supervisor, Pacific Islands Fish and Wildlife Office, 300 Ala Moana Boulevard, Box 50088, Honolulu, HI 96850; telephone 808-792-9400; facsimile 808-792-9581. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800-877-8339.

**SUPPLEMENTARY INFORMATION:****Public Comments**

We intend that any final action resulting from this proposal will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or suggestions on this proposed rule from the public, other concerned governmental agencies, the scientific community, industry, or any other interested parties. We particularly seek comments concerning:

- (1) Specific information on:
  - The amount and distribution of habitat for the species included in this proposed rule,
  - What areas currently occupied, and that contain features essential for the conservation of the species, we should include in the designation and why, and
  - What areas not currently occupied are essential to the conservation of the species and why.
- (2) Biological, commercial trade, or other relevant data concerning threats (or lack thereof) to these species.
- (3) Additional information concerning the range, distribution, and population sizes of these species, including the locations of any additional populations of these species.

(4) Any information on the biological or ecological requirements of these species. The following information regarding the potential economic and other impacts of the proposed critical habitat designation is requested solely so that we may consider the potential effects of critical habitat designation in the final rule; this information will not be considered in the decision whether to list these 48 species.

(5) Land use designations and current or planned activities in the areas occupied by these species and their possible impacts on these species and proposed critical habitat.

(6) Which areas are appropriate as critical habitat for these species and why they should be proposed for designation as critical habitat.

(7) The reasons why we should or should not designate habitat as "critical habitat" under section 4 of the Act (16 U.S.C. 1531 *et seq.*), including whether the benefit of designation outweighs threats to the species caused by the designation, such that the designation of critical habitat for any particular species is prudent.

(8) Information on whether the draft economic analysis (DEA) identifies all State and local costs and benefits attributable to the proposed critical habitat designation, and information on

any costs or benefits that we have overlooked.

(9) Information on whether the DEA makes appropriate assumptions regarding current practices and any regulatory changes likely if we designate critical habitat.

(10) Information on whether the DEA identifies all costs that could result from the critical habitat designation and whether you agree with the analysis.

(11) Information on whether the DEA correctly assesses the effect on regional costs associated with any land use controls that may result from the critical habitat designation.

(12) Information on areas that the critical habitat designation could potentially impact to a disproportionate degree.

(13) Economic data on the incremental costs of designating any particular area as critical habitat.

(14) Information on any quantifiable economic benefits of the designation of critical habitat.

(15) Whether the benefits of excluding any particular area from critical habitat outweigh the benefits of including that area in critical habitat under section 4(b)(2) of the Act.

(16) Information on economic impacts that have occurred since the previous economic analyses were completed relevant to critical habitat "overlap" areas, or that may occur in the future due to designation of critical habitat (see Economic Analysis, below, for details).

(17) Information on economic impacts relevant to areas where the proposed critical habitat does not overlap with existing critical habitat for other plants on the island of Kauai.

(18) Any foreseeable economic, national security, or other potential impacts resulting from the proposed critical habitat designation and, in particular, any impacts on small entities, and the benefits of including or excluding areas that exhibit these impacts.

(19) Whether we could improve or modify our approach to designating critical habitat in any way to provide for greater public participation and understanding, or to better accommodate public concerns and comments.

You may submit your comments and materials concerning this proposed rule by one of the methods listed in the **ADDRESSES** section. We will not consider comments sent by e-mail or fax or to an address not listed in the **ADDRESSES** section.

If you submit a comment via <http://www.regulations.gov>, your entire comment—including any personal identifying information—will be posted

on the website. If you submit a hardcopy comment that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy comments on <http://www.regulations.gov>.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection at <http://www.regulations.gov>, or by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

You may obtain copies of the proposed rule and draft economic analysis by mail from the Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**) or by visiting the *Federal eRulemaking Portal* at <http://www.regulations.gov>.

## Background

### *An Ecosystem-based Approach*

On the island of Kauai, as on most of the Hawaiian Islands, native species that occur in the same habitat types (ecosystems) depend on many of the same biological features and on the successful functioning of that ecosystem

to survive. We have therefore organized the species addressed in this proposed rule by common ecosystem. Although the listing determination for each species is analyzed separately, we have organized the specific analysis for each species within the context of the broader ecosystem in which it occurs to avoid redundancy. In addition, native species that share ecosystems often face a suite of common factors that may threaten them, and these threat factors require similar management actions to ameliorate or eliminate them. Effective management of these threat factors often requires implementation of conservation actions at the ecosystem scale to enhance or restore critical ecological processes and provide for long-term viability of those species in their native environment. Thus, by taking this approach, we hope to not only organize this proposed rule effectively, but also to more effectively focus conservation management efforts on the common threats that occur across these ecosystems, restore ecosystem function for the recovery of each species, and provide conservation benefits for associated native species, thereby potentially precluding the need to list other species under the Act that occur in these shared ecosystems.

We propose to list each of the 48 species endemic to the island of Kauai addressed in this rule as an endangered

species. These 48 species (45 plants, 2 birds, and 1 picture-wing fly) are found in 6 ecosystem types: lowland mesic, lowland wet, montane mesic, montane wet, dry cliff, and wet cliff (Table 1). Although most of these species are restricted to a single ecosystem, some are found in multiple ecosystems. For each species, we identified and evaluated those factors that threaten the species and that may be common to all of the species at the ecosystem level. For example, the degradation of habitat by feral ungulates is considered a threat to each species within each ecosystem. As a result, this threat factor is considered to be a multiple ecosystem-level threat, as each individual species within each ecosystem faces a threat that is essentially identical in terms of the nature of the impact, its severity, its imminence, and its scope. We further identified and evaluated any threat factors that may be unique to certain species, and do not apply to all species under consideration within the same ecosystem. For example, the threat of avian malaria is unique to the two birds in this proposed rule, and is not applicable to any of the other species proposed for listing. We have identified such threat factors, which apply only to certain species within the ecosystems addressed here, as species-specific threats.

TABLE 1.—THE 48 KAUAI SPECIES AND THE ECOSYSTEMS UPON WHICH THEY DEPEND

Ecosystem	Species
Lowland Mesic	Plants: <i>Canavalia napaliensis</i> , <i>Chamaesyce eleanoriae</i> , <i>Chamaesyce remyi</i> var. <i>remyi</i> , <i>Charpentiera densiflora</i> , <i>Doryopteris angelica</i> , <i>Dubautia kenwoodii</i> , <i>Labordia helleri</i> , <i>Pittosporum napaliense</i> , <i>Platydesma rostrata</i> , <i>Psychotria hobbyi</i> , <i>Tetraplasandra bisattenuata</i>
Lowland Wet	Plants: <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> , <i>Chamaesyce remyi</i> var. <i>remyi</i> , <i>Charpentiera densiflora</i> , <i>Cyanea eleelensis</i> , <i>Cyanea kolekoleensis</i> , <i>Cyanea kuhihewa</i> , <i>Cyrtandra oenobarba</i> , <i>Dubautia imbricata</i> ssp. <i>imbricata</i> , <i>Labordia helleri</i> , <i>Melicope paniculata</i> , <i>Melicope puberula</i> , <i>Phyllostegia renovans</i> , <i>Platydesma rostrata</i> , <i>Pritchardia hardyi</i> , <i>Stenogyne kealiae</i> , <i>Tetraplasandra bisattenuata</i>
Montane Mesic	Plants: <i>Chamaesyce remyi</i> var. <i>remyi</i> , <i>Diellia mannii</i> , <i>Labordia helleri</i> , <i>Myrsine knudsenii</i> , <i>Myrsine mezii</i> , <i>Platydesma rostrata</i> , <i>Psychotria grandiflora</i> , <i>Stenogyne kealiae</i> , <i>Tetraplasandra flynnii</i> Animals: Akekee, <i>Drosophila attigua</i>
Montane Wet	Plants: <i>Astelia waialeale</i> , <i>Chamaesyce remyi</i> var. <i>remyi</i> , <i>Dryopteris crinalis</i> var. <i>podosorus</i> , <i>Dubautia kalalauensis</i> , <i>Dubautia waialeale</i> , <i>Geranium kauaiense</i> , <i>Keysseria erici</i> , <i>Keysseria helenae</i> , <i>Labordia helleri</i> , <i>Labordia pumila</i> , <i>Lysimachia daphnoides</i> , <i>Melicope degeneri</i> , <i>Melicope puberula</i> , <i>Myrsine mezii</i> , <i>Phyllostegia renovans</i> , <i>Platydesma rostrata</i> , <i>Psychotria grandiflora</i> , <i>Tetraplasandra flynnii</i> Animals: Akekee, Akikiki, <i>Drosophila attigua</i>
Dry Cliff	Plants: <i>Chamaesyce eleanoriae</i> , <i>Lysimachia scopulensis</i> , <i>Schiedea attenuata</i> , <i>Stenogyne kealiae</i>
Wet Cliff	Plants: <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> , <i>Chamaesyce remyi</i> var. <i>remyi</i> , <i>Cyanea dolichopoda</i> , <i>Cyrtandra oenobarba</i> , <i>Cyrtandra paliku</i> , <i>Dubautia plantaginea</i> ssp. <i>magnifolia</i> , <i>Lysimachia iniki</i> , <i>Lysimachia pendens</i> , <i>Lysimachia venosa</i> , <i>Platydesma rostrata</i> , <i>Pritchardia hardyi</i>

Under the Act, we are required to designate critical habitat to the maximum extent prudent and determinable concurrently with the

publication of a final determination that a species is endangered or threatened. In this rule, we are proposing to designate critical habitat for 47 of the 48 Kauai

species. We have determined that the designation of critical habitat is not prudent for one species of native palm tree due to the increased threat of

collection that may result from such designation. The designation of critical habitat for the other 47 Kauai species is organized by common ecosystem. Although critical habitat is identified for each species individually, we have found that the conservation of each depends, at least in part, on the successful functioning of the commonly shared ecosystem. Each critical habitat unit identified in this proposed rule therefore contains the physical and biological features essential to the conservation of each species and those areas that are essential for the conservation of each associated species. Where the unit is not occupied by a particular species, we believe it is essential for the conservation of that species. All of the areas proposed for designation would constitute critical habitat for multiple species, based upon their shared habitat requirements. The identification of critical habitat also takes into account any species-specific conservation needs as appropriate. For example, the presence of specific host plants for larval development is essential for the conservation of the picture-wing fly *Drosophila attigua*, but is not a requirement shared by all species within the same ecosystem.

This approach represents a departure from our previous approaches to designating critical habitat for threatened and endangered species in Hawaii, which focused on discrete areas occupied by the species at the time of listing. Because Hawaii has 394 listed species (294 plants), the previous approach to critical habitat designations resulted in an overlapping and confusing patchwork of critical habitat areas that could be confusing to the public to interpret. More importantly, we have learned that many native Hawaiian plants and animals currently occupy areas of marginal habitat because the threats are reduced in those areas, but these species can thrive when reintroduced into historical habitats when threats are being effectively managed. For this reason, we believe it is important to designate unoccupied habitat in those cases where it is essential to the recovery of the species.

We believe the approach adopted in this proposed rule will make critical habitat in Hawaii a more useful conservation tool for land managers. Focusing on the management and restoration of habitat at the ecosystem scale and on ecosystem processes that these species require will result in more effective conservation than a designation based solely on the locations of the last few known individuals. In addition, we believe this approach will aid recovery given the

uncertainties of climate change and other processes that may impact highly localized habitat conditions and essential features in the future. Critical habitat areas for multiple species may also better provide for the recovery of these species by guiding our conservation efforts as well as those of our partners, and by providing better information to the public and other entities about important conservation areas.

### The Island of Kauai

The island of Kauai is the northernmost and oldest of the eight major Hawaiian Islands (Foote *et al.* 1972, p. 3). It was formed about 6 million years ago by a single shield volcano and is 553 square miles (sq mi) (1,430 sq kilometers (km)) in area. The island is characterized by deeply dissected canyons and steep ridges (Department of Geography 1998, p. 151). The large caldera, once the largest in the Hawaiian Islands, now extends about 10 mi (16 km) in diameter and comprises the elevated tableland of the Alakai Swamp (Department of Geography 1998, p. 151). To the west of the Alakai Swamp is the deeply dissected Waimea Canyon, extending 10 mi (16 km) in length and up to 1 mi (1.6 km) in width. Later volcanic activity on the southeastern flank of the volcano formed the smaller Haupu caldera. Subsequent erosion and collapse of its flank formed Haupu Ridge (Macdonald *et al.* 1983, p. 457).

The amount of rainfall on the Hawaiian Islands depends greatly on topography, and the orographic (mountain-caused) effect is revealed by the wide range in the pattern of annual rainfall, from 10 inches (in) to 450 in (25 centimeters (cm) to 1,145 cm) (Giambelluca and Schroeder 1998, p. 59). Variations in the landscape can create microclimates, with large changes in rainfall and wind patterns over very short distances (Wagner *et al.* 1999, p. 43). Mount Waialeale, Kauai's second highest point at 5,148 feet (ft) (1,569 meters (m)) in elevation (Walker 1999, p. 21) is one of the wettest spots on earth, with annual rainfall measured at more than 450 in (1,145 cm) (Department of Geography 1998, p. 151). One of the island's most famous features is the Na Pali Coast, where stream and wave action have cut deep valleys and eroded the land to form precipitous cliffs as high as 3,000 ft (910 m) (Joesting 1984, p. 14).

The current soil classification system for the Hawaiian Islands distinguishes soil types based on their measurable physical and chemical properties, and environmental factors that influenced

their formation. Eleven of the 12 soil types occur in Hawaii (Gavenda *et al.* 1998, p. 96). Hawaii's basaltic rocks decompose to clay and various oxides and hydroxides when exposed to the weather in high rainfall areas. Silica and other elements are leached out, leaving the iron oxides, which are conspicuously red in color, and very evident in the eroded cliffs of Waimea Canyon. These red soils support plant life, and have low fertility and nutrient content (Walker 1999, p. 32). The soils in drier areas lack significant organic material and are characterized by deposits, called caliche, of soluble salts near the soil surface. Caliche may form concretions (solid mass or coalescence) around plant roots and stems (Walker 1999, p. 32).

Because of its age and relative isolation, levels of floristic diversity and endemism are higher on Kauai than on any other island in the Hawaiian archipelago. However, the vegetation of Kauai has undergone extreme alterations because of past and present land use. Land with rich soils was altered by the early Hawaiians and, more recently, converted to agricultural use (Gagne and Cuddihy 1999, p. 45) or pasture. Intentional and inadvertent introduction of alien plant and animal species has also contributed to the reduction in range of the native vegetation on the island of Kauai. (Throughout this rule, the terms "alien," "feral," "nonnative," and "introduced" all refer to species that are not naturally native to the Hawaiian Islands.) Most of the taxa included in this rule persist on steep slopes, precipitous cliffs, valley headwalls, and other regions where unsuitable topography has prevented urbanization and agricultural development, or where inaccessibility has limited encroachment by nonnative plant and animal species.

### Kauai Ecosystems

The six Kauai ecosystems that support the species addressed in this proposed rule are described in the following sections.

#### Lowland Mesic

The lowland mesic ecosystem includes a variety of grasslands, shrublands, and forests, generally below 3,000 ft (1,000 m) elevation, that receive between 50 and 75 in (127 and 191 cm) annual rainfall, or in otherwise mesic substrate conditions (The Nature Conservancy (TNC) 2006b). In the Hawaiian Islands, this ecosystem is found on Hawaii, Maui, Molokai, Lanai, Oahu, and Kauai, on both windward and leeward sides of the islands. On Kauai, this ecosystem is typically found on the western slopes of the island

(Gagne and Cuddihy 1999, p. 75; TNC 2006b). Biological diversity is high in this system (TNC 2006b), and 11 of the 48 species included in this proposed rule are reported from this ecosystem (Hawaii Biodiversity and Mapping Program (HBMP) 2007; TNCH 2007).

#### Lowland Wet

The lowland wet ecological system is generally found below 3,000 ft (1,000 m) elevation on the windward sides of the main Hawaiian Islands, except Kahoolawe and Niihau (Gagne and Cuddihy 1999, p. 85; TNC 2006c). These areas include a variety of wet grasslands, shrublands, and forests that receive greater than 75 in (191 cm) annual precipitation, or are found in otherwise wet substrate conditions (TNC 2006c). On Kauai, this system is best developed in wet valleys and slopes adjacent to the summit plateau of Waialeale and Alakai (TNC 2006c). According to The Nature Conservancy (TNC), biological diversity is high in this system (TNC 2006c), and 16 of the 48 species included in this proposed rule are reported from this ecosystem (HBMP 2007; TNCH 2007).

#### Montane Mesic

A variety of natural communities (e.g., grasslands, shrublands, and forests) are found in the montane mesic ecological system. This system is found between 3,000 and 6,000 ft (1,000 and 2,000 m) elevation in areas receiving 50 to 75 in (127 to 191 cm) of precipitation yearly (TNC 2006e). The montane mesic system is found on the islands of Hawaii, Maui, Molokai, and Kauai. On Kauai, this system is best developed on the west-facing slopes. Biological diversity is ranked as moderate in the montane mesic system, according to TNC (TNC 2006e), and 11 of the 48 species included in this proposed rule are reported from this ecosystem (HBMP 2007; TNCH 2007).

#### Montane Wet

The montane wet ecological system is composed of natural communities (grasslands, shrublands, forests, bogs) found at elevations between 3,000 and 6,000 ft (1,000 and 2,000 m) and in areas where annual precipitation is greater than 75 in (191 cm) (TNC 2006f). This system is found on all of the main Hawaiian Islands except Niihau and Kahoolawe (TNC 2006f). On Kauai it is best developed in the summit plateau of Waialeale and Alakai. In this system, biological diversity is moderate to high (TNC 2006f), and 21 of the 48 species included in this proposed rule are reported from this ecosystem (HBMP 2007; TNCH 2007).

#### Dry Cliff

The dry cliff ecological system is composed of vegetation communities

occupying steep slopes (greater than 65 degrees) in areas that receive less than 75 in (191 cm) of rainfall annually, or in otherwise dry substrate conditions (TNC 2006a). This system is found on all of the main Hawaiian Islands except Niihau, and on the island of Kauai is best developed in the leeward canyons. A variety of grasslands and shrublands occur within this system (TNC 2006a). Biological diversity is low to moderate in this system (TNC 2006a), and 4 of the 48 species included in this proposed rule are reported from this ecosystem (Hawaii Biodiversity and Mapping Program (HBMP) 2007; TNCH 2007).

#### Wet Cliff

The wet cliff ecological system is generally composed of grasslands and shrublands on near-vertical slopes (greater than 65 degrees) in areas that receive more than 75 in (191 cm) of annual precipitation, or that are in otherwise wet substrate conditions (TNC 2006d). This system is found on the islands of Hawaii, Maui, Molokai, Lanai, Oahu, and Kauai. On Kauai, this system is typically found on the windward cliffs adjacent to Waialeale (TNC 2006d). Biological diversity is low to moderate in this system (TNC 2006d), and 11 of the 48 species included in this proposed rule are reported from this ecosystem (HBMP 2007; TNCH 2007).

### Description of the 48 Species

Here we provide a brief description of each of the 48 species proposed for listing, presented in alphabetical order by genus; plants are presented first, followed by animals.

#### Plants

*Astelia waialealae* (painiu), an herb in the Asteliaceae family, occurs in bogs and on bog hummocks (low mounds or ridges of vegetation) dominated by *Metrosideros polymorpha* (ohia) in the montane wet ecosystem at elevations between 4,000 and 5,000 ft (1,220 and 1,525 m) (Wagner *et al.* 1999, p. 1,461; TNCH 2007). *A. waialealae* was known historically from five locations in the Alakai Swamp region of Kauai (Wagner *et al.* 1999, p. 1,461; HBMP 2007). Between October and December 1994, botanists from the National Tropical Botanical Garden (NTBG) and the U.S. Fish and Wildlife Service (Service) undertook a systematic survey of bogs on the island of Kauai, revisiting all of the historically known locations of *A. waialealae*, as well as 16 additional bogs. At that time, *A. waialealae* was confirmed to exist in three bogs. One bog, known as Sincok Bog 1, contained three *Astelia* clumps with 3 individuals in one, 5 in another, and possibly 10 in the third, for a total of 18 individuals.

Sincok Bog 2 contained two clumps, with one individual in each, and Waikoali Bog, or Circle Bog, contained two clumps with one individual in each (Perlman and Wood 1995, pp. 9-11). In 1996 and 1997, both Sincok Bog 1 and Sincok Bog 2 were fenced, followed by Circle bog in 1998. Regular monitoring of these bogs commenced, and with protection from the fences, there was an increase in numbers of clumps and individuals of *A. waialealae* found in all three bogs. By 2001, the numbers of clumps (and individuals) reached their peaks of 5 clumps (9 individuals) for Circle bog, 6 clumps (36 individuals) for Sincok Bog 1, and 2 clumps (7 individuals) for Sincok Bog 2. By 2003, numbers of individuals began dropping dramatically, with visible signs of poor health for those remaining (USFWS Kauai monitoring database 2008). Some individuals were removed at that point for preservation in local propagation facilities. Between December 2005 and January 2006, NTBG conducted botanical research around the summit bog region of Waialeale and located one clump of *A. waialealae* consisting of three individual plants. With the discovery of these three plants, the current total of *A. waialealae* is believed to be 27 individuals, possibly representing only 13 genetically distinct plants (Service 2005a; Wood 2006, pp. 8-9; USFWS Kauai monitoring database 2008).

*Canavalia napaliensis* (awikiwiki), a climbing plant in the pea family (Fabaceae), occurs in open sites, on talus slopes, and on gulch bottoms in mesic forest in the lowland mesic ecosystem, at elevations between 20 and 1,900 ft (6 and 579 m) (Wagner and Herbst 1999, p. 654; TNCH 2007). *C. napaliensis* was historically known from 12 locations along the northwestern coast of the island of Kauai, extending westward from Haena to Makaha ridge (HBMP 2007). Currently, this species is restricted to a small section of the Na Pali coast from Haena to Kalalau Valley (S. Perlman, pers. comm. 2000; HBMP 2007), in 5 populations totaling approximately 106 to 206 individuals (HBMP 2007). The populations are located in Hoolulu Valley (50 to 100 individuals); Waiahuaka Valley (1 individual); Pohakuao (5 individuals); Kalalau Valley (50 to 100 individuals); and Limahuli Valley (1 individual) (Wagner and Herbst 1999, p. 654; HBMP 2007).

*Chamaesyce eleanoriae* (akoko), a small shrub in the spurge family (Euphorbiaceae), is restricted to steep, north-facing, narrow ridge crests, outcrops, and steep rocky slopes and upper portions of basalt cliffs in the dry

cliff and lowland mesic ecosystems (Lorence and Wagner 1996, p. 68; K. Wood, NTBG, in litt. 2007a; TNCH 2007). Documented habitats include *Metrosideros-Diospyros* (ohia-lama) mesic forest, *Metrosideros* cliff shrubland, *Metrosideros* mesic shrubland, and *Eragrostis variabilis* (kawelu) coastal dry cliffs, at elevations between 885 and 3,499 ft (270 and 1,036 m) (HBMP 2007). *C. eleanoriae* was historically known from 10 populations totaling fewer than 500 individuals (K. Wood, in litt. 2007a; Lorence and Wagner 1996, pp. 68-70). Currently, three populations are known: one at the Kalalau Valley rim between 2,950 and 3,200 ft (900 and 975 m), below and between the two Kalalau lookouts; one at Alealau above Kalalau at 3,100 ft (945 m) elevation; and one at Pohakuao, an isolated hanging valley northeast of Kalalau, at elevations from 886 to 2,592 ft (270 to 790 m). As of the last monitoring visit in 2001, these 3 populations combined totaled fewer than 50 individuals (NTBG 2007).

*Chamaesyce remyi* var. *kauaiensis* (akoko), a shrub in the spurge family (Euphorbiaceae), is found in the lowland wet and wet cliff ecosystems in *Metrosideros polymorpha* wet forest at elevations between 1,900 and 2,297 ft (579 and 700 m) (Koutnik 1999, pp. 613-614; HBMP 2007; TNCH 2007). Little is known about the historical range of this species; however, two collections made on private lands at Kaholuamanao and near Hanapepe Falls in 1916 and 1926, respectively, indicate that its range likely extended south and west from its currently known locations on the island of Kauai (HBMP 2007). Currently, *C. remyi* var. *kauaiensis* is found in Lumahai Valley, Wainiha, Wailua River, the "Blue Hole" at the head of Wailua River in the Lihue-Koloa forest reserve, and at Iliiliula (K. Wood, pers. comm. 2005a; HBMP 2007). Based on surveys conducted from 2000 through 2004, the number of individuals at Lumahai Valley dropped from 50 to only "occasional." The number of individuals at Wailua River dropped from 500 to 200; the number of individuals at the Wainiha population increased from 200 to as many as 700; about 200 are found at "Blue Hole"; and a population of 20 individuals was found in Iliiliula (K. Wood, pers. comm. 2005a; HBMP 2007). The total number of individuals is at least 920 and possibly over 1,000 in the 5 populations.

*Chamaesyce remyi* var. *remyi* (akoko) is a vine-like shrub in the spurge family (Euphorbiaceae) found in the lowland mesic, lowland wet, wet cliff, montane mesic, and montane wet ecosystems in

mesic to wet *Metrosideros polymorpha-Dicranopteris linearis* (ohia-uluhe) forest, at elevations between 1,200 and 4,100 ft (366 and 1,250 m) (Wood 1998; Koutnik 1999, pp. 613-614; HBMP 2007; TNCH 2007). This species is historically known from widely distributed populations on the island of Kauai (HBMP 2007). Currently *C. remyi* var. *remyi* is found in 10 populations totaling a little more than 350 individuals at Pohakupili, Makaleha, Malamamaiki, Limahuli, Lumahai, Limahuli-Hanakapiai, Kalalau-Honopu, Koaie canyon, Wahiawa drainage, and Puu Kolo (Wood 1998; K. Wood, pers. comm. 2005a; HBMP 2007).

*Charpentiera densiflora* (papala) is a tree in the amaranth family (Amaranthaceae) which occurs primarily in the lowland mesic ecosystem, with one record from the lowland wet ecosystem (Wagner *et al.* 1999, p. 190; HBMP 2007; TNCH 2007). This species is found in moist, closed areas, and grows along drainages and in gulches in valleys, primarily in *Diospyros-Metrosideros* (lama-ohia) mixed mesic forest, at elevations between 400 and 2,200 ft (122 and 671 m) (HBMP 2007). Historically, *C. densiflora* was found along the Kalalau trail in the Hoolulu Valley, with limited distribution in three valleys (including Hanakapiai and Hanakoa) along the Na Pali Coast of Kauai (Sohmer 1972, p. 294). Currently, 7 populations are known, totaling approximately 400 individuals, in Hanakapiai, Kalalau, Limahuli, Hoolulu, and Waiahuakua valleys, and in Pohakuao, a hanging valley between Kalalau and Hanakoa (HBMP 2007).

*Cyanea dolichopoda* (haha) is a shrub in the bellflower family (Campanulaceae). It is found in *Metrosideros polymorpha* lowland wet shrubland on a cliff face at approximately 2,300 ft (700 m) elevation within the wet cliff ecosystem (Lammers and Lorence 1993, p. 432; TNCH 2007). The species was first discovered in 1990 in the "Blue Hole" area below Mt. Waialeale, and the plant was last seen in 1992 (Lammers and Lorence 1993, pp. 431-432). However, additional individuals are very likely to be found in the extremely steep habitat with additional surveys (S. Perlman, in litt. 2007).

*Cyanea eleleensis* (haha) is a shrub in the bellflower family (Campanulaceae) and is reported from the lowland wet ecosystem (Lammers 1992, p. 129; TNCH 2007). It was found growing in a shaded gulch in wet forest, surrounded by steep, precipitous cliffs of Pali Elele, at an elevation of 699 ft (213 m) (HBMP 2007; Lammers 1992, p.

129). This species was discovered in Wainiha Valley on the island of Kauai in 1977, in one population noted as "fewer than 10" individuals (Lammers 1992, p. 129; K. Wood, pers. comm. 2000; HBMP 2007). Collections for genetic storage and ex situ propagation were not made at the time of the 1977 discovery. Since its discovery in 1977, subsequent surveys for this species have not been conducted in the original (type) location. Although individuals of this species were not relocated in surveys conducted in August 2001 and June 2002 in areas adjacent to the original location, much of the suitable habitat (*Metrosideros* lowland wet forest) for this species on Kauai has not been surveyed. If surveys are conducted, additional individuals are likely to be found (S. Perlman and K. Wood, pers. comm. 2007).

*Cyanea kolekoleensis* (haha), a shrub in the bellflower family (Campanulaceae), occurs in wet *Metrosideros polymorpha* forest in the lowland wet ecosystem at elevations of 2,125 to 2,500 ft (650 to 765 m) (Lammers 1992, p. 130; HBMP 2007; TNCH 2007). First discovered in 1987 in the Wahiawa drainage, the last known *C. kolekoleensis* was observed in 1992. Seeds were in storage and propagation for this species was attempted, but none survived (M. Clark, NTBG, in litt. 2007; Lyon Arboretum 2007). However, there are many areas within the ecosystem type in the Wahiawa drainage that have not been surveyed for this species, from Mt. Kahili to Kapalaoa and the Hanapepe Valley rim, and species experts are confident that additional individuals will be found (S. Perlman, in litt. 2007).

*Cyanea kuhihewa* (haha), a shrub in the bellflower family (Campanulaceae), is reported from *Metrosideros polymorpha-Dicranopteris linearis* wet forest at an elevation of 1,680 ft (512 m) in the lowland wet ecosystem (Lammers 1996, pp. 238-240; HBMP 2007; TNCH 2007). In a 1994 survey for *C. kuhihewa*, seven individuals were observed, most of which were damaged by a nonnative insect, the two-spotted leafhopper (*Sophonia rufofacia*) (NTBG Provenance Report 1994). In 2001, only one individual plant remained, and was observed dead in 2003 (Wood *et al.* 2002, p. 3; S. Perlman, pers. comm. 2003a). Prior to that time, seeds and tissue were collected for genetic storage and propagation (Wood *et al.* 2002, p. 3; Bender 2006, p. 1; N. Sugii, Lyon Arboretum, pers. comm. 2006; V. Pence, Cincinnati Zoo and Botanical Garden, pers. comm. 2007). This species is still found in cultivation at the Lyon Arboretum and the Cincinnati Zoo,

Center for Conservation and Research of Endangered Wildlife (D. Burney, NTBG, pers. comm. 2006; N. Sugii, pers. comm. 2006a; V. Pence, pers. comm. 2007).

*Cyrtandra oenobarba* (haiwale) is a subshrub (a lowgrowing woody shrub or perennial with a woody base) in the African violet family (Gesneriaceae) that occurs in the lowland wet and wet cliff ecosystems (Wagner *et al.* 1999, pp. 770-771; TNCH 2007). *C. oenobarba* is found on wet slopes, mossy areas, or in rock crevices near waterfalls in *Metrosideros polymorpha-Dicranopteris linearis* wet cliffs, forest and shrubland, at elevations between 1,320 and 2,800 ft (402 and 853 m) (Wood 1998, p. 3; HBMP 2007). Historically, wide-ranging collections were made of *C. oenobarba* on the island of Kauai, from the eastern side at Kekoiki ridge, the northern coast at Haena, the south-central area at Olokele and Hanapepe, and from the south at Haupu (NTBG Provenance Report 1993; HBMP 2007). Currently, populations of *C. oenobarba* in the Halelea Forest Reserve include east Mamalahoa (10 individuals), north Namolokama (15 to 200 individuals), and Hanalei Valley (scattered) on State land, and upper Lumahai Valley (50 individuals) and Wainiha (100 individuals) on private land (HBMP 2007). Populations of *C. oenobarba* in the Lihue-Koloa Forest Reserve include Wailua River (40 to 50 individuals) on State land, and Iliiliula drainage (occasional) and Wahiawa drainage (50 individuals) on private land (HBMP 2007). The 8 populations total 270 to as many as 450 individuals (NTBG Provenance Report 1993; HBMP 2007; Wood 1998, p. 3).

*Cyrtandra paliku* (haiwale) is a subshrub in the African violet family (Gesneriaceae) that occurs on seeping basalt rock faces of north-facing cliffs dominated by *Metrosideros polymorpha* and *Dicranopteris linearis* in the wet cliff ecosystem, at elevations between 2,200 and 2,800 ft (670 to 850 m). *C. paliku* was first discovered in 1993 on the cliffs below Kekoiki, in the Makaleha Mountains of Kauai, where approximately 70 individuals were found (Wagner *et al.* 2001, pp. 150-151; HBMP 2007; TNCH 2007). The species maintained a population of approximately 70 individuals from 1993 through 1999; however, there are currently only 10 known individuals (Perlman, in litt. 2006).

*Diellia mannii* is a fern in the asplenium family (Aspleniaceae). It is found on a northwest-facing slope just above a gulch bottom in what was likely *Acacia koa* (koa)-*Metrosideros polymorpha* dominated montane mesic forest in the past, but which is now a forest dominated by the nonnative

*Corynocarpus laevigatus* (karakanut) in the montane mesic ecosystem, at an elevation of 3,450 ft (1,050 m) (Agurauia and Wood 2003, p. 155; HBMP 2007; TNCH 2007). *D. mannii* was historically known from one location in the Halemanu area of what is now Kokee State Park, in the northwestern region of Kauai. The species was thought to be extinct since the early 1900s, until 2002 when a single individual was rediscovered (Agurauia and Wood 2003, pp. 154-155; Palmer 2003, p. 120). Currently, the species is known only from this one individual in the southeastern branch of Nawaimaka Stream in the Halemanu Mountains of Kokee State Park (HBMP 2007).

*Doryopteris angelica* is a fern in the pteris family (Pteridaceae) found in *Acacia koa* (koa)-*Metrosideros polymorpha* lowland mesic forest in the lowland mesic ecosystem at elevations between roughly 1,900 and 3,000 ft (579 and 914 m) (HBMP 2007; TNCH 2007). Three populations of fewer than 20 individuals were discovered in 1994, and currently the species is known from approximately 29 to 54 individuals in 5 populations at Awaawapuhi (2 to 3 individuals), Mahanaloa (3 to 6 individuals), Makaha (10 to 20 individuals), Kuia (10 to 20 individuals), and Paaiki (4 to 5 individuals) (NTBG 1998; Wagner [W.H.] *et al.* 1999b, p. 147; Wood 1999, 2000, 2007a; Perlman, in litt. 2006; HBMP 2007).

*Dryopteris crinalis* var. *podosorus*, a fern in the dryopteris family (Dryopteridaceae), is known from steep to vertical riparian basalt walls within dark seeping drainages in *Metrosideros polymorpha* montane wet forest within the montane wet ecosystem, from 4,000 to 5,100 ft (1,200 to 1,550 m) in elevation (TNCH 2007; Wood 2007c). Historically, this variety was known from the Kokee area, Kawaikoi, and Waialeale (Palmer 2003, p. 139). Currently, 3 populations totaling 32 to 47 individuals are known. The Mohihi population is made up of 10 to 20 individuals, from 15 to 20 individuals comprise the south Kilohana population, and the Waialeale population is known from 7 individuals (Wood 2007c).

*Dubautia imbricata* ssp. *imbricata* (naenae), a shrub in the sunflower family (Asteraceae), currently occurs in the lowland wet ecosystem, although there are historical records from the montane wet ecosystem as well (Carr 1999, p. 298; TNCH 2007). Occurrence records show that *D. imbricata* ssp. *imbricata* has typically been found in wet *Metrosideros polymorpha* forest and

*Metrosideros*, *Oreobolus* (sedge), *Rhynchospora* (kuolohia) bogs at elevations between approximately 2,165 and 3,640 ft (660 and 1,110 m) (HBMP 2007). Historically and currently, *D. imbricata* ssp. *imbricata* is known only from the Wahiawa Mountains of Kauai (St. John and Carr 1981, pp. 198, 201; Carr 1999, p. 298; HBMP 2007). There are approximately 200 individuals at Wahiawa drainage, approximately 1,000 individuals on both sides of the ridge between Hanapepe and Iole, and an estimate of several hundred individuals at Iliiliula (K. Wood, pers. comm. 2005a; HBMP 2007). These 3 populations total approximately 1,400 individuals (K. Wood, pers. comm. 2005a; HBMP 2007).

*Dubautia kalalauensis* (naenae), a shrub or tree in the sunflower family (Asteraceae), is found in the montane wet ecosystem in *Metrosideros polymorpha* wet forest at elevations between 4,000 and 4,050 ft (1,205 and 1,235 m) (Baldwin and Carr 2005, p. 261; TNCH 2007). Historically, this species, as a part of the species *Dubautia laxa*, was known from several locations below the rim of Kalalau Valley in Kokee State Park in the northwestern region of Kauai. Currently, *D. kalalauensis* is found in only one location along the rim of Kalalau Valley near Puu o Kila Lookout and totals 26 individuals (Baldwin and Carr 2005, p. 261).

*Dubautia kenwoodii* (naenae), a shrub in the sunflower family (Asteraceae), is found in diverse lowland mesic forest in the lowland mesic ecosystem at an elevation of 2,625 ft (800 m) (HBMP 2007; TNCH 2007; Wood 2007b). First described in 1998 as a new species, *D. kenwoodii* is known from one individual found below the western rim of Kalalau Valley, in the northwestern region of Kauai (Carr 1998).

*Dubautia plantaginea* ssp. *magnifolia* (naenae) is a shrub or small tree in the sunflower family (Asteraceae) found in the wet cliff ecosystem (Carr 1999, p. 304; HBMP 2007; TNCH 2007). Typical habitat for this species includes wet cliff and wet forest and shrubland at elevations between 1,542 and 2,395 ft (470 and 730 m) (HBMP 2007). Historically, *D. plantaginea* ssp. *magnifolia* was known from two populations less than 2 mi (3.2 km) apart in bog habitat in the Alakai Wilderness Preserve and the Na Pali-Kona Forest Reserve on Kauai (HBMP 2007). In 1992, the year that Hurricane Iniki struck Kauai, the only known population at "Blue Hole" at the headwaters of the Wailua River of "a couple hundred" individuals was greatly reduced. Currently, there are

approximately 100 individuals in the only known population (Blue Hole) (S. Perlman, pers. comm. 2003b).

*Dubautia waialealae* (naenae) is a dome or tussock-shaped shrub in the sunflower family (Asteraceae) that occurs in bogs in the montane wet ecosystem at elevations between 3,980 and 5,249 ft (1,213 and 1,600 m) (Carr 1999, p. 308; HBMP 2007; TNCH 2007). The type collection was made on the summit of Waialeale in 1909 (Rock 1910, p. 304), but little is known of other historical locations of *D. waialealae* on Kauai. Currently, there is one large population centered on the rain-gauge summit of Waialeale, with many subpopulations radiating about 0.6 mi (1 km) to the north and south. These subpopulations were observed in groups of 7 to 400 individuals (Wood 2006, pp. 25-29), with a total population of 3,000 individuals (Wood 2006, p. 9). In 1994, a single individual of *D. waialealae* was reported at North Bog, 8.5 mi (14 km) away from the population at Waialeale; however, in 2006, it was reported that this individual had died (K. Wood, in litt. 1994a; M. Bruegmann, pers. comm. 2006b; HBMP 2007).

*Geranium kauaiense* (nohoanu) is a decumbent (reclining) subshrub in the geranium family (Geraniaceae) (Wagner *et al.* 1999, p. 733). It occurs in the montane wet ecosystem in *Metrosideros-Rhynchospora* bogs and bog margins at elevations between 4,000 and 4,080 ft (1,219 and 1,463 m) (Wagner *et al.* 1999, p. 733; HBMP 2007; TNCH 2007).

Historically, *G. kauaiense* was known from montane bogs on the island of Kauai, ranging from North Bog to as far south as the summit of Waialeale (HBMP 2007). Currently, there are three subpopulations within a very small range (within 0.5 mi, 0.8 km) in the Halehaha Bogs of the Alakai Wilderness Preserve totaling approximately 140 individuals (K. Wood, in litt. 1994b; S. Perlman, pers. comm. 1999b; Wood 2006, p. 10; HBMP 2007).

*Keysseria erici* is a herb in the sunflower family (Asteraceae) that occurs in *Metrosideros* mixed bogs in the montane wet ecosystem, at elevations between 4,000 and 5,120 ft (1,219 and 1,561 m) (Mill 1999, pp. 329-330; HBMP 2007; TNCH 2007). Little is known of the historical occurrences of *K. erici*. The type was collected by Forbes (1918, p. 306) from the "Alakai swamp, Waimea drainage basin" on Kauai. Currently, this species is found in three to four populations totaling several thousand individuals (HBMP 2007). The populations occur at Namolokama, Hanakapiai-Wainiha

ridge, In-between Bog, and at the Kilohana bogs (including Rain Gauge Bog, T Bog, and Platanthera Bog) (HBMP 2007).

*Keysseria helenae* is an herb in the sunflower family (Asteraceae) and is found in *Metrosideros polymorpha* or mixed sedge and grass bogs at elevations between 3,900 and 5,120 ft (1,189 and 1,561 m) in the montane wet ecosystem (Mill 1999, p. 330; HBMP 2007; TNCH 2007). Little is known of the historical occurrences of *K. helenae*. The type was collected from the "swamp near Kaholuamano" by Forbes (1918, p. 306). Currently, this species is found at Kauluwehi Bog in the Alakai Wilderness Preserve, at Waialeale, and on Kahili-Kawaiikini Ridge, totaling approximately 300 individuals (K. Wood, pers. comm. 2003b; HBMP 2007).

*Labordia helleri* (kamakahala) is a shrub, sometimes climbing, in the logania family (Loganiaceae) (Wagner *et al.* 1999, pp. 856-857). It occurs in *Metrosideros-Acacia-Dicranopteris* mesic to wet forest, at elevations between 1,200 and 3,900 ft (366 and 1,189 m), in the lowland mesic, lowland wet, montane mesic, and montane wet ecosystems (HBMP 2007; TNCH 2007). Historically, *L. helleri* was wide-ranging on Kauai. Collections were made as far south as the Haupu Mountains, through central Kauai to the northwestern coast (HBMP 2007). Currently, there are 10 populations totaling 350 to 550 individuals. The largest population extends from the Na Pali Kona Forest Reserve into Kuia Natural Area Reserve (NAR), and contains 300 to 500 individuals at Honopu, Awaawapuhi, Kuia drainage, and Kalalau-Milolii ridge. Other much smaller populations occur at upper Mahanaloa (10 individuals), Limahuli (recorded as "occasional" in HBMP database), Waioli (1 individual), Kaunuohua ridge (1 individual), Kohua ridge (1 individual), Koaie stream (10 individuals), Kawaiiki (3 individuals), southeast Puu Kolo (recorded as "localized" in HBMP database), and Puu Kolo-Kahuamoia (1 individual) (HBMP 2007).

*Labordia pumila* (kamakahala), a shrub in the logania family (Loganiaceae), occurs in the montane wet ecosystem at elevations between 3,478 and 5,100 ft (1,060 to 1,555 m) in *Metrosideros polymorpha* mixed sedge and grass bogs (Wagner *et al.* 1999, p. 860; HBMP 2007; TNCH 2007). Little is known of the historical locations of *L. pumila* on Kauai. The type specimen was collected by Wawra (1869, 1870) at the summit of Waialeale. Currently, *L. pumila* is found in three populations on the Alakai plateau. The largest population along the Wainiha rim totals

500 individuals (HBMP 2007). There are also about 300 to 400 individuals at the summit of Waialeale, and occasional individuals at Namolokama (Wood 2006, p. 10). The total number of known individuals from all 3 populations is 800 to 900; however, one estimate suggests that the overall population in the summit areas may be as high as 5,000 to 6,000 individuals (Wood 2006, p. 10).

*Lysimachia daphnoides* (lehua makanoe), a member of the myrsine family (Myrsinaceae), is found in *Metrosideros polymorpha* mixed bogs at elevations between 3,960 and 4,440 ft (1,207 and 1,353 m) in the montane wet ecosystem (Marr and Bohm 1997, p. 265; Wagner *et al.* 1999, p. 1,080; HBMP 2007; TNCH 2007). Historically, *L. daphnoides* was known from the more southerly mountains of Kauai, including the Wahiawa drainage and ridges, in what is now the Lihue-Koloa Forest Reserve (HBMP 2007). Currently, this species is found in the Alakai Wilderness Preserve and the Na Pali Kona Forest Reserve, in 3 populations totaling 200 to 300 individuals (HBMP 2007; Service 2005a). The population along the Alakai swamp trail (including Charlie's Bog, Kilohana, south Kilohana, and northwest Kilohana) totals 190 to 280 individuals; the second population includes Sincock Bog 1 and Kauluwehi (21 individuals); and the third population occurs at Waiakoali-Mohihi and Mohihi drainage (7 individuals) (HBMP 2007).

*Lysimachia iniki* is a woody shrub in the myrsine family (Myrsinaceae) that occurs on wet, mossy, or rocky cliffs in the wet cliff ecosystem at 2,400 ft (720 m) (Marr and Bohm 1997, pp. 270-271; TNCH 2007). This species was first described in 1997 from material collected in the "Blue Hole" at the headwaters of the Wailua River on Kauai. At the time it was discovered it was known from 26 individuals, but currently at least 40 individuals are known (Marr and Bohm 1997, pp. 270-271; S. Perlman, in litt. 2006, 2007).

*Lysimachia pendens* is a many-branched shrub in the myrsine family (Myrsinaceae) and is reported from wet, mossy, or rocky cliffs in the wet cliff ecosystem at 2,400 ft (720 m) (Marr and Bohm 1997, p. 275; TNCH 2007). This species was discovered in the "Blue Hole" area of Kauai in 1987 from several small populations totaling approximately 100 individuals (Marr and Bohm 1997, p. 275; Division of Forestry and Wildlife 2005 [Comprehensive Conservation Wildlife Strategy]). Many plants were destroyed by two major landslides that apparently occurred between 1997 and 2003, based

on information taken from field survey reports. Currently, the species is known from only eight individuals (S. Perlman, in litt. 2003, 2006, 2007).

*Lysimachia scopulensis*, a shrub in the myrsine family (Myrsinaceae), is found on cliffs in lowland diverse mesic forest pockets at elevations between 2,950 and 3,200 ft (900 and 975 m) within the dry cliff ecosystem (Wood 2007d; TNCH 2007). First discovered in 1991 in Kalalau Valley, this species is currently known from two populations. The Kalalau population is comprised of approximately 15 individuals and the Puu Kii population is comprised of 10 to 15 individuals, for a total of 25 to 30 individuals (Marr and Bohm 1997, pp. 283-284; Wood 2007d).

*Lysimachia venosa*, a shrub in the myrsine family (Myrsinaceae), occurs in *Metrosideros polymorpha* dominated wet forest areas in the wet cliff ecosystem, at elevations between 3,000 and 5,700 ft (915 and 1,740 m) (Marr and Bohm 1997, p. 284; Wood 2006, p. 11; TNCH 2007). *L. venosa* was known historically from two collections in the early 1900s from the Waialeale summit region of Kauai (Marr and Bohm 1997, p. 284; Wagner *et al.* 1999, p. 1,085; HBMP 2007). In 1991, a broken branch of this species was collected from the headwaters of the Wailua River that had fallen from the cliffs above, possibly from the summit area of Waialeale (Wood 2006, p. 11; Marr and Bohm 1997, p. 284). While no plants were found during surveys of the summit area in 2006, there is still additional habitat to be surveyed, and species experts believe *L. venosa* still exists (S. Perlman, in litt. 2007; Wood 2006, p. 11).

*Melicope degeneri* (alani) is a small shrub or tree in the rue family (Rutaceae) that occurs in the montane wet ecosystem in *Metrosideros-Cheirodendron-Dicranopteris* wet forest between the elevations of 3,000 and 3,800 ft (914 and 1,158 m) (Stone *et al.* 1999, p. 1,186; HBMP 2007; TNCH 2007). *M. degeneri* was thought to be extinct until it was rediscovered in Pohakuao, just beyond the northwest corner of the Hono o Na Pali NAR, in 1993 (Wood 2000, p. 6), and subsequently observed in upper Hanakoa in 1995 and along Koaie Stream in 1999 (NTBG Accession Data 1999). The Pohakuao individual has not been relocated since its discovery (Wood 2000, p. 5). Ten trees were originally documented during the discovery of the Hanakoa population in 1995 (Wood 2000, p. 4; Wood 2007 pp. 4-6). Since 1995, 2 of the trees have died and 3 additional individuals were located, for a current total of 11 individuals (S. Perlman, in litt. 2007c;

N. Tangalin, in litt. 2007a). In addition, 1 small mature tree of *M. degeneri* was found growing in Koaie Canyon's upper drainage in 1999, and was last observed there in September of 2006 (K. Wood, pers. comm. 2007b), bringing the total known number of *M. degeneri* to 12, and possibly 13, known individuals (including the Pohakuao occurrence).

*Melicope paniculata* (alani) is a tree in the rue family (Rutaceae) (Stone *et al.* 1999, p. 1,199). It occurs in the lowland wet ecosystem in forests dominated by *Metrosideros polymorpha*, at elevations between 1,200 and 2,680 ft (365 and 815 m) (Stone *et al.* 1999, p. 1,199; HBMP 2007; TNCH 2007). This species was historically reported from central Kauai (HBMP 2007; Stone *et al.* 1999, p. 1,199). Currently, *M. paniculata* is known from six sites, with five individuals in upper Limahuli Valley, three individuals along the north fork of the Wailua River, five individuals along Koaie Stream, and three individuals on the ridge between Hulua and Kapalaoa. The population in Lumahai Valley is estimated to be approximately 100 to 200 individuals; however Bender (2006, p. 7) estimated that there may be a total of 500 individuals (Wood 1998, p. 4; Stone *et al.* 1999, p. 1,199; Wagner and Herbst 2003, p. 45; HBMP 2007).

*Melicope puberula* (alani) is a shrub or small tree in the rue family (Rutaceae) that occurs in the lowland wet and montane wet ecosystems in wet forest and bogs at elevations ranging between 2,080 and 4,100 ft (634 and 1,250 m) (Stone *et al.* 1999, p. 1,202; HBMP 2007; TNCH 2007). Historically, *M. puberula* was known from the Alakai Swamp on the island of Kauai (St. John 1944b, p. 266). Currently, this species is known from the south rim of Kalalau east to the Alakai-Kilohana plateau area, and north into Hono o Na Pali NAR (HBMP 2007). The Hawaii Biodiversity and Mapping Program delineated these three areas as one population (named the Kalalau-Wainiha population) (HBMP 2007). In 1993, a single individual was observed near Hinalele Falls in the southern portion of the Wainiha Mountain Range (HBMP 2007). The largest population occurs in the Alakai-Kilohana Plateau area with approximately 600 individuals. About 100 individuals are found within the Kalalau area, and approximately 200 individuals occur within the Hono o Na Pali NAR, for a total of approximately 900 individuals (HBMP 2007).

*Myrsine knudsenii* (kolea) is a small tree in the myrsine family (Myrsinaceae). Historically, the species may have been found in lowland mesic and wet ecosystems, but currently it is only known from *Acacia koa*-

*Metrosideros polymorpha-Dicranopteris linearis* mesic forest at elevations between 3,200 and 3,900 ft (975 and 1,200 m) in the montane mesic ecosystem (Wagner *et al.* 1999, p. 941; Wood *et al.* 2002, p. 15; HBMP 2007; TNCH 2007). Historically, *M. knudsenii* was found in Hanapepe Valley in south-central Kauai; Kawaiula Trail in western Kauai; and Awaawapuhi, Kumuwela, Honopu, and Nualolo in the Kokee region of the island of Kauai (Wagner *et al.* 1999, p. 941). Currently, the species is known from 3 populations totaling approximately 30 individuals at Honopu, Awaawapuhi, and Nualolo (S. Perlman, in litt. 2007; Wood *et al.* 2001, p. 10; Wood *et al.* 2002, p. 15; HBMP 2007; Wood 4907 (BISH)).

*Myrsine mezii* (kolea), a small tree in the myrsine family (Myrsinaceae), is found in *Acacia-Metrosideros* forest in the montane mesic and montane wet ecosystems at elevations between 3,380 and 3,480 ft (1,030 and 1,060 m) (Wagner *et al.* 1999, p. 943; HBMP 2007; NTBG Accession Data 9888, 2002; TNCH 2007). *M. mezii* is known from only two locations totaling five individuals, in the Koaie Canyon area of western Kauai (N. Tangalin, in litt. 2007b). Four trees comprise one population at Nawaimaka, and the second known occurrence at Kawaiiki is composed of a single tree in poor condition (N. Tangalin, in litt. 2007b). The population size has not changed in the last 10 years, and historical locations and numbers are unknown.

*Phyllostegia renovans*, a subshrub in the mint family (Lamiaceae), occurs at elevations from 2,700 to 3,700 ft (225 to 1,125 m) in *Metrosideros polymorpha* wet forest in the lowland wet and montane wet ecosystems (HBMP 2007; TNCH 2007). First discovered in 1989 in the headwaters of the Wainiha River, this species is currently known from 4 populations: approximately 30 surviving individuals reintroduced into Limahuli Valley after the last wild individual from that area died, 5 individuals at Wainiha, 10 individuals at Kalalau Valley, and 1 individual in Lumahai Valley (K. Wood, in litt. 1994, p.4; Wagner 1999, p. 275; HBMP 2007).

*Pittosporum napaliense* (hoawa) is a small tree in the pittosporum family (Pittosporaceae) typically found in *Pandanus* and lowland mesic forest in the lowland mesic ecosystem, at elevations between 400 and 2,100 ft (122 and 640 m) (Wagner *et al.* 1999, pp. 1,045-1,047; HBMP 2007; TNCH 2007). Historically, *P. napaliense* was known from northwestern Kauai (Wagner *et al.* 1999, p. 1,047; HBMP 2007). Currently, this species is known from 3 populations; 2 of these are located

within the Hono o Na Pali NAR in Waiahuakua (50 individuals) and Hoolulu valleys (100 individuals), with the third population (10 to 50 individuals) located in upper Kalalau Valley in the Na Pali Coast State Park (HBMP 2007).

*Platydesma rostrata* (pilo kea lau lii) is a shrub in the rue family (Rutaceae). It occurs in the lowland mesic, lowland wet, wet cliff, montane mesic, and montane wet ecosystems, in forest dominated by *Acacia koa* and *Metrosideros polymorpha*, at elevations between 2,500 and 4,000 ft (760 and 1,220 m) (Stone *et al.* 1999, p. 1,210; HBMP 2007; TNCH 2007). *P. rostrata* was historically known from Makaha and Milolii ridge in the Na Pali Kona Forest Reserve, and Kaunuohua ridge and Nualolo trail in Kokee State Park, on the island of Kauai (HBMP 2007). Currently, this species is found in the Na Pali Kona Forest Reserve on the Awaawapuhi and Honopu trails; in Halelea Forest Reserve at Lumahai; in Hono o Na Pali NAR at Pihea; in Kunia NAR on the Nualolo Trail; in Mahanaloa and Kuia valleys; and in the Lihue-Koloa Forest Reserve at Pohakupele, Hulua, Kapalaoa, and Iliiliula Valley (HBMP 2007). These small populations total approximately 100 individuals (HBMP 2007).

*Pritchardia hardyi* (loulou) is a tree in the palm family (Arecaceae) that occurs in the lowland wet and wet cliff ecosystems (Read and Hodel 1999, p. 1,370; TNCH 2007). It is found in *Metrosideros-Dicranopteris* wet forest and shrubland and on windswept windward ridges and headwater drainages, at elevations between 1,800 and 3,400 ft (548 and 1,036 m) (Read and Hodel 1999, p. 1,370; HBMP 2007). Historically, *P. hardyi* was known from a single population totaling about 200 individuals in an area on the southeast (windward) side of Kauai (HBMP 2007). An additional population totaling about 100 individuals was found north of that area (NTBG Provenance Report 040094), bringing the total number of known individuals of *P. hardyi* to approximately 300. Both populations occur almost entirely within the Lihue-Koloa and Halelea Forest Reserves (HBMP 2007).

*Psychotria grandiflora* (kopiko) is a small tree or shrub in the coffee family (Rubiaceae) that occurs in the montane mesic and montane wet ecosystems (K. Wood, in litt. 2007c; TNCH 2007). It is found in *Acacia-Metrosideros* mesic to wet forest between the elevations of 3,400 and 4,100 ft (1,128 and 1,250 m) (HBMP 2007). Historically, this species was known from collections at Waimea, Kokee, and Kalalau, all from the

northwestern area of Kauai (Fosberg 1964, p. 258). Currently, 10 small populations of *Psychotria grandiflora* are found only within Kokee State Park, and are estimated to total between 16 and 30 individuals (Arnold 2007, pp. 1-3; HBMP 2007; S. Perlman, in litt. 2007d; N. Tangalin, in litt. 2007c).

*Psychotria hobydi* (kopiko) is a tree in the coffee family (Rubiaceae) that occurs in lowland *Acacia koa-Metrosideros polymorpha* mesic forest in the lowland mesic ecosystem at elevations between 1,700 and 2,700 ft (520 and 825 m) (Wagner *et al.* 1999, pp. 1,166-1,168; HBMP 2007; TNCH 2007). The first collection of *P. hobydi* was made in Mahanaloa Valley on Kauai in 1970 (St. John 1975, p. 59). Currently, this species is known from 10 populations totaling approximately 120 individuals in the following locations: 1 population of 2 individuals in Kawaiula Valley; 1 population of approximately 5 individuals at the junction of Mahanaloa Valley and Kuia Valley; 3 populations totaling approximately 47 individuals in Mahanaloa Valley; 2 populations of 17 to 22 individuals in Paaiki Valley; 2 populations of approximately 39 individuals in Poopooiki Valley; and 1 population in upper Kalalau Valley of approximately 10 individuals (HBMP 2007).

*Schiedea attenuata*, a shrub in the pink family (Caryophyllaceae), occurs on cliffs at elevations between 2,297 and 2,625 ft (700 and 900 m) in the dry cliff ecosystem (Wagner *et al.* 1994, pp. 187-190; TNCH 2007). *Schiedea attenuata* was discovered in 1991 by K. Wood during a rappel on the cliffs in an area of precipitous slopes above the Kalalau Valley on Kauai. Approximately 20 individuals were last observed there in 1994 (M. Brueggemann, in litt. 1994b; Wagner *et al.* 1994, p. 187).

*Stenogyne kealiae* is a trailing or scandent vine in the mint family (Lamiaceae) (Wagner and Weller 1991, p. 51). It occurs in the dry cliff, lowland wet, and montane mesic ecosystems, in *Metrosideros polymorpha* forest, *M. polymorpha-Acacia koa* forest, and *M. polymorpha-Dicranopteris linearis* shrubland, at elevations between 3,550 and 4,100 ft (1,082 and 1,250 m) (Wagner and Weller 1991, p. 51; TNCH 2007). One population (Wainiha), however, is reported between 2,231 and 2,707 ft (680 and 825 m) elevation (HBMP 2007). Historically, this species occurred at Pohakupili near Kealia in the Kealia Forest Reserve on the island of Kauai. Currently, this species occurs at Honopu, Kalalau, Malamalamaiki, Pohakupili, and Wainiha. The 5 populations of *S. kealiae* total

approximately 100 to 200 individuals (HBMP 2007).

*Tetraplasandra bisattenuata* (ohe ohe) is a tree in the ginseng family (Araliaceae), which occurs in lowland mesic to wet forest and shrubland in the lowland mesic and lowland wet ecosystems at elevations between 1,800 and 2,000 ft (550 and 610 m) (TNCH 2007; Wood 2007f, pp. 1-5). This species is known only from the Haupu and Kahili regions of Kauai. Currently, 35 individuals are found at Mt. Haupu and 2 individuals are at Mt. Kahili (Wood 2007f, p. 1).

*Tetraplasandra flynnii* (ohe ohe) is a tree in the ginseng family (Araliaceae) found in *Metrosideros polymorpha* (ohia) montane mesic to wet forest in the montane mesic and montane wet ecosystems, at elevations between 3,850 and 4,000 ft (1,175 and 1,225 m) (Lowry and Wood 2000, p. 42; HBMP 2007; TNCH 2007). Three individuals of *T. flynnii* were first discovered in 1988, and currently it is only known from those three individuals (Lowry and Wood 2000, pp. 40 and 43; HBMP 2007).

#### A. Animals

The Kauai creeper (*Oreomystis bairdi*), or akikiki, is a small Hawaiian honeycreeper found only on the island of Kauai, currently in the montane wet ecosystem (TNCH 2007). The Hawaiian honeycreepers are in the subfamily Drepanidinae of the finch family, Fringillidae (AOU 1998, p. 676). The akikiki is most common in forests dominated by *Metrosideros polymorpha* with a diverse subcanopy (Scott *et al.* 1986, p. 139). Based on surveys conducted from 1968 through 1973, its distribution was thought to encompass 21,750 ac (88 sq km) at elevations between 1,968 and 5,248 ft (600 and 1,600 m), but a survey in 2000 indicated its distribution had decreased to 8,896 ac (36 sq km) (Scott *et al.* 1986, p. 141; Tweed *et al.* 2005, pp. 3-4). The akikiki generally forages on trunks, branches, and twigs of live and dead trees, and occasionally forages in subcanopy shrubs. It feeds primarily on insects, insect larvae, and spiders gleaned and extracted from bark, lichens, and moss (Foster *et al.* 2000, p. 4). Nests are made of moss, small pieces of bark, bits of lichen, and fine plant fibers (Eddinger 1972, p. 673; Foster *et al.* 2000, p. 7; VanderWerf and Roberts, in press). The akikiki was considered common from high to low elevation in native forests in the late 1800s (Perkins 1903, p. 54), and was described as locally abundant on and near the Alakai Plateau in the early 1960s (Richardson and Bowles 1964, p. 29). From 1968 to 1973, the species was estimated to number 6,832 ± 966 birds

(Sincock *et al.* 1983, p. 53). In 1981, data from the Hawaii Forest Bird Survey indicated there were approximately  $1,650 \pm 450$  akikiki in a 9.7 sq mi (25 sq km) area of the southeastern Alakai, in the vicinity of Sincock's Bog (Scott *et al.* 1986, p. 141). The current population of the akikiki is estimated to be  $1,312 \pm 530$  birds, based on surveys conducted in April and May 2007 (Hawaii Division of Forestry and Wildlife and USGS, unpubl. data 2007). The abundance of the akikiki has thus declined by approximately 80 percent in the last 40 years, and its distribution has been reduced to less than half of its former extent.

The Kauai akepa (*Loxops caeruleirostris*), or akekee, is a small forest bird found only on the island of Kauai. Like the akikiki, the akekee is also a Hawaiian honeycreeper in the subfamily Drepanidinae of the Fringillidae family (AOU 1998, p. 677). The akekee occurs in the montane mesic and montane wet ecosystems in forests dominated by *Metrosideros polymorpha*, *Acacia koa*, *Cheirodendron trigynum*, and *C. platyphyllum* (Lepson and Pratt 1997, p. 4; TNCH 2007). The akekee uses its bill to open flower and leaf buds while foraging for arthropod prey (insects, insect larvae, spiders), and is a specialist on the ohia tree (*M. polymorpha*) (Lepson and Pratt 1997, p. 4). Nests are made of moss and lichen, with the nest lining made of fine grasses and soft bark strips (Eddinger 1972, p. 97; Berger 1981, p. 140; Lepson and Freed 1997, pp. 11-12). Until recently, the population of akekee appeared to be relatively stable, even while other endemic Kauai birds demonstrated sharp declines (Lepson and Pratt 1997, p. 14). The akekee was described as "quite plentiful" (Bryan and Seale 1901, p. 136) and common "over a large part of the high plateau" in the late 1800s (Perkins 1903, p. 417), and probably occurred throughout upper elevation forested regions of the island (Perkins 1903, p. 417). Richardson and Bowles (1964, p. 30) reported that it was fairly common in higher elevation forests. Conant *et al.* (1998, p. 16) reported that the akekee was common in the area around Sincock's Bog in 1975 and observed it daily. The first quantitative information on population size and distribution was based on extensive surveys conducted from 1968 to 1973, which yielded an island-wide population estimate of  $5,066 \pm 840$  birds, with most individuals found in the Alakai Plateau area, west to Kokee, and on Makaleha Mountain and in Wainiha Valley (Sincock *et al.* 1983, p.

53). This was followed by population estimates of  $7,839 \pm 704$  birds in 2000, and  $5,669 \pm 1,003$  birds in 2005 (Hawaii Division of Forest and Wildlife and USGS, unpubl. data 2007). The most recent surveys, conducted in April and May 2007, show the current population of akekee to be  $3,536 \pm 1,030$  birds (Hawaii Division of Forest and Wildlife and USGS, unpubl. data 2007), indicating that the population has dropped to less than half its former size within the last 7 years. The geographic range occupied by the akekee was approximately 34 sq mi (88 sq km) in 1970 (Scott *et al.* 1986, p. 155), which was reported not to have changed in 2000 (Foster *et al.* 2004, p. 721). However the 2007 surveys failed to find the species in many areas where it had previously been observed, indicating that there has likely been a range contraction, although the extent of that contraction is not yet known.

*Drosophila attigua*, a large species of Hawaiian picture-wing fly, occurs in wet forest in the montane mesic and montane wet ecosystems at elevations generally between 3,000 and 3,936 ft (914 and 1,200 m), although it has been found as low as 2,460 ft (750 m). The adult flies are generalist microbivores (microbe eaters) and feed upon a variety of decomposing plant material. The eggs are laid within the decomposing bark of native *Cheirodendron* sp. (olapa) trees (family Araliaceae), where the hatching larvae complete development before dropping to the soil to pupate (Speith 1980, p. 278; Kaneshiro and Kaneshiro 1995, p. 13-14; TNCH 2007). *D. attigua* was historically known from 2 populations on the island of Kauai: one population east of the Alakai massif at Mt. Kahili where 19 males and 13 females were observed (Hardy and Kaneshiro 1969, p. 41; Kaneshiro and Kaneshiro 1995, p. 13; HBMP 2007), and a second population on the western end of the Alakai Swamp in the Na Pali Kona Forest Reserve at Pihea (K. Kaneshiro, pers. comm. 2007). The species was also collected at Mohihi Stream located within the Alakai Wilderness Preserve in 1963, and at the Kokee Stream within Kokee State Park in 1991 (Kaneshiro and Kaneshiro 1995, p. 14). Observations of *D. attigua* at the Pihea site have been somewhat sporadic, as the species has been observed there only three times, once each in 1986, 1987, and most recently in 1991, despite numerous surveys (HBMP 2007; K. Kaneshiro, pers. comm. 2007; K. Magnacca, Wesley College, pers. comm. 2007).

### Previous Federal Action

Thirty-one of the species proposed here for listing are currently candidate species (72 FR 69033, December 6, 2007); candidate species are those taxa for which the Service has sufficient information on their biological status and threats to propose them for listing under the Act, but for which the development of a listing regulation has been precluded to date by other higher priority listing activities. The current candidates addressed in this proposed listing rule include the plants *Astelia waialealae*, *Canavalia napaliensis*, *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea eleeleensis*, *Cyanea kuhihewa*, *Cyrtandra oenobarba*, *Dubautia imbricata* ssp. *imbricata*, *Dubautia plantaginea* ssp. *magnifolia*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia helleri*, *Labordia pumila*, *Lysimachia daphnoides*, *Melicope degeneri*, *Melicope paniculata*, *Melicope puberula*, *Myrsine mezii*, *Pittosporum napaliense*, *Platydesma rostrata*, *Pritchardia hardyi*, *Psychotria grandiflora*, *Psychotria hobdyi*, *Schiedea attenuata*, *Stenogyne kealiae*; the bird, akikiki; and the picture-wing fly, *Drosophila attigua*. The candidate status of all of these species was most recently assessed and reaffirmed in the December 6, 2007, Notice of Review of Native Species that are Candidates or Proposed for Listing as Threatened or Endangered (CNOR) (72 FR 69033).

On May 4, 2004, the Center for Biological Diversity petitioned the Secretary of the Interior to list 225 species of plants and animals, including the 31 candidate species listed above, as endangered or threatened under the provisions of the Act. Since then, we have published our annual findings on the May 4, 2004, petition (including our findings on the 31 candidate species listed above) in the CNOR dated May 11, 2005 (70 FR 24870), September 12, 2006 (71 FR 53756), and December 6, 2007 (72 FR 69033). This proposal constitutes a further response to the 2004 petition.

On October 11, 2007, we received a petition from Dr. Eric VanderWerf and the American Bird Conservancy to list the akikiki and the akekee as endangered or threatened species. According to the petitioners, the akikiki and akekee warrant listing under the Act because they have small populations, occur in small geographic ranges, and are undergoing rapid population and range declines; the two species also face numerous imminent

and significant threats including, but not limited to, habitat loss and degradation by alien plants and nonnative ungulates, diseases spread by alien mosquitoes, predation by alien mammals, and catastrophic events such as hurricanes (VanderWerf and American Bird Conservancy, in litt. 2007). The petitioners also cite the inadequacy of regulatory mechanisms as a threat, noting that as members of the subfamily Drepanidinae (Hawaiian honeycreepers), the akikiki and akekee are not protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712; see 71 FR 50205, August 24, 2006). The akikiki was already a candidate species. This proposal constitutes our response to the October 11, 2007, petition.

In addition to the 31 candidate species and the akekee, we are proposing to list, with critical habitat, the following 16 species of plants endemic to Kauai: *Cyanea kolekoleensis*, *Cyanea dolichopoda*, *Cyrtandra paliku*, *Diellia mannii*, *Doryopteris angelica*, *Dryopteris crinalis* var. *podosorus*, *Dubautia kalalauensis*, *Dubautia kenwoodii*, *Lysimachia iniki*, *Lysimachia pendens*, *Lysimachia scopulensis*, *Lysimachia venosa*, *Myrsine knudsenii*, *Phyllostegia renovans*, *Tetraplasandra bisattenuata*, and *Tetraplasandra flynnii*. These 16 Kauai plant species, as well as 170 others on the Hawaiian Islands, have been identified as the "rarest of the rare" Hawaiian plant species, in need of

immediate conservation, by the members of the multiagency (Federal, State, and private) Plant Extinction Prevention (PEP) program. The goal of this program is to prevent the extinction of plant species with fewer than 50 individuals remaining in the wild on the islands of Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii. The goal of the PEP program is to prevent extinction by establishing a network of multi-island plant propagation sites and storage facilities, and conducting emergency monitoring and genetic sampling of all PEP species (Hawaii Division of Forestry and Wildlife (DOFAW) 2007; Service 2007). The Service has provided significant funding to this program since 2002, through section 6 (Cooperation with the States) of the Act. We believe these 16 plant species warrant listing under the Act for the reasons discussed above ("Description of the 48 Species") and in the "Summary of Factors Affecting the Species" (below), and since these species occur within the same six ecosystems and share common threats with the other 32 species we are addressing in this proposed rule, we have included them here in an effort to provide them with Federal protection in an expeditious manner.

#### **Summary of Factors Affecting the Species**

Section 4 of the Act (16 U.S.C. 1533) and our implementing regulations (50

CFR part 424) set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence. If we determine that the level of threat posed to a species by one or more of the five listing factors is such that the species meets the definition of either endangered or threatened under section 3 of the Act, that species may then be proposed for listing. The Act defines an endangered species as "in danger of extinction throughout all or a significant portion of its range," and a threatened species as "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The threats to each of the individual 48 species are summarized in Table 2, and discussed in detail below. Factor D is not included in the table as no primary threats to the species fell under this category.

TABLE 2.—SUMMARY OF PRIMARY THREATS IDENTIFIED FOR EACH OF THE 48 KAUAI SPECIES

Species	Ecosystem	Factor A								Factor B	Factor C			Factor E	
		Non-native plants	Pigs	Goats	Deer	Fire	Hurricanes	Land-slides or Flooding	Climate Change		Illegal collection	Predation by ungulates	Predation by rats		Predation by non-native invertebrates
<i>Astelia waialealae</i>	MW (bogs only)	X	X				X			X					LN, NR
<i>Canavalia napaliensis</i>	LM	X	X			X				X		X			
<i>Chamaesyce eleanoriae</i>	LM, DC	X	X					L		X					LN
<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	LW, WC	X	X			X		L		X		X			
<i>Chamaesyce remyi</i> var. <i>remyi</i>	LM, LW, MM, MW, WC	X	X	X			X	L		X		X			
<i>Charpentiera densiflora</i>	LM, LW	X		X		X		L, F		X		X			
<i>Cyanea dolichopoda</i>	WC	X					X	L		X					LN
<i>Cyanea eleeeleensis</i>	LW	X	X				X	L		X		X			NW
<i>Cyanea kolekoleensis</i>	LW	X	X				X	F		X		X			NW
<i>Cyanea kuhihewa</i>	LW	X	X				X	L		X		X			NW
<i>Cyrtandra oenobarba</i>	LW, WC	X	X	X			X	L, F		X		X			
<i>Cyrtandra paliku</i>	WC	X					X	L		X					LN
<i>Diellia mannii</i>	MM	X				X		L		X					LN
<i>Doryopteris angelica</i>	LM	X	X	X			X					X			LN
<i>Dryopteris crinalis</i> var. <i>podosorus</i>	MW	X	X				X			X					LN
<i>Dubautia imbricata</i> ssp. <i>imbricata</i>	LW	X	X				X			X					
<i>Dubautia kalalauensis</i>	MW	X					X			X					LN
<i>Dubautia kenwoodii</i>	LM	X	X	X			X	FR		X					FR, LN
<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>	WC	X	X				X	L		X					
<i>Dubautia waialealae</i>	MW (bogs only)	X	X	X			X			X					LN

TABLE 2.—SUMMARY OF PRIMARY THREATS IDENTIFIED FOR EACH OF THE 48 KAUAI SPECIES—Continued

Species	Ecosystem	Factor A										Factor B			Factor C			Factor E
		Non-native plants	Pigs	Goats	Deer	Fire	Hurricanes	Landslides or Flooding	Climate Change	Illegal collection	Predation by ungulates	Predation by rats	Predation by non-native invertebrates	Other species-specific threats				
<i>Geranium kauaiense</i>	MW (bogs only)	X					X			X				X				NR
<i>Keyserria erici</i>	MW (bogs only)	X					X			X								
<i>Keyserria helenae</i>	MW (bogs only)	X					X			X								
<i>Labordia helleri</i>	LM, LW, MM, MW	X	X	X			X			X				X				
<i>Labordia pumila</i>	MW (bogs only)	X					X			X								NR
<i>Lysimachia daphnoides</i>	MW (bogs only)	X	X				X			X				X				NR
<i>Lysimachia iniki</i>	WC	X					X			X	L							LN
<i>Lysimachia pendens</i>	WC	X	X				X			X	L							
<i>Lysimachia scopulensis</i>	DC	X	X	X			X			X	L							LN
<i>Lysimachia venosa</i>	WC	X					X			X	L							NW
<i>Melicope degeneri</i>	MW	X	X	X			X			X							X	LN, NR
<i>Melicope paniculata</i>	LW	X	X	X			X			X	L						X	
<i>Melicope puberula</i>	LW, MW	X	X	X			X			X				X				
<i>Myrsine knudsenii</i>	MM	X	X	X			X			X							X	LN
<i>Myrsine mezii</i>	MM, MW	X	X	X			X			X	L			X				LN
<i>Phyllostegia renovans</i>	LW, MW	X	X	X			X			X	L			X				LN
<i>Pittosporum napallense</i>	LM	X		X			X			X				X				
<i>Platydesma rostrata</i>	LM, LW, MMMW, WC	X	X	X			X			X	L			X			X	
<i>Pritchardia hardyi</i>	LW, WC	X	X	X			X			X				X			X	



*A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range*

The Hawaiian Islands are located over 2,000 mi (3,200 km) from the nearest continent. This isolation has allowed the few plants and animals that arrived in the Hawaiian Islands to evolve into many varied and highly endemic species (species that occur nowhere else in the world). The only native terrestrial mammal on the Hawaiian Islands is a flying mammal, the Hawaiian hoary bat (*Lasurus cinereus semotus*). The native plants and animals of the Hawaiian Islands have therefore evolved in the absence of any mammalian predators, browsers, or grazers; many of the native species have lost defenses against threats such as mammalian predation and competition with aggressive, weedy plant species that are typical of mainland environments (Loope 1992, p. 11; Wagner *et al.* 1999, pp. 3-6, 45). For example, Carlquist (in Carlquist and Cole 1974, p. 29) notes that "Hawaiian plants are notably nonpoisonous, free from armament, and free from many characteristics thought to be deterrents to herbivores (oils, resins, stinging hairs, coarse texture)." In addition, species restricted to highly specialized locations or food sources (e.g., some Hawaiian forest birds and picture-wing flies) are particularly vulnerable to changes (from nonnative species, hurricanes, fire, and climate change) in their habitat (Carlquist and Cole 1974, pp. 28-29; Loope 1992, pp. 3-6; Stone 1992, pp. 88-102).

*Habitat destruction and modification by introduced ungulates*

Introduced mammals have greatly impacted the native vegetation, as well as the native fauna, of the Hawaiian Islands. The first introductions of alien mammals began with pigs, dogs, and rats that arrived with the Polynesians around 400 A.D. (Kirch 1982, p. 3-4). Impacts to the native species and ecosystems of Hawaii accelerated following the arrival of Captain James Cook in 1778. The Cook expedition and subsequent explorers intentionally introduced a European race of pigs or boars and other livestock, such as goats, to serve as food sources for seagoing explorers (USGS 1998, p. 752). The mild climate of the islands, combined with the lack of competitors or predators, has led to the successful establishment of large populations of these introduced mammals, to the detriment of native Hawaiian species and ecosystems. Over the 200 years following the introduction of these animals, the numbers of introduced ungulates has increased, and

the adverse impacts on native vegetation have become increasingly apparent (Mueller-Dombois *et al.* 1981, p. 310). Beyond the direct effects of trampling and consuming native plants, feral ungulates (hoofed mammals) contribute significantly to increased erosion on the islands, and their behavior (i.e., rooting, moving across large expanses) facilitates the spread and establishment of competing, invasive, nonnative plant species. The presence of introduced alien mammals is considered one of the primary factors underlying the alteration and degradation of native vegetation and habitats on the island of Kauai. All six ecosystems and the associated native species that occur in these ecosystems are threatened by the destruction or degradation of habitat due to nonnative ungulates (hoofed mammals), including pigs (*Sus scrofa*), goats (*Capra hircus*), and black-tailed deer (*Odocoileus hemionus*).

Pigs have been described as the most pervasive and disruptive nonnative influence on the unique native forests of the Hawaiian Islands, and are widely recognized as one of the greatest current threats to forest ecosystems in Hawaii (Aplet *et al.* 1991, p. 56; Anderson and Stone 1993, p. 195; Loope 1999, p. 56). European pigs, introduced to Hawaii by Captain James Cook in 1778, hybridized with domesticated Polynesian pigs, became feral, and invaded forested areas, especially wet and mesic forests and dry areas at high elevations. They are currently present on Kauai, Niihau, Oahu, Molokai, Maui, and Hawaii. These introduced pigs are extremely destructive and have both direct and indirect impacts on native plant communities. While rooting in the earth in search of invertebrates and plant material, pigs directly impact native plants by disturbing and destroying vegetative cover, and trampling plants and seedlings. They may also reduce or eliminate plant regeneration by damaging or eating seeds and seedlings (further discussion of predation by nonnative ungulates is under Factor C, below). Pigs are a major vector for the establishment and spread of competing invasive nonnative plant species, by dispersing plant seeds on their hooves and coats as well as through the spread of manure, and by fertilizing the disturbed soil through their feces. Pigs feed preferentially on the fruits of many nonnative plants, such as *Passiflora mollissima* (banana poka) and *Psidium cattleianum* (strawberry guava), spreading the seeds of these invasive species through their feces as they travel in search of food. In addition, rooting pigs contribute to erosion by clearing

vegetation and creating large areas of disturbed soil, especially on slopes (Aplet *et al.* 1991, p. 56; Smith 1985, pp. 190, 192, 196, 200, 204, 230-231; Stone 1985, pp. 254-255, 262-264; Medeiros *et al.* 1986, pp. 27-28; Scott *et al.* 1986, pp. 360-361; Tomich 1986, pp. 120-121; Cuddihy and Stone 1990, pp. 64-65; Loope *et al.* 1991, pp. 1-21; Wagner *et al.* 1999, p. 52). The compacted volcanic soils, wallows, and downed, hollowed-out tree ferns created by feral pig activity hold water and create breeding sites for mosquitoes, which transmit avian disease (Scott *et al.* 1986, pp. 365-368; Atkinson *et al.* 1995, p. S68). Mosquito-borne diseases such as malaria pose a significant threat to native Hawaiian forest birds, including the akikiki and akeke (see Factor C).

Goats native to the Middle East and India were also successfully introduced to the Hawaiian Islands in the late 1700s. Feral goats now occupy a wide variety of habitats on Kauai, where they consume native vegetation, trample roots and seedlings, accelerate erosion, and promote the invasion of alien plants (Stone 1985, p. 48; van Riper and van Riper 1982, pp. 34-35). Goats are able to access and forage in extremely rugged terrain, including nearly vertical cliffs of the Na Pali Coast, and have a high reproductive capacity (Clarke and Cuddihy 1980, pp. C-19, C-20; Culliney 1988, p. 336; Cuddihy and Stone 1990, p. 64); because of these factors, goats are believed to have completely eliminated some plant species from islands (Atkinson and Atkinson 2000, p. 21). Goats can be highly destructive to natural vegetation, and contribute to erosion by: eating young trees and young shoots of plants before they can become established; creating trails that can damage native vegetative cover, destabilize substrate, and create gullies that convey water and exacerbate erosion; and dislodging stones from ledges that can damage vegetation below (C. Phillipson, pers.comm. 2008). The erosion caused by goats on the steep slopes of Kauai contributes to the potential for landslides and also increases the potential for flooding. Large feral herds of goats can cause damage at multiple scales; their climbing ability allows access to the more remote areas of Kauai and their browsing causes habitat degradation that can lead to landslides from erosion.

Black-tailed deer (also known as mule deer) were first introduced to Kauai in 1961 for the purpose of sport hunting. These deer are currently limited to the western side of Kauai, where they feed on a variety of native and alien plants (van Riper and van Riper 1982, p. 42-46). In addition to directly impacting

native plants through browsing, deer likely impact native plants indirectly by serving as a primary vector for the spread of introduced plants. Deer feed on many alien plant species, and likely distribute these plants seeds through their feces as they travel. Black-tailed deer have been noted as a vector of habitat alteration in the Kauai ecosystems (NTBG report 2007a; HBMP 2007), and impact the Kauai plants through predation as well (Factor C).

Each of the six Kauai ecosystems identified in this proposed rule (lowland mesic, lowland wet, montane mesic, montane wet, dry cliff, and wet cliff) and the proposed native species dependent on these habitat types are subject to both the direct and indirect adverse impacts of feral ungulates, which result in the destruction and degradation of habitat for the native Kauai species. The effects of these nonnative animals include the destruction of vegetative cover; trampling of plants and seedlings; direct consumption of native vegetation; soil disturbance; dispersal of alien plant seeds on hooves, coats, and through the spread of seeds in feces; and creation of open disturbed areas conducive to further invasion by nonnative pest plant species. All of these impacts lead to the subsequent conversion of a plant community dominated by native species to one dominated by nonnative species (see Habitat destruction and modification by nonnative plants, below). In addition, because these mammals inhabit terrain that is often steep and remote (Cuddihy and Stone 1990, p. 59), foraging and trampling contributes to severe erosion of watersheds. As early as 1900, there was increasing concern expressed about the integrity of island watersheds leading to establishment of a professional forestry program emphasizing soil and water conservation (Nelson 1989, p. 3).

Habitat destruction and modification by nonnative plants

#### General Ecosystem Impacts

The native vegetation on all of the main Hawaiian Islands has undergone extreme alteration because of past and present land management practices, including ranching, the deliberate introduction of nonnative plants and animals, and agricultural development (Cuddihy and Stone 1990, pp. 27, 58). All of the species being addressed in this proposed rule are threatened by almost 50 taxa of introduced plants that alter their habitat. The original native flora of Hawaii (species that were present before humans arrived) consisted of about 1,000 taxa, 89 percent

of which were endemic (species that occur only on the Hawaiian Islands). Over 800 plant taxa have been introduced from elsewhere, and nearly 100 of these have become pests (e.g., injurious plants) in Hawaii (Smith 1985, p. 180; Gagne and Cuddihy 1999, p. 45; Cuddihy and Stone 1990, p. 73). Some of these plants were brought to Hawaii by various groups of people, including the Polynesians, for food or cultural reasons. Plantation owners (and the territorial government of Hawaii), alarmed at the reduction of water resources for their crops caused by the destruction of native forest cover by grazing feral and domestic animals, introduced nonnative trees for reforestation. Ranchers intentionally introduced pasture grasses and other nonnative plants for agriculture, and sometimes inadvertently introduced weed seeds as well. Other plants were brought to Hawaii for their potential horticultural value (Cuddihy and Stone 1990, p. 73; Scott *et al.* 1986, pp. 361-363).

Nonnative plants adversely impact native Hawaiian habitat, including the 6 Kauai ecosystems and the 48 species identified in this proposed rule, by modifying the availability of light, altering soil-water regimes, modifying nutrient cycling, altering fire characteristics of native plant communities (e.g., successive fires that burn farther and farther into native habitat, destroy native plants, and remove habitat for native species by altering microclimatic conditions to favor alien species), and ultimately converting native dominated plant communities to nonnative plant communities (Cuddihy and Stone, 1990, p. 74; D'Antonio and Vitousek 1992, p. 73; Smith 1985, pp. 180-181; Vitousek *et al.* 1997, p. 6). This directly and indirectly affects the plant and animal species proposed for listing by modifying or destroying their habitat and reducing food sources. Below we have organized by ecosystem a list of nonnative plants followed by a discussion of the specific negative effects of those nonnative plants on the proposed species.

#### Lowland Mesic Ecosystem

The nonnative plant threats to the species inhabiting the lowland mesic ecosystem include the understory and subcanopy species *Blechnum appendiculatum* (no common name, hereafter "NCN"), *Erigeron karvinskianus* (daisy fleabane), *Hedychium gardnerianum* (kahili ginger), *Kalanchoe pinnata* (air plant), *Lantana camara* (lantana), *Melastoma septemnerium* (Indian rhododendron),

*Rubus argutus* (prickly Florida blackberry), *Rubus rosifolius* (thimbleberry), and the canopy species *Psidium cattleianum* (strawberry guava), *P. guajava* (common guava), *Rhodomyrtus tomentosa* (downy or rose myrtle), and *Schinus terebinthifolius* (Christmasberry) (Carr 1998, p. 10; NTBG Accession Database 1999; NTBG Provenance Report 1991; Wood 1998, p. 1; Wood 1999, p. 1; Wood 2005, p. 1; Wood 2007a, p. 1; Wood 2007f, p. 1; HBMP 2007). In addition, there are several nonnative grasses such as *Melinis minutiflora* (molasses grass), *Oplismenus hirtellus* (basketgrass), *Paspalum conjugatum* (Hilo grass), *P. urvillei* (Vasey grass), and *Setaria parviflora* (yellow foxtail) that pose a significant threat to the species dependent on this ecosystem (HBMP 2007).

#### Lowland Wet Ecosystem

The nonnative plant threats to the species inhabiting the lowland wet ecosystem include the understory and subcanopy species *Axonopus fissifolius* (narrow-leaved carpetgrass), *Christella parasitica* (NCN), *Clidemia hirta* (Koster's curse), *Coffea arabica* (Arabian coffee), *Cyperus meyenianus* (NCN), *Erigeron karvinskianus*, *Juncus planifolius* (bog rush), *Lantana camara*, *Melastoma septemnerium*, *Oplismenus hirtellus*, *Pterolepis glomerata* (NCN), *Rubus rosifolius*, *Sacciolepis indica* (glenwood grass), *Setaria parviflora*, and *Sphaeropteris cooperi* (Australian tree fern), and the canopy species *Psidium cattleianum*, *P. guajava*, and *Rhodomyrtus tomentosa* (Hawaii State Comprehensive Wildlife Strategy (HSCWS) 2005; NTBG 2006; Wood 1998, p. 2; Wood 2007f, p. 3; HBMP 2007).

#### Montane Mesic Ecosystem

The nonnative plant threats to the species inhabiting the montane mesic ecosystem include the understory and subcanopy species *Axonopus fissifolius*, *Blechnum appendiculatum*, *Christella parasitica*, *Cyperus meyenianus*, *Ehrharta stipioides* (meadow ricegrass), *Erigeron karvinskianus*, *Hedychium gardnerianum*, *Holcus lanatus* (common velvet grass), *Kalanchoe pinnata*, *Lantana camara*, *Lonicera japonica* (Japanese honeysuckle), *Melastoma septemnerium*, *Paspalum urvillei*, *Passiflora tarminiana* (banana poka), *Rubus argutus*, *R. ellipticus* (yellow Himalayan raspberry), and *R. rosifolius*, and the canopy species *Corynocarpus laevigatus* (karakanut), *Eucalyptus robusta* (swamp mahogany), *Psidium cattleianum*, *Rhodomyrtus tomentosa*,

and *Ricinus communis* (castor bean) (HBMP 2007).

#### Montane Wet Ecosystem

The nonnative plant threats to the species inhabiting the montane wet ecosystem include the understory and subcanopy species *Andropogon glomeratus* (bushy bluestem), *Andropogon virginicus* (broomsedge), *Axonopus fissifolius*, *Clidemia hirta*, *Cyperus meyenianus*, *Erechtites valerianifolia* (fireweed), *Erigeron karvinskianus*, *Hedychium gardnerianum*, *Juncus planifolius*, *Kalanchoe pinnata*, *Lantana camara*, *Paspalum urvillei*, *Passiflora tarminiana*, *Rubus argutus*, *R. ellipticus*, *R. rosifolius*, *Sacciolepis indica*, *Setaria parviflora*, and *Xyris complanata* (yellow-eyed grass), and the canopy species *Morella faya* (firetree) and *Psidium cattleianum* (HBMP 2007).

#### Dry Cliff Ecosystem

The nonnative plant threats to the species inhabiting the dry cliff ecosystem include the understory and subcanopy species *Andropogon glomeratus*, *Erigeron karvinskianus*, *Kalanchoe pinnata*, *Lantana camara*, *Lonicera japonica*, *Passiflora tarminiana*, *Rubus argutus*, and *Verbena litoralis* (vervain) (Wood 2007d; HBMP 2007).

#### Wet Cliff Ecosystem

The nonnative plant threats to the species inhabiting the wet cliff ecosystem include the understory and subcanopy species *Ageratum conyzoides* (maile honohono), *Andropogon glomeratus*, *Blechnum appendiculatum*, *Clidemia hirta*, *Cyperus meyenianus*, *Erigeron karvinskianus*, *Juncus planifolius*, *Kalanchoe pinnata*, *Lonicera japonica*, *Paspalum conjugatum*, *Passiflora edulis* (passion fruit, lilikoi), *P. tarminiana*, *Pluchea carolinensis* (sourbush), *Rubus argutus*, *R. rosifolius*, *Setaria parviflora*, *Sphaeropteris cooperi*, and *Youngia japonica* (oriental hawksbeard), and the canopy species *Buddleja asiatica* (dog tail) and *Psidium cattleianum* (S. Perlman, in litt. 2007; HBMP 2007).

#### Nonnative Species-Specific Impacts

Nonnative plants represent a significant and immediate threat to each of the 48 species being addressed in this proposed rule throughout their ranges by destroying and modifying habitat. They can adversely impact microhabitat by modifying the availability of light, altering soil-water regimes, and modifying nutrient cycling processes. They can also alter fire characteristics of native plant habitat, leading to

incursions of fire-tolerant nonnative plant species into native habitat. Nonnative plants outcompete native plants by growing faster; in addition, they release chemicals that inhibit the growth of other plants. By outcompeting native species, nonnative plants convert native-dominated plant communities to nonnative plant communities (Cuddihy and Stone 1990, p. 74; Vitousek 1992, pp. 33-35). The following list provides a brief description of the nonnative plants that pose a threat to the species proposed for listing that occur in the ecosystems being addressed in this proposed rule.

- *Ageratum conyzoides* is a perennial herb that produces thousands of seeds spread by wind and water, with over half germinating shortly after being shed, displacing native understory vegetation (Pacific Island Ecosystem at Risk (PIER) 2007).

- *Andropogon glomeratus*, a grass species, displaces native vegetation by invading disturbed areas, with culms (stems of grasses or similar plants) to 5 ft (1.5 m) tall, and reproduces readily by seed (Ohio Department of Natural Resources 2006; PIER 2008a).

- *Andropogon virginicus* is a grass with seeds that are easily distributed by wind, clothing, vehicles, and feral animals (Smith 1989, p. 63). Some research suggests that this species may also release allelopathic substances (chemicals that inhibit growth in other plants) that dramatically decrease the reestablishment of native plants (Rice 1972, p. 752). This species is on the Hawaii State noxious weed list (HAR Title 4, Subtitle 6, Chapter 68).

- *Axonopus fissifolius* is a pasture grass that forms dense mats with tall foliage. This species does well in soils with low nitrogen levels, and can outcompete other grasses in wet forests and bogs. The species is not subject to any major diseases or insect pests, and recovers quickly from fire. The seeds are readily spread by water, vehicles, and grazing animals (O'Connor 1999, pp. 1,500-1,502; Cook *et al.* 2005, p. 4).

- *Blechnum appendiculatum* is a fern with fronds to 23 in (60 cm) long, that forms large colonies, outcompeting many native fern species (Palmer 2003, p. 81).

- *Buddleja asiatica* is a shrub or small tree that can tolerate a wide range of habitats, forms dense thickets, and is rapidly spreading into wet forest and even lava and cinder substrate areas in Hawaii where it displaces native vegetation (Wagner *et al.* 1999, p. 415; Pacific Island Ecosystem at Risk (PIER) 2008b).

- *Christella parasitica* (a fern) is known to hybridize with other

*Christella* species, and may hybridize with endemic Hawaiian *Christella* species (Palmer 2003, p. 90).

- *Clidemia hirta* is a noxious shrub in the Melastomataceae family that forms a dense understory, shades out native plants and prevents their regeneration, and is considered a significant nonnative plant threat (Wagner *et al.* 1985, p. 41; Smith 1989, p. 64). All plants in the Melastomataceae family are legally declared noxious in the State of Hawaii (HAR Title 4, Subtitle 6, Chapter 68).

- *Coffea arabica* is shade tolerant and can form dense stands in the forest understory. Its seeds are dispersed by birds and rats and can germinate under the forest canopy displacing native vegetation (PIER 2008c).

- *Corynocarpus laevigatus* is a tree up to 49 ft (15 m) tall. *C. laevigatus* seeds were broadcast by aircraft over the interior of Kauai in 1929 in an attempt to restore the watershed, and it is now naturalized there (Wagner *et al.* 1985, p. 39; Forster and Forster 1999, p. 566). It forms dense shade which excludes other species, and the seeds are distributed by frugivorous (fruit-eating) birds and pigs (PIER 2008d).

- *Cyperus meyenianus* can grow as tall as 2 ft (0.6 m) in height and outcompetes native plants (Koyama 1999, p. 1,421).

- *Ehrharta stipioides* is a grass that creates a thick mat in which other species cannot regenerate; its seeds are easily dispersed by awns (slender, terminal, bristle-like process found at the spikelette in many grasses) that attach to fur or clothing (U.S. Army 2006, p. 2-1-20).

- *Erechtites valerianifolia*, a tall (up to 8 ft (2.5 m)), widely-distributed annual herb, produces thousands of wind-dispersed seeds, outcompeting native plants (Wagner *et al.* 1999, p. 314).

- *Erigeron karvinskianus* reproduces and spreads rapidly to form dense mats, and can spread by stem layering and regrowth of broken roots. This species crowds out and displaces ground level plants (Weeds of Blue Mountains Bushland 2006).

- *Eucalyptus robusta* was planted by State foresters in the early 1900s on all the main Hawaiian Islands except Niihau and Kahoolawe in an attempt to protect watersheds. These trees are quick-growing, can reach 99 ft (30 m) in height, reproduce from seed, and replace native forest species (Cuddihy and Stone 1990, p. 52; Wagner *et al.* 1999, p. 957; PIER 2008e).

- *Hedychium gardnerianum* forms vast, dense colonies, displacing other plant species, and reproduces by stolons

where already established. The conspicuous, fleshy, red seeds are dispersed by fruit-eating birds as well as humans (Smith 1985, p. 191). Aircraft-based analysis has found that this species reduces the amount of nitrogen in the native *Metrosideros* forest canopy in Hawaii, a finding subsequently corroborated by ground-based sampling (Asner and Vitousek 2005). This species may also block stream edges, altering water flow and the native vegetation community (Global Invasive Species Database (GISD) 2007).

- *Holcus lanatus* is an aggressively growing and possibly allelopathic (having a chemical inhibitory effect on other organisms) grass that quickly becomes dominant over other plants (Pitcher and Russo 1980, p. 3).

- *Juncus planifolius* forms dense mats and has the potential of displacing natives by preventing establishment of their seedlings (Medeiros *et al.* 1991, p. 28).

- *Kalanchoe pinnata* can form dense stands that prevent reproduction of native species. It can also reproduce by vegetative means at indents along the leaf (Motooka *et al.* 2003).

- *Lantana camara* was brought to Hawaii as an ornamental plant, and is an aggressive, thicket-forming shrub which is now found on all of the main islands (Wagner *et al.* 1999, p. 1,320).

- *Lonicera japonica* is a sprawling vine that can grow over and smother shrubs and small trees, and cover the forest floor, preventing growth of native species (PIER 2008f).

- *Melastoma septemnerium* is another member of the Melastomataceae family. This plant displaces and outcompetes native vegetation because of its invasive characteristics such as high germination rate, rapid growth, early maturity, ability of fragments to root, possible asexual reproduction, and efficient seed dispersal, especially by birds (Smith 1985, p. 194; University of Florida Herbarium 2006). This species is on the Hawaii State noxious weed list (HAR Title 4, Subtitle 6, Chapter 68).

- *Melinis minutiflora* forms dense mats that can fuel more intense fires that destroy native plants (O'Connor 1999, p. 1,562; Cuddihy and Stone 1990, p. 89).

- *Morella faya* is an evergreen shrub or small tree up to 26 ft (8 m) tall. It forms monotypic stands, has the ability to fix nitrogen, and alters the successional ecosystems in areas it invades, displacing native vegetation through competition. It is also a prolific fruit producer (average of 400,000 fruit per individual shrub or tree per year), and the fruit are spread by frugivorous birds and feral pigs (Vitousek 1990, p.

8-9; Wagner *et al.* 1999, p. 931; PIER 2008g). This species is on the Hawaii State noxious weed list (HAR Title 4, Subtitle 6, Chapter 68).

- *Oplismenus hirtellus* forms a dense groundcover, is sometimes climbing, and roots at the nodes, enabling its rapid spread. It also has sticky seeds that attach to visiting animals and birds that then carry them to new areas where they are deposited and spread accordingly (O'Connor 1999, p. 1,565; Johnson 2005).

- *Paspalum conjugatum* is found in wet habitats, and forms a dense ground cover. Its small hairy seeds are easily transported on humans and animals or are carried by the wind through native forests, where it establishes and displaces native vegetation (Cuddihy and Stone 1990, p. 83; Tomich 1986, p. 125; PIER 2006; University of Hawaii 2008h).

- *Paspalum urvillei* forms dense stands which displace native vegetation (Motooka *et al.* 2003, p. 1).

- *Passiflora edulis* is a vigorous, climbing vine cultivated for its fruit in Hawaii (Escobar 1999, p. 1,010). It can grow up to 20 ft (6 m) per year once established, smothering trees and shrubs. Each fruit has hundreds of seeds which are eaten and distributed by pigs (PIER 2008i).

- *Passiflora tarminiana*, a vine native to South America, is widely cultivated for its fruit (Escobar 1999, p. 1,012). First introduced to Hawaii in the early 1900s, it is now a significant pest in mesic forest, where it overgrows and smothers the forest canopy. Its seeds are readily dispersed by humans, birds, and feral pigs (La Rosa 1992, pp. 272, 290).

- *Pluchea carolinensis* is a fast-growing shrub that forms thickets in dry habitats and can tolerate saline conditions. The wind-dispersed seeds facilitate plant dispersal which displaces native vegetation (Francis 2006).

- *Psidium cattleianum* forms dense stands in which few other plants can grow, displacing native vegetation through competition. The fruit is eaten by pigs and birds that disperse the seeds throughout the forest (Smith 1985, p. 200; Wagner *et al.* 1985, p. 24).

- *Psidium guajava* forms dense stands in disturbed forest. The seeds are spread by feral pigs and alien birds, and it can also regenerate from underground parts by suckering (Wagner *et al.* 1999, p. 972).

- *Pterolepis glomerata* is another member of the Melastomataceae family. The basis for its classification as invasive are the plant's germination rates, rapid growth, early maturity, ability of fragments to root, possible

asexual reproduction, and seed dispersal by birds (University of Florida Herbarium 2006). Because of these attributes, it displaces native vegetation through competition.

- *Rhodymyrtus tomentosa* forms dense thickets and produces large amounts of seed that are dispersed by frugivorous birds and mammals (Smith 1985, p. 201). It also alters natural fire regimes and sprouts prolifically after fires (University of Florida 2006). This species is on the Hawaii State noxious weed list (HAR Title 4, Subtitle 6, Chapter 68).

- *Ricinus communis* is a fast growing tree that can form thickets that shade out other species (PIER 2007).

- *Rubus argutus* reproduces both vegetatively and by seed, readily sprouts from underground runners, and is quickly spread by frugivorous birds (Tunison 1991, p. 2; Wagner *et al.* 1999, p. 1,107; U.S. Army 2006, p. 2-1-21, 2-1-22). This species, which displaces native vegetation through competition, is on the Hawaii State noxious weed list (HAR Title 4, Subtitle 6, Chapter 68).

- *Rubus ellipticus* is a climbing shrub that forms impenetrable thickets, is covered with prickles, and has edible yellow fruit that are readily dispersed by birds. This species, which displaces native vegetation through competition, is on the Hawaii State noxious weed list (Benton 2005, p. 1; GISD 2008a; HAR Title 4, Subtitle 6, Chapter 68).

- *Rubus rosifolius* forms dense thickets and outcompetes native plant species. It easily reproduces from roots left in the ground, and seeds are spread by feral animals and birds (PIER 2008j; GISD 2008b).

- *Sacciolepis indica* is an annual grass that invades disturbed and open areas in wet habitats. The seeds are dispersed by sticking to animal fur (University of Hawaii 1998).

- *Schinus terebinthifolius* forms dense thickets and grows in all terrain, and the red berries are attractive to birds (Smith 1989, p. 63). *Schinus* seedlings grow very slowly and can survive in dense shade, exhibiting vigorous growth when the canopy is opened after a disturbance (Brazilian Pepper Task Force 1997). Because of these attributes, it is able to displace native vegetation through competition.

- *Setaria parviflora* can grow in a wide variety of habitats. Its culms (hollow or pithy stalks or stems) can be up to 4 ft (1.2 m) tall, and this species can form significant colonies shading and crowding out native plant species (O'Connor 1999, p. 1,592; University of Florida 2007).

- *Sphaeropteris cooperi* is a tree fern native to Australia that was brought to

Hawaii for use in landscaping (Medeiros *et al.* 1992, p. 43). It can achieve high densities in native Hawaiian forest and grows up to 1 ft (0.3 m) in height per year. It reaches maximum known heights of 39 ft (12 m) (Jones and Clemesha 1976, p. 56), and can displace native species. Understory disturbance by pigs facilitates its establishment (Medeiros *et al.* 1992, p. 30), and it has been known to spread over seven mi (12 km) through windblown dispersal of spores from plant nurseries (Medeiros *et al.* 1992, p. 29).

- *Verbena litoralis* is a perennial herb up to 6.5 ft (2 m) tall, and is naturalized in a wide range of habitats in Hawaii (Wagner *et al.* 1999, p. 1,325). It displaces native vegetation through competition.

- *Xyris complanata* is a clumping herb cultivated for use in floral arrangements. It is naturalized in Hawaii in wet muddy areas and on lava and can outcompete native vegetation (Wagner *et al.* 1999, p. 1,615).

- *Youngia japonica* is an annual herb 3 ft (0.9 m) tall that is native to southeastern Asia and is now a pantropical weed (Wagner *et al.* 1999, p. 377). In Hawaii it occurs in moist, disturbed sites, and can invade nearly intact native wet forest (Wagner *et al.* 1999, p. 377), outcompeting native vegetation.

#### *Habitat destruction and modification by fire*

Fire is a relatively new, human-related threat to native species and natural vegetation in Hawaii. The historical fire regime in Hawaii was characterized by infrequent, low severity fires (Cuddihy and Stone 1990, p. 91; Smith and Tunison 1992, pp. 395-397). Few natural ignition sources existed, natural fuel beds were often discontinuous, and rainfall in many areas on most islands was, and is moderate to high. Fires inadvertently or intentionally ignited by the original Polynesians in Hawaii probably contributed to the initial decline of native vegetation in the drier plains and foothills. These early settlers practiced slash-and-burn agriculture that created open lowland areas suitable for the later colonization of nonnative, fire-adapted grasses (Kirch 1982, pp. 5-6, 8; Cuddihy and Stone 1990, pp. 30-31). Beginning in the late 18th century, Europeans and Americans introduced plants and animals that further degraded native Hawaiian ecosystems. Pasturage and ranching, in particular, created highly fire-prone areas of nonnative grasses and shrubs (D'Antonio and Vitousek 1992, p. 67). Although fires are infrequent in mountainous regions

today, extensive fires have occurred in lowland mesic areas, and up to half of the areas dominated by alien species have been damaged by fire.

Fires of all intensities, seasons, and sources are destructive to native Hawaiian ecosystems (Brown and Smith 2000, p. 172), and a single grass-fueled fire can kill most native trees and shrubs in the burned area (D'Antonio and Vitousek 1992, p. 74). Few native Hawaiian plants and animals are adapted to withstand fire, and none are known to depend on fire for their existence or regeneration. Although Vogl (1969) (*in Cuddihy and Stone 1990, p. 91*) proposed that naturally occurring fires, primarily from lightning strikes, have been important in the development of the original Hawaiian flora, and that many Hawaiian plants might be fire adapted, Mueller-Dumbois (1981) (*in Cuddihy and Stone 1990, p. 91*) point out that most natural vegetation types of Hawaii would not carry fire before the introduction of alien grasses, and Smith and Tunison (*in press*) (*in Cuddihy and Stone 1990, p. 91*) state that native plant fuels typically have low flammability. Cuddihy and Stone (1990, p. 91) state that fire probably influenced the evolution of the montane ecosystems of Maui and Hawaii, which contain grasslands of the native *Deschampsia nubigena* and stands of native shrub species and koa (*Acacia koa*).

Alien-dominated grasslands and shrublands constitute the greatest fire threat to native lowland vegetation, including the lowland mesic ecosystem described in this proposal. Grasses (particularly those that produce mats of dry material or retain a mass of standing dead leaves) that invade native forests and shrublands provide fuels that allow fire to burn areas that would not otherwise easily burn (Fujioka and Fujii 1980, *in Cuddihy and Stone 1990, p. 93*). Native woody plants may recover from fire to some degree, but fire tips the competitive balance toward alien species (National Park Service 1989 *in Cuddihy and Stone 1990, p. 93*). Many nonnative invasive plants, especially fire tolerant grasses, outcompete native plants and inhibit their regeneration (D'Antonio and Vitousek 1992, pp. 70, 73-74; Tunison *et al.* 2002, p. 122).

Fire represents a threat to many of the species found in the lowland mesic, montane mesic, and dry cliff ecosystems addressed in this proposed rule. Fire can destroy dormant seeds as well as plants, even in steep or inaccessible areas. Successive fires that burn farther and farther into native habitat destroy native plants and remove habitat for native species by altering microclimate

conditions favorable to alien plants. Alien plant species most likely to be spread as a consequence of fire are those that produce a high fuel load, are adapted to survive and regenerate after fire, and establish rapidly in newly burned areas. For example, a documented increase in the frequency and size of fires at Hawaii Volcanoes National Park since 1968 coincided with an increasing cover of alien grasses (Smith and Tunison 1992, p. 398).

#### *Habitat destruction and modification by hurricanes*

Hurricanes adversely impact native Hawaiian habitat, including all six Kauai ecosystems and their associated species identified in this proposed rule. They do this by destroying native vegetation, opening the canopy and thus modifying the availability of light, and creating disturbed areas conducive to invasion by nonnative pest species (Asner and Goldstein 1997, p. 148; Harrington *et al.* 1997, pp. 539-540). Because many Hawaiian plant and animal species, including the 48 species in this proposal, persist in low numbers and in restricted ranges, natural disasters, such as hurricanes, can be particularly devastating (Hawaii Comprehensive Wildlife Conservation Plan 2005, p. 4-3).

In November 1982, Hurricane Iwa struck the Hawaiian Islands with wind gusts exceeding 100 miles per hour (mph) (161 kilometers per hour (kph)), causing extensive damage, especially on the islands of Niihau, Kauai, and Oahu (Businger 1998, pp. 2, 6). Many forest trees were destroyed, which opened the canopy and facilitated invasion of native habitat by nonnative plants. Competition with nonnative plants is a threat to each of the 6 ecosystems and the 48 species addressed in this proposed rule, as described above. In September 1992, Hurricane Iniki, a Category 4 hurricane with maximum wind speeds recorded at 140 mph (225 kph), passed directly over the island of Kauai, causing significant damage to Kauai's native plant populations (Businger 1998, pp. 2, 6; S. Perlman, *in litt.* 1992, pp. 1-9). Several species of Kauai's endemic forest birds suffered significant declines in population, and some have not been observed since the hurricanes. In addition, populations of several of Hawaii's rare plants, including three of the species in this proposal, *Lysimachia iniki*, *L. pendens*, and *L. venosa*, were adversely impacted by hurricanes Iwa and Iniki through wind damage, canopy disruption, and landslides (S. Perlman, *in litt.* 1992, p. 1). Damage by future hurricanes could further decrease the remaining native-

plant dominated habitat areas that support rare plants and wildlife in Kauai ecosystems (S. Perlman, in litt. 1992, pp. 1-9).

#### *Habitat destruction and modification due to landslides and flooding*

Landslides and flooding destabilize substrates, damage and destroy individual plants, and alter hydrological patterns, which result in changes to native plant and animal communities. Due to the steep topography of much of the island of Kauai, erosion and disturbance caused by introduced ungulates exacerbates the potential for landslides or flooding, which in turn threaten native plants. For those species that occur in small numbers in highly restricted geographic areas, such events have the potential to eradicate all individuals of a population, or even all populations of a species, resulting in extinction.

Landslides and flooding likely adversely many of the species addressed in this proposed rule, including: *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *kauiensis*, *C. remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea dolichopoda*, *C. eleeleensis*, *C. kolekoleensis*, *C. kuhihewa*, *Cyrtandra oenobarba*, *C. paliku*, *Diellia mannii*, *Dubautia kenwoodii*, *Dubautia plantaginea* ssp. *magnifolia*, *Lysimachia iniki*, *L. pendens*, *L. scopulensis*, *L. venosa*, *Melicope paniculata*, *Myrsine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Schiedea attenuata*, and *Stenogyne kealiae*. Monitoring data from the HBMP suggests that these species are threatened by landslides or falling rocks, since they are found in landscape settings susceptible to these events (e.g., steep slopes and cliffs). Since *Schiedea attenuata* is known from only a single population of 20 individuals on a steep cliff, one landslide could lead to the extinction of the species by direct destruction of the individual plants, mechanical damage to individual plants which could lead to their death, destabilization of the cliff habitat leading to additional landslides, and alteration of hydrological patterns (e.g., affecting the availability of soil moisture). Field survey data presented in the HBMP suggest that *Charpentiera densiflora* and *Cyrtandra oenobarba* are threatened by both landslides and flooding, and *Cyanea kolekoleensis* is threatened by flooding.

#### *Habitat destruction and modification by climate change*

The exact nature of the impacts of global climate change and increasing temperatures on native Hawaiian

ecosystems, including the 6 Kauai ecosystems and each of the associated 48 species identified in this proposed rule, are unknown, but are likely to include the loss of native species that comprise the communities in which the 48 Kauai species occur (Benning *et al.* 2002, pp. 14,246 and 14,248; Pounds *et al.* 1999, pp. 611-612; Still *et al.* 1999, p. 610). Future changes in precipitation are uncertain because they depend in part on how El Niño (a disruption of the ocean atmospheric system in the Tropical Pacific having important global consequences for weather and climate) might change, and reliable projections of changes in El Niño have yet to be made (Hawaii Climate Change Action Plan 1998, pp. 2-10).

According to some climate change projections, temperature increases could pose an additional threat specific to the akekee and akikiki by causing an increase in the elevation at which regular transmission of avian malaria occurs (Benning *et al.* 2002). Experimental evidence has shown that the malarial parasite does not develop in birds in an environment below 55 degrees Fahrenheit (F) (13 degrees Celsius (C)), and field studies have found that maximum malaria transmission occurs where mean ambient summer temperature is 63 degrees F (17 degrees C) (Benning *et al.* 2002, p. 14,246). Between 55 and 63 degrees F (13 and 17 degrees C), malaria transmission is sporadic and usually associated with warmer periods, such as El Niño events (Benning *et al.* 2002, p. 14,246). There are no forested areas on Kauai where mean ambient temperature is below 55 degrees F (13 degrees C), which indicates that all areas are subject to malaria at least periodically. Benning *et al.* (2002) used GIS simulation to show that an increase in temperature of 3.6 degrees F (2 degrees C), which is within the range predicted by some climate models (e.g. Still *et al.* 1999 and references therein, p. 608; IPCC 2001, p. 67-69), would raise the 63 degrees F (17 degrees C) isotherm in the Alakai swamp region on Kauai by 984 ft (300 m), resulting in an 85 percent decrease in the land area where malaria transmission currently is only periodic. If climate change were to reduce the remaining suitable habitat for the akekee and akikiki by 85 percent as predicted, it would likely contribute to the extinction of the species over time.

The 48 Kauai species in this proposal are theoretically amongst the most vulnerable to extinction due to anticipated global climate change, although the specific impacts of such climate change on these species cannot currently be known. Impacts to the

species proposed for listing would be expected to include habitat loss or alteration and/or changes in disturbance regimes, in addition to direct physiological stress. The probability of species going extinct as a result of these factors increases when ranges are restricted, habitat decreases, and population numbers decline (IPCC 2007, p. 8). Such is the case for each of the 48 Kauai species, which are characterized by limited climactic ranges and/or restricted habitat requirements, small population size, and low number of individuals. The threat of climate change for the akikiki and akekee would be further exacerbated by the extensive loss of suitable habitat due to the expansion of the transmission zone for malaria.

#### *Summary of Habitat Destruction and Modification*

The threats to each of the 48 Kauai species addressed in this proposed rule are occurring throughout the entire range of each of the species. These threats include introduced ungulates, nonnative plants, fire, natural disasters, and climate change.

The effects from ungulates are immediate because ungulates currently occur in all of the ecosystems on which these species depend. The threat posed by introduced ungulates is significant because they cause: (1) Trampling and grazing that directly impacts the plant species proposed for listing; (2) increased soil disturbance, leading to mechanical damage to individuals of proposed plants and host plants of *Drosophila attigua* (picture-wing fly); (3) trampling and grazing native plants used for nesting and foraging by the akekee and akikiki, and for foraging by *D. attigua*; (4) creation of open, disturbed areas conducive to weedy plant invasion and establishment of alien plants from dispersed fruits and seeds, which results over time in the conversion of a community dominated by native vegetation to one dominated by nonnative vegetation (leading to all of the negative impacts associated with nonnative plants, detailed below); (5) increased watershed erosion and sedimentation; and (6) creation of breeding sites for mosquitoes, the primary vector for the transmission of avian diseases, which threaten the akikiki and akekee. These threats are expected to continue or increase without control or eradication.

Nonnative plants represent a significant and immediate threat to all 48 species being addressed in this proposed rule through habitat destruction and modification for the following reasons: (1) They adversely

impact microhabitat by modifying the availability of light; (2) they alter soil-water regimes; (3) they modify nutrient cycling processes; (4) they alter fire characteristics of native plant habitat, leading to incursions of fire-tolerant nonnative plant species into native habitat; and (5) they outcompete, and possibly directly inhibit the growth of, native plant species. All of these threats can convert native dominated plant communities to nonnative plant communities (Cuddihy and Stone 1990, p. 74; Vitousek 1992, pp. 33-35). This conversion has negative impacts on, and threatens, the 45 plant species addressed here, as well as the akikiki, akekee, and *Drosophila attigua*, which depend upon native plant species for essential life history needs.

The threat from fire to the species in this proposed rule that depend on lowland mesic, montane mesic, and dry cliff ecosystems (see Table 2) is significant because fire damages and destroys native vegetation, including dormant seeds, seedlings, and juvenile and adult plants. Many nonnative invasive plants, particularly fire-tolerant grasses, outcompete native plants and inhibit their regeneration (D'Antonio and Vitousek 1992, pp. 70, 73-74; Tunison *et al* 2001, p. 122). Successive fires that burn farther and farther into native habitat destroy native plants and remove habitat for native species by altering microclimatic conditions and creating conditions favorable to alien plants. The threat from fire is unpredictable but omnipresent in these ecosystems that have been invaded by nonnative, fire-prone grasses.

Natural disasters such as hurricanes represent a significant threat to native habitat and the 48 species addressed in this proposed rule because they open the forest canopy, modify available light, and create disturbed areas that are conducive to invasion by nonnative pest plants (Asner and Goldstein 1997, p. 148; Harrington *et al.* 1997, pp. 346-347). These impacts can be particularly devastating to the 48 species addressed in this proposed rule because due to other threats they now persist in low numbers or occur in restricted ranges, and are therefore less resilient to such disturbances. Furthermore, a particularly destructive hurricane holds the potential of driving a highly localized endemic species to extinction in a single event. In 1982 and 1992, the island of Kauai received the brunt of hurricane-force winds and rain associated with Hurricanes Iwa and Iniki. Field biologists noted significant declines in native Hawaiian plant and wildlife populations following these events, and believe that future hurricane

damage could further exacerbate these declines (S. Perlman, in litt. 1992, p. 1). Hurricanes pose an immediate and ever-present threat, because they can occur at any time, although their occurrence is not predictable.

Landslides and flooding adversely impact many of the species in this proposed rule (see Table 2) by destabilizing substrates, damaging and destroying individual plants, and altering hydrological patterns which result in habitat destruction or modification and changes to native plant and animal communities. These threats are significant and, as with hurricanes, have the potential to occur at any time, although their occurrence is not predictable.

The projected effects of global climate change and increasing temperatures on the 48 species addressed in this proposed rule relate to changes in microclimatic conditions, which may lead to the loss of native species due to direct physiological stress, the loss or alteration of habitat, and/or changes in disturbance regimes (e.g., storms and hurricanes). Because the probability of species going extinct increases when ranges are restricted, habitat decreases, and population numbers decline – conditions that describe the situation for small populations of single-island endemics such as those addressed in this proposed listing – each of the 48 Kauai species are particularly vulnerable to extinction due to such changes. In addition, climate change may pose a significant threat specific to the akekee and akikiki by causing an increase in the elevation at which regular transmission of avian malaria occurs. However, because the specific effects of probable climate change on these species are unknown at this time, we are not able to determine the magnitude of this threat with confidence.

#### *B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*

The palm tree *Pritchardia hardyi* is found only on the island of Kauai. Rare palm trees are highly desirable to collectors, and there is an active internet sales and online auction market for their seeds and seedlings, including *P. hardyi* (GardenGuides.com 2007; Rarepalmseeds.com 2007; South Coast Palms 2007; Kapoho Palms 2007; J.D. Anderson Nursery 2007; Jungle Music Palms and Cycads 2007; Tropical Gardens of Maui 2007). Seeds of *P. hardyi* have been stolen from an outplanting site in the past (R. Nishek, NTBG, pers. comm. 2007), and we have evidence of vandalism and illegal

collection of other species of endangered *Pritchardia* palms on Kauai (Johnson 1996, pp. 16-17; A. Kyono, DOFAW, pers. comm. 2000; R. Nishek, pers. comm. 2007). Because this species is found in only two populations with limited numbers of individuals, we consider overutilization to be an immediate and significant threat to *P. hardyi* throughout its entire range. We do not consider overutilization to pose a threat to any of the other 47 Kauai species.

#### *C. Disease or Predation*

##### *Avian Diseases*

Avian diseases transmitted by the introduced southern house mosquito (*Culex quinquefasciatus*), including avian pox (*Poxvirus avium*) and malaria (*Plasmodium relictum*), play a major role in limiting the distribution of the many Hawaiian forest bird species, and pose a significant and immediate threat to the akekee and akikiki throughout their ranges (Benning *et al.* 2002, p. 14,246). Like many other native Hawaiian forest birds, the akikiki and akekee are no longer found at lower elevations, but have become restricted to the higher elevation montane mesic (akekee only) and montane wet (both akekee and akikiki) ecosystems where mosquitoes and the diseases they carry are less prevalent (Scott *et al.* 1986, p. 367-368). In the warmer fall months, *Culex quinquefasciatus* breeds at higher densities in upper elevation forests, coinciding with a prevalence of malaria in avian populations at higher elevations (van Riper *et al.* 1986, pp. 332-333, 338).

Native Hawaiian birds evolved in the absence of mosquito-borne avian diseases, and only recently became exposed when mosquitoes were accidentally introduced to the islands in 1827, in association with the introduction of avian pox and malaria through imported cage birds and domestic fowl (Yorinks and Atkinson 2000, p. 731 and references therein). Native Hawaiian forest birds are more susceptible to malaria than are nonnative bird species (van Riper *et al.* 1986, pp. 327-328). In addition, native birds infected with malaria also show altered behaviors that increase their vulnerability to predation (Yorinks and Atkinson 2000, pp. 731-738). Avian malaria appears to be highly pathogenic for the Hawaiian honeycreepers (birds in the subfamily Drepanidinae), including the akikiki and akekee (Yorinks and Atkinson, p. 737). In a study of iiwi (*Vestiaria coccinea*), another Hawaiian honeycreeper, Atkinson *et al.* (1995, p. S65) described “extraordinarily high mortality” of birds

infected with malaria. This susceptibility, in combination with the observation that other Hawaiian honeycreepers have become restricted to high elevation forests, led Atkinson *et al.* (1995, p. S68) to predict that a shift in the current mosquito distribution to higher elevations could be disastrous for those species with already reduced populations. As discussed below (“Other Natural or Manmade Factors Affecting Their Continued Existence”), climate change may pose just such a threat to the akikiki and akekee, by potentially causing an increase in the elevation at which regular transmission of avian malaria occurs (Benning *et al.* 2002, pp. 12,246-14,247).

#### Predation

Hawaii’s plants and animals evolved in nearly complete isolation. Successful colonization of these remote volcanic islands was infrequent, and many organisms never established populations. As an example, Hawaii lacks any native ants or conifers, has very few bird families, and has only a single native land mammal (Loope 1998, p. 748). Defenses against mammalian herbivory, such as thorns, prickles, and production of toxins, were not needed, and evolutionary pressure for plants to produce or maintain them was lacking. Therefore, Hawaiian plants lost or never developed these defenses (Carlquist 1980, p. 173). Likewise, birds endemic to Hawaii lost their resistance to diseases common to their continental origins, and strategies to avoid mammalian predators. Native Hawaiian birds were not able to withstand the stressors of habitat change and predation caused when browsers, grazers, rooters, and predators were introduced (e.g., goats, cattle, pigs, rats, cats, and deer) (Scott *et al.* 1986, pp. 352-361, 364-365). The native flora and fauna of the islands are thus particularly vulnerable to the impacts of introduced alien species.

#### Introduced Ungulates

In addition to the habitat impacts discussed above (See “Habitat Destruction and modification by introduced ungulates”), the following ungulates most likely threaten the 45 plant species in this proposal by trampling and eating individual plants, as follows (this information is also presented in Table 2): *Astelia waialealae* (feral goats and pigs), *Canavalia napaliensis* (feral goats), *Chamaesyce eleanoriae* (feral goats), *Chamaesyce remyi* var. *kauaiensis* (feral pigs), *C. remyi* var. *remyi* (feral goats, pigs, and black-tailed deer), *Charpentiera densiflora* (feral goats),

*Cyanea eleleensis* (feral pigs), *C. kolekoleensis* (feral pigs), *C. kuhihewa* (feral pigs), *Cyrtandra oenobarba* (feral goats and pigs), *Diellia mannii* (black-tailed deer and feral pigs), *Doryopteris angelica* (black-tailed deer, feral goats and pigs), *Dryopteris crinalis* var. *podosorus* (feral pigs), *Dubautia imbricata* ssp. *imbricata* (feral pigs), *Dubautia kenwoodii* (feral goats and pigs), *Dubautia plantaginea* ssp. *magnifolia* (feral pigs), *Dubautia waialealae* (feral goats and pigs), *Geranium kauaiense* (feral pigs), *Keyseria erici* (feral pigs), *K. helenae* (feral pigs), *Labordia helleri* (black-tailed deer, and feral goats and pigs); *Labordia pumila* (feral pigs); *Lysimachia daphnoides* (feral pigs), *L. pendens* (feral pigs), *L. scopulensis* (feral pigs and goats), *Melicope degeneri* (feral goats and pigs), *M. paniculata* (feral goats and pigs), *M. puberula* (feral goats and pigs), *Myrsine knudsenii* (black-tailed deer, feral goats and pigs), *M. mezii* (feral goats and pigs), *Phyllostegia renovans* (feral goats and pigs), *Pittosporum napaliense* (feral goats), *Platydesma rostrata* (black-tailed deer, feral goats and pigs), *Pritchardia hardyi* (feral goats and pigs), *Psychotria grandiflora* (black-tailed deer, feral goats and pigs), *P. hobdyi* (black-tailed deer, feral goats and pigs), *Schiedea attenuata* (feral goats), *Stenogyne kealiae* (black-tailed deer, feral goats and pigs), *Tetraplasandra bisattenuata* (feral pigs), and *Tetraplasandra flynnii* (feral goats) (Wood 1998, p. 1; Wagner *et al.* 1999, p. 282; HBMP Database 2007; Wood in litt. 2007, pp. 1, 4, 6-8, 10-12; USFWS 2007 Candidate Status Assessments).

We have direct evidence of ungulate damage to some of these species, but for many, ungulate damage is presumed based on several studies conducted in Hawaii and elsewhere. In a study conducted by Diong (1982, p. 160) on Maui, feral pigs were observed browsing on young shoots, leaves, and fronds of a wide variety of plants, of which over 75 percent were endemic species (Diong 1982, p. 160). A stomach content analysis in this study showed that 60 percent of the pigs’ food source consisted of the endemic *Cibotium* (tree fern). Pigs were observed to fell plants and remove the bark of the native plant species *Clermontia*, *Cibotium*, *Coprosma*, *Psychotria*, *Scaevola*, and *Hedyotis*, resulting in larger trees being killed over a few months of repeated feeding (Diong 1982, p. 144). A study in Texas conducted by Beach (1997, pp. 3-4) revealed that feral pigs spread disease and parasites, and that their rooting and wallowing behavior led to spoilage of watering holes and loss of soil through

leaching and erosion. Rooting activities also decreased the survivability of some plant species through disruption at root level of mature plants and seedlings (Beach 1997, pp. 3-4).

Feral goats thrive on a variety of food plants, and are instrumental in the decline of native vegetation in many areas (Cuddihy and Stone 1990, p. 64). Feral goats trample roots and seedlings, cause erosion, and promote the invasion of alien plants. They are able to forage in extremely rugged terrain and have a high reproductive capacity (Clarke and Cuddihy 1980, p. C-20; van Riper and van Riper 1982, pp. 34-35; Tomich 1986, pp. 153-156; Cuddihy and Stone 1990, p. 64). A study of goat predation on a native *Acacia koa* (koa) forest on the island of Hawaii has shown that grazing pressure by goats can cause the eventual extinction of koa because it is unable to reproduce (Spatz and Mueller-Dombois 1973, p. 874). If goats are maintained at constantly high numbers, mature trees will eventually die and with them, the root systems that support suckers and vegetative reproduction. An enclosure analysis demonstrated that release from goat pressure by fencing resulted in a rapid recovery in height growth and numbers of vegetative resprouts of koa (Spatz and Mueller-Dombois 1973, p. 873). Another study at Puuwaawaa on the island of Hawaii demonstrated that prior to management actions in 1985, regeneration of endemic shrubs and trees in the goat-grazed area was almost totally lacking, contributing to the invasion of the forest understory by exotic grasses and weeds. After the removal of grazing animals in 1985, koa and *Metrosideros* spp. (ohia) seedlings were observed germinating by the thousands (Department of Land and Natural Resources 2002, p. 52). Goats have been observed uprooting, eating, and trampling native plants in the Kauai ecosystems (e.g., K.R. Wood 1994; S. Perlman, in litt. 2007). Based on a comparison of fenced and unfenced areas, it is clear that goats can devastate native ecosystems. They can also outcompete black-tailed deer. It is estimated that there are 2 goats per hectare in Hawaii (C. Kessler, pers. comm. 2008).

Black-tailed deer consume native vegetation, trample roots and seedlings, accelerate erosion, and promote the invasion of nonnative plants (van Riper and van Riper 1982, pp. 42-43; Stone 1985, pp. 261-262; Tomich 1986, pp. 132-134; Cuddihy and Stone 1990, p. 67). About 350 animals are known to occur in and near Waimea Canyon, with some invasion into Alakai Swamp in drier periods (Cuddihy and Stone 1990, p. 67). According to current State

records, they are feeding largely on the introduced species strawberry guava, thimbleberry, passion flower, and blackberry, as well as the native species *Alyxia oliviformis* (maile), *Dodonaea viscosa* (aalii), *Dianella sandwicensis* (ukiuki), *Coprosma* sp. (pilo), and *Acacia koa* (Cuddihy and Stone 1990, p. 67). Black-tail deer affect the species and ecosystems addressed in this proposed rule by damaging native plants through browsing or trampling, resulting in plant mortality and/or the loss of reproductive vigor. By spreading seeds of nonnative species on their coats or in their digestive tracts, they also increase competition for resources with native species.

#### Rats

There are three species of introduced rats in the Hawaiian Islands. The Polynesian rat (*Rattus exulans*) and the black rat (*Rattus rattus*) are primarily found in the wild, in dry to wet habitats, while the Norway rat (*Rattus norvegicus*) is typically found in manmade habitats such as urban areas or agricultural fields (Tomich 1986, p. 41). The Polynesian rat probably arrived on the Hawaiian Islands as an inadvertent introduction by early Polynesian colonizers from the central Pacific (Tomich 1986, p. 42). More recently, the black rat and the Norway rat most likely arrived on the Hawaiian Islands as stowaways on ships sometime in the 19th century (Atkinson and Atkinson 2000, p. 25).

Rats occur in all six of the Kauai ecosystems, and rat predation threatens at least 19 of the 45 plant species addressed in this proposed rule (see Table 2). Although introduced rats are best known for their impacts on island birds, rat predation on seeds and young plants can seriously affect regeneration. They are also known to have caused declines or even the total elimination of island plant species (Campbell and Atkinson 1999, as cited in Atkinson and Atkinson 2000, p. 24). Rats impact the native plants by eating fleshy fruits, seeds, flowers, stems, leaves, roots, and other plant parts (Atkinson and Atkinson 2000, p. 23). In the Hawaiian Islands, rats may consume as much as 90 percent of the seeds produced by some trees, or in some cases prevent the regeneration of forest species completely (Cuddihy and Stone 1990, pp. 68-69). Plants with large, fleshy fruits are particularly susceptible to rat predation including several of the plant genera proposed for listing here, for example the fruits of *Pritchardia* spp., and plants in the bellflower (e.g., *Cyanea* spp.), and African violet (e.g., *Cyrtandra* spp.) families (Cuddihy and

Stone 1990, pp. 67-69). Research on rats in forests in New Zealand has demonstrated that, over time, rats may alter the species composition of forest plants (Cuddihy and Stone 1990, pp. 68-69).

Rat predation may also threaten the native host and foraging plants of *Drosophila attigua*, and is a threat to the akekee and akikiki in the montane mesic and montane wet ecosystems. Rats are reported in the ecosystems where these birds occur and are potential predators on roosting or incubating adults, nests, and young (VanderWerf and Smith 2002, p. 73; Scott *et al.* 1986, pp. 363-364; USFWS 2007 Candidate Status Assessments). Predation by rats was the greatest cause of nest failure for the puaiohi, or small Kauai thrush (*Myadestes palmeri*), an endangered bird that inhabits the same areas as the akekee and akikiki (Tweed *et al.* 2006, p. 753). Puaiohi nest almost exclusively in pseudo-cavities on cliff faces (Snetsinger *et al.* 2005, p. 77), unlike akikiki and akekee that build cup nests in trees (Akikiki, BNA 555, p. 7; Akekee, BNA 295, p. 6). Captive raised puaiohi built cup nests in trees during a 1999 captive release in the Kawaikoi, and two females and their associated young were killed by rats at these nests (Tweed *et al.* 2003, USGS/BRD, unpublished data). From these data and information on rat predation for cliff nests (Snetsinger *et al.* 2005, p. 79), it is clear that both puaiohi cliff nests and cup nests built in trees are vulnerable to rat predation. Although we do not have direct evidence of rat predation on the akekee or akikiki from nest studies, it is reasonable to assume that these birds nesting in the same area as the puaiohi would be exposed to similar impacts from rat predation.

#### Cats and Owls

Feral cats (*Felis domesticus*) are present in the Alakai Swamp, which is within the montane wet ecosystem (Tweed *et al.* 2006, p. 753). Cats are believed to prey on roosting or incubating akekee and akikiki adults, nests, and young (VanderWerf and Smith 2002, p. 73; Scott *et al.* 1986, pp. 363-364). Though cats are most common at lower elevations, they have been observed in high-elevation rain forests on Hawaii and Maui (Scott *et al.* 1986, p. 363). On Hawaii Island, native forest birds have been found to be a regular component in the diets of feral cats in the montane wet forest (Smucker *et al.* 2000, p. 233). Examination of the stomach contents of 118 feral cats at Hakalau forest found native and introduced birds to be the most common prey item (Banko *et al.* 2004, p. 162). In

addition, two species of owls, the native pueo (*Asio flammeus sandwichensis*) and the introduced barn owl (*Tyto alba*), are also known to prey on forest birds. Between 1996 and 1998, 10 percent of nest failures of the endangered puaiohi on Kauai were attributed to owls (Snetsinger *et al.* 1994, p. 47; Snetsinger *et al.* 2005, pp. 72, 79). Since the puaiohi occurs in the same area and forest type as the akikiki and akekee and is of generally similar size, it is not unreasonable to assume there may be similar impacts to these bird species.

#### Invertebrates

Predation by nonnative invertebrate pests adversely impacts 13 of the plant and animal species (Table 2) in this proposed rule through mechanical damage to plants, destruction of plant parts, parasitism, and mortality. Those introduced invertebrate pests with the greatest effect on these native species include at least 12 different species of slugs (Joe 2006, pp. 6, 12), the black twig borer (*Xylosandrus compactus*) (Davis 1970, pp. 38-39), the two-spotted leafhopper (*Sophonia rufofascia*) (Hawaii Department of Agriculture, p. 1; Fukada 1996, pp. 1-12), and the western yellow-jacket wasp (*Vespula pensylvanica*) (Gambino and Loope 1992, p. 1).

Predation by nonnative slugs is most likely a threat to individuals of the four species of *Cyanea* in this proposed rule: *Cyanea dolichopoda*, *C. eleleensis*, *C. kolekoleensis*, and *C. kuhihewa* (Joe 2006, p. 10). On Oahu, slugs have been reported to destroy *C. grimesiana* ssp. *obatae* and *C. superba* ssp. *superba* in the wild, and have been observed eating leaves and fruit of cultivated individuals of *Cyanea* (L. Mehrhoff, pers. comm. 1995; U.S. Army Garrison 2005, pp. 3-34, 3-51). Little is known about the predation of certain rare plants by slugs; however, information in the U.S. Army's 2005 Status Report for the Makua Implementation Plan indicates that slugs can be a threat to all species of *Cyanea* (U.S. Army Garrison 2005, p. 3-51). Research investigating slug herbivory and control methods shows that slug impacts on *Cyanea* seedlings results in up to 70 to 80 percent seedling mortality (U.S. Army Garrison 2005, p. 3-51). Although we do not have direct evidence of slug predation on the 4 species of *Cyanea* addressed in this rule, slugs are found in the ecosystems on Kauai in which these plants occur. It is therefore reasonable to assume these plant species would be exposed to similar impacts from slug predation.

The black twig borer (*Xylosandrus compactus*) is known to infest a wide

variety of common plant taxa, including native species of *Melicope* (Davis 1970, p. 39; Extension Entomology and UH-CTAHR Integrated Pest Management Program 2006a, p. 1). This insect pest burrows into branches, introduces a pathogenic fungus as food for its larvae, and lays its eggs (Davis 1970, p. 39). Twigs, branches, and even entire plants can be killed from an infestation (Extension Entomology and UH-CTAHR Integrated Pest Management Program 2006a, p. 2). On the Hawaiian Islands, the black twig borer has many hosts, disperses easily, and is probably present at most elevations up to 2,500 ft (762 m) (Howarth 1985, pp. 152-153). Damage caused by the black twig borer has been observed by field biologists on *Canavalia napaliensis*, *Charpentiera densiflora*, *Melicope degeneri*, *M. paniculata*, and *M. puberula* (HBMP 2006).

The two-spotted leafhopper is a threat as the effects of its predation have been observed on four plant species included in this proposed rule: *Chamaesyce remyi* var. *remyi* (K. Wood, pers. comm. 2000), *Cyanea kuhihewa* (Wood 2004), *Platydesma rostrata* (HBMP 2007), and *Psychotria hobbyi* (HBMP 2006). This nonnative insect damages the leaves it feeds on, typically causing chlorosis (yellowing due to disrupted chlorophyll production) to browning and death of foliage (Hawaii Department of Agriculture 2006, p. 1). The damage to plants can result in the death of affected leaves or the whole plant, owing to the combined action of its feeding and oviposition behavior (Alyokhin *et al.* 2004, p. 13). In addition to the mechanical damage caused by the feeding process, the insect may introduce plant pathogens that lead to eventual plant death (Extension Entomology and UH-CTAHR Integrated Pest Management Program 2006b, p. 2). The two-spotted leafhopper is a highly polyphagous insect, and of its recorded host plant species 68 percent are fruit, vegetable and ornamental crops, and 22 percent are endemic plants, over half of which are rare and endangered (Alyokhin *et al.* 2004, p. 13). Its range is limited to below 4,000 ft (1,219 m) in elevation, unless there is a favorable microclimate. There has been a dramatic reduction in the two-spotted leafhopper populations in the past few years, possibly due to egg parasitism (M. Fukada, pers. comm. 2007).

Nonnative predatory and parasitic insects are considered significant factors contributing to the reduction in range and abundance of *Drosophila attigua* (Science Panel 2005, p. 25). In addition to the accidental establishment of nonnative species, nonnative predators

and parasites have been purposefully imported and released in Hawaii since 1865 for biological control of pests. Between 1890 and 2004, 387 nonnative species were introduced, sometimes with the specific intent of reducing populations of native Hawaiian insects (Funasaki *et al.* 1988, pp. 109-110, 143; Lai 1988, pp. 180, 186; Staples and Cowie 2001, pp. 41, 54-57). Nonnative arthropods pose a serious threat to Hawaii's native *Drosophila*, both through direct predation or parasitism as well as competition for food and space (Howarth and Medeiros 1989, pp. 82-83; Howarth and Ramsay 1991, pp. 80-83; Kaneshiro and Kaneshiro 1995, pp. 41-45; Staples and Cowie 2001, pp. 41, 54-57).

Due to their large colony sizes and systematic foraging habits, species of social Hymenoptera (ants and some wasps) and parasitic wasps pose a predation threat to the Hawaiian picture-wing flies, including *D. attigua* (Gambino *et al.* 1987, p. 170; Foote and Carson 1995, p. 370; Kaneshiro and Kaneshiro 1995, p. 12). Hawaiian arthropods, including *D. attigua*, evolved without the predation influence of social wasps (Kaneshiro and Kaneshiro 1995, pp. 41-45), and therefore have no defenses against such predation. In 1977, an aggressive race of the western yellow-jacket wasp became established in the State of Hawaii, and is now abundant between 1,969 and 5,000 ft (600 and 1,524 m) in elevation (Gambino *et al.* 1990, p. 1,087; Foote and Carson 1995, p. 370) on all the main islands (Tenorio and Nishida 1995, p. 174). *Drosophila attigua* is present within the elevation range occupied by the yellow-jacket wasps. Yellow-jacket wasps are voracious predators in most ecosystems in which they are found. Compared with typical North American populations, yellow-jackets in Hawaii display a high incidence of colonies that overwinter and persist into at least a second year. The result is that numbers of workers at such colonies are much greater than at annual colonies (Gambino *et al.* 1987, p. 169). Yellow-jacket colonies in Hawaii can each produce over a half-million foragers that consume tens of millions of arthropods (Gambino and Loope 1992, p. 19). Picture-wing flies may be particularly vulnerable to predation by wasps due to their lekking (gathering in groups for breeding) behavior, conspicuous courtship displays that can last for several minutes, and relatively large size (K. Kaneshiro, University of Hawaii at Manoa, pers. comm. 2006). Yellow-jacket wasps are widespread within at least a portion of the range

encompassing the *D. attigua* population sites in the montane mesic and montane wet ecosystems on Kauai (Science Panel 2005, p. 12).

The rarity or disappearance of numerous picture-wing fly species, including *Drosophila attigua*, from historical observation sites over the past 25 years may be due to a variety of factors. While there is no documentation that conclusively ties this decrease in observations to the establishment of yellow-jacket wasps within their habitats, the concurrent arrival of wasps and decline of picture-wing fly observations in some areas suggest that the wasps may have played a significant role in the decline of some picture-wing fly populations, including that of *D. attigua* (Foote and Carson 1995, p. 370; Kaneshiro and Kaneshiro 1995, p. 41-45; Science Panel 2005, p. 25).

#### Summary of Predation

We consider predation and parasitism by nonnative animal species (pigs, goats, deer, rats, cats, owls, and invertebrates) to pose an immediate and significant threat to 36 of the 48 species in this proposed rule throughout their ranges for the following reasons: (1) Observations and reports have documented pigs, goats, and deer browsing and trampling of 26 of the plant species, in addition to other studies demonstrating the negative impacts of ungulate browsing and trampling on native plant species of the islands (Spatz and Mueller-Dombois 1973, p. 874; Diong 1982, p. 160; Cuddihy and Stone 1990, p. 67); (2) nonnative invertebrates and rats cause mechanical damage to plants and destruction of plant parts (branches, fruits, seeds) to 22 of the 45 plant species in this proposed rule; (3) nonnative invertebrates such as yellow-jacket wasps prey upon, parasitize, and kill *Drosophila attigua*; and (4) rats, owls, and cats are likely predators on roosting or incubating adults, nests, and young of the akekee and akikiki (See Table 2).

#### *D. The Inadequacy of Existing Regulatory Mechanisms*

Currently, there are no Federal, State, or local laws, treaties, or regulations that specifically conserve or protect the 48 species from the threats described in this proposed rule. The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) is the domestic law that implements the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of shared migratory bird resources. Each of the conventions

protects selected species of birds; however, the MBTA does not provide protection for any Hawaiian honeycreepers (Drepanididae), including the two species being addressed in this proposed rule (akikiki and akekee) (71 FR 50205, August 24, 2006).

#### *E. Other Natural or Manmade Factors Affecting Their Continued Existence*

##### Competition with Nonnative Invertebrates

Competition by nonnative crane-flies (family Tipulidae) is a threat to *Drosophila attigua* in the montane mesic and montane wet ecosystems on Kauai. The Hawaiian Islands now support several established species of nonnative crane-flies, and the larvae of some species feed within the decomposing bark of *Cheirodendron* spp. (Science Panel 2005, p. 18; K. Magnacca, pers. comm. 2005; S. Montgomery, pers. comm. 2005a). These tipulid larvae feed within the same portion of the decomposing host plant area normally occupied by *D. attigua* larvae during their development. The effect of this competition is a reduction in available host plant material for *D. attigua* larvae (Science Panel 2005, p. 18). There have been no statistical studies conducted on tipulid larvae competition in Hawaii, but it is thought the issue is severe based on many observations of very high numbers of tipulid flies present within the host plants of several species of Hawaiian *Drosophila* (S. Montgomery, pers. comm. 2008). In laboratory studies, Grimaldi and Jaenike (1984) demonstrated that competition between *Drosophila* larvae and other fly larvae can exhaust food resources, which affects both the probability of larval survival and the body size of adults, resulting in reduced adult fitness, fecundity, and lifespan.

##### Small Number of Populations and Individuals

Species that are endemic to single islands are inherently more vulnerable to extinction than widespread species because of the increased risk of genetic bottlenecks, random demographic fluctuations, climate change, and localized catastrophes such as hurricanes and disease outbreaks (Mangel and Tier 1994, p. 607; Pimm *et al.* 1998, p. 757). These problems are further magnified when populations are few and restricted to a very small geographic area, and when the number of individuals is very small. Populations with these characteristics face an

increased likelihood of stochastic extinction due to changes in demography, the environment, genetics, or other factors (Gilpin and Soulé 1986, pp. 24-34).

Small, isolated populations often exhibit reduced levels of genetic variability, which diminishes the species' capacity to adapt and respond to environmental changes, thereby lessening the probability of long-term persistence (e.g., Barrett and Kohn 1991, p. 4; Newman and Pilson 1997, p. 361). The problems associated with small population size and vulnerability to random demographic fluctuations or natural catastrophes are further magnified by synergistic interactions with other threats, such as those discussed above (Factors A–C).

Very small plant populations may experience reduced reproductive vigor due to ineffective pollination or inbreeding depression. This is particularly true for dioecious species, such as *Melicope degeneri* and *Myrsine mezii* in this proposal, in which staminate (male) and pistillate (female) flowers occur on separate individuals. Isolated individuals have difficulty achieving natural pollen exchange, which decreases the production of viable seed. Populations are also impacted by demographic stochasticity, through which populations are skewed toward either male or female individuals by chance.

The following 25 plant species in this proposal are threatened by the effects of small population size (fewer than 50 individuals): *Astelia waialealae*, *Chamaesyce eleanoriae*, *Cyanea dolichopoda*, *C. eleeleensis*, *C. kolekoleensis*, *C. kuhihewa*, *Cyrtandra paliku*, *Diellia mannii*, *Doryopteris angelica*, *Dryopteris crinalis* var. *podosorus*, *Dubautia kalalauensis*, *D. kenwoodii*, *D. waialealae*, *Lysimachia iniki*, *L. pendens*, *L. scopulensis*, *L. venosa*, *Melicope degeneri*, *Myrsine knudsenii*, *M. mezii*, *Phyllostegia renovans*, *Psychotria grandiflora*, *Schiedea attenuata*, *Tetraplasandra bisattenuata*, and *T. flynnii*. We consider these species threatened by small population size because:

- No viable seeds or reproduction have been observed in *Astelia waialealae*, *Melicope degeneri*, and *Psychotria grandiflora*.
- Only five individuals of *Myrsine mezii* are known, and this number has not changed over 10 years (N. Tangalin, in litt. 2007b).
- *Cyrtandra paliku*, *Dubautia kalalauensis*, *Lysimachia iniki*, *Schiedea attenuata*, and *Tetraplasandra flynnii* are known only from a single population with fewer than 50

individuals (Wagner *et al.* 1994, p. 187; K. Wood, pers. comm. 1995; Marr and Bohm 1997, pp. 270-271; S. Perlman, pers. comm. 2003b; Baldwin and Carr 2005, p. 261; S. Perlman, in litt. 2006 and 2007).

- *Diellia mannii* and *Dubautia kenwoodii* are each known from only one individual in the wild (Carr 1998, p. 8; HBMP 2007).

- At least four species, *Cyanea eleeleensis*, *C. kolekoleensis*, *C. kuhihewa*, and *Lysimachia venosa*, are not known to persist in the wild. Of these, *Cyanea eleeleensis*, *C. kolekoleensis*, and *Lysimachia venosa* are not in storage or propagation, but individuals familiar with these species believe they may possibly remain extant and that much of their suitable habitat (lowland wet and wet cliff) on Kauai remains to be surveyed (Wood 2006, p. 11; S. Perlman, in litt. 2007; S. Perlman and K. Wood, pers. comm. 2007).

- *Cyanea kuhihewa* is found only in cultivation (D. Burney, NTBG, pers. comm. 2006; N. Sugii, pers. comm. 2006a; V. Pence, pers. comm. 2007) and is threatened by reduced reproductive vigor as well as vulnerability to extinction due to a single catastrophic event at either of the facilities that are propagating this species.

##### Summary of Other Natural or Manmade Factors Affecting Their Continued Existence

The threat to *Drosophila attigua* from nonnative tipulid flies is immediate and significant because the larvae of nonnative tipulid flies feed on the same host plants occupied by the larvae of *Drosophila attigua*, and the effect of this competition is a reduction in available host plant material for *D. attigua* larvae. This threat occurs throughout the range of *D. attigua*. Laboratory studies have shown that competition between *Drosophila* larvae and other fly larvae can exhaust food resources, which affects both the probability of larval survival and the body size of adults, resulting in reduced adult fitness, fecundity, and lifespan.

We consider the threat to at least 25 plant species in this proposal from limited numbers of populations and few (less than 50) individuals is significant and immediate for the following reasons: (1) These species may experience reduced reproductive vigor due to ineffective pollination or inbreeding depression; (2) they may experience reduced levels of genetic variability leading to diminished capacity to adapt and respond to environmental changes, thereby lessening the probability of long-term persistence; and (3) a single catastrophic

event may result in extinction of the species. This threat applies to the entire range of each species.

### Proposed Listing Determination

We have carefully assessed the best scientific and commercial information available regarding threats to each of the 48 Kauai species. We find that all of these species face immediate and significant threats throughout their ranges from the present destruction and modification of their habitats, primarily from feral ungulates and nonnative plants, and from the threatened destruction and modification of their habitats from hurricanes (compounded because of their small population sizes and limited distribution), landslides, and flooding. In addition, we are concerned about the effects of projected climate change, particularly rising temperatures and consequent increased likelihood of malarial transmission, but recognize there is limited information on the exact nature of impacts from climate change (Factor A). There is also immediate and significant threat of disease or predation, including avian diseases such as malaria that impact the akikiki and akekee; widespread impacts of predation and herbivory on 36 of the species by nonnative pigs, goats, deer, rats, cats, owls, and invertebrates (Factor C); the threat of extinction due to factors associated with small numbers of populations and individuals; and competition from introduced tipulid flies for *Drosophila attigua* (Factor E) (see Table 2). In addition, the palm *Pritchardia hardyi* is threatened by overcollection (Factor B). These threats are exacerbated by the species' inherent vulnerability to extinction from stochastic events at any time because of their endemism, small numbers of individuals and populations, and restricted habitats.

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species "that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future." We find that each of these endemic species is presently in danger of extinction throughout its entire range, based on the immediacy, severity, and scope of the threats described above. Therefore, on the basis of the best available scientific and commercial information, we propose listing the following 48 species as endangered in accordance with section 3(6) of the Act: the plants *Astelia waialealae*, *Canavalia napaliensis*, *Chamaesyce eleanorae*, *Chamaesyce remyi* var. *kauaiensis*,

*Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea dolichopoda*, *Cyanea eleleensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Cyrtandra oenobarba*, *Cyrtandra paliku*, *Diellia mannii*, *Doryopteris angelica*, *Dryopteris crinalis* var. *podosorus*, *Dubautia imbricata* ssp. *imbricata*, *Dubautia kalalauensis*, *Dubautia kenwoodii*, *Dubautia plantaginea* ssp. *magnifolia*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia helleri*, *Labordia pumila*, *Lysimachia daphnoides*, *Lysimachia iniki*, *Lysimachia pendens*, *Lysimachia scopulens*, *Lysimachia venosa*, *Melicope degeneri*, *Melicope paniculata*, *Melicope puberula*, *Myrsine knudsenii*, *Myrsine mezii*, *Phyllostegia renovans*, *Pittosporum napaliense*, *Platydesma rostrata*, *Pritchardia hardyi*, *Psychotria grandiflora*, *Psychotria hobdyi*, *Schiedea attenuata*, *Stenogyne kealiae*, *Tetraplasandra bisattenuata*, and *Tetraplasandra flynnii*; the birds, akekee (*Loxops caeruleirostris*) and akikiki (*Oreomystis bairdi*); and the insect *Drosophila attigua*.

Under the Act and our implementing regulations, a species may warrant listing if it is threatened or endangered throughout all or a significant portion of its range. Each of the 48 endemic Kauai species proposed for listing in this rule is highly restricted in its range, and the threats occur throughout its range. Therefore, we assessed the status of each species throughout its entire range. In each case, the threats to the survival of these species occur throughout the species' range and are not restricted to any particular portion of that range. Accordingly, our assessment and proposed determination applies to each species throughout its entire range.

### Critical Habitat

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) essential to the conservation of the species and

(b) which may require special management considerations or protection; and

(2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means the use of all methods and procedures that are

necessary to bring an endangered or threatened species to the point at which the measures provided under the Act are no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against Federal agencies carrying out, funding, or authorizing the destruction or adverse modification of critical habitat. Section 7(a)(2) of the Act requires consultation on Federal actions that may affect critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by the landowner. Where a landowner seeks or requests Federal agency funding or authorization that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) would apply, but even in the event of a destruction or adverse modification finding, the landowner's obligation is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

For inclusion in a critical habitat designation, habitat within the geographical area occupied by the species at the time of listing must contain the physical and biological features (we also refer to these as primary constituent elements, or PCEs) that are essential to the conservation of the species, and be included only if those features may require special management considerations or protection. Critical habitat designations identify, to the extent known using the best scientific data available, habitat areas containing the PCEs laid out in the appropriate quantity and spatial arrangement that is essential to the conservation of the species. Under the Act, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed only when we determine that those areas are essential for the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R.

5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be proposed as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources include the recovery plan for the species, if available; articles in peer-reviewed journals; conservation plans developed by States and counties; scientific status surveys and studies; biological assessments; or other unpublished materials and expert opinion or personal knowledge.

Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine to be necessary for the recovery of the species, as additional scientific information may become available in the future. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be required for recovery of the species.

Areas that support populations, but are outside the critical habitat designation, will be subject to conservation actions implemented by the Service and other Federal agencies under section 7(a)(1) of the Act. They are also subject to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available scientific information at the time of the agency action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may require consultation under section 7 of the Act and may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if any new information available to these planning efforts calls for a different outcome.

Section 4(a)(3) of the Act, as amended, and our implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. Service regulations (50 CFR 424.12(a)(1)) state that designation of critical habitat is not prudent when one or both of the following situations exist: (1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species.

In considering the designation of critical habitat for each of the 48 Kauai species, we have determined that there is one species, the palm *Pritchardia hardyi*, for which the designation of critical habitat is not prudent. Rare palm trees are highly desirable to collectors, and there is an active market for the seeds and seedlings of rare palms, including those of *P. hardyi*, through internet sales and online auctions (GardenGuides.com 2007; Rarepalmseeds.com 2007; South Coast Palms 2007; Kapoho Palms 2007; J.D. Anderson Nursery 2007; Jungle Music Palms and Cycads 2007; Tropical Gardens of Maui 2007). Seeds of *P. hardyi* have been stolen from an outplanting site in the past (R. Nishek, pers. comm. 2007), and we have evidence of vandalism and illegal collection of other species of endangered *Pritchardia* palms on Kauai (Johnson 1996, pp. 16-17; A. Kyono, pers. comm. 2000; R. Nishek, pers. comm. 2007). The designation of critical habitat for *P. hardyi* would require us to identify the geographic areas where the species occurs, thereby increasing the species' vulnerability to further unauthorized and illegal collection. Collecting and vandalism is identified as a threat specific to *P. hardyi* in our threats analysis. As the designation of critical habitat for this species would exacerbate this ongoing threat, we determine that the designation of critical habitat for *P. hardyi* is not prudent in accordance with the Act and its implementing regulations.

With the exception of *Pritchardia hardyi*, we find that the designation of critical habitat for each of the other 47 species addressed in this rule will benefit them by serving to focus conservation efforts on the restoration and maintenance of ecosystem functions that are essential for attaining their recovery and long-term viability. In addition, the designation of critical habitat serves to inform management

and conservation decisions by identifying any additional physical and biological features of the ecosystem that may be essential for the conservation of certain species, such as the availability of sufficient arthropod prey for the akikiki and akekee, or hummocks in bog systems for *Astelia waialeale*. We therefore find that designation of critical habitat is prudent for the following 47 Kauai species, as critical habitat would be beneficial and there is no evidence that the designation of critical habitat would result in an increased threat from taking or other human activity for these species: (1) Plants—*Astelia waialeale*, *Canavalia napaliensis*, *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea dolichopoda*, *Cyanea eleeleensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Cyrtandra oenobarba*, *Cyrtandra paliku*, *Diellia mannii*, *Doryopteris angelica*, *Dryopteris crinalis* var. *podosorus*, *Dubautia imbricata* ssp. *imbricata*, *Dubautia kalalauensis*, *Dubautia kenwoodii*, *Dubautia plantaginea* ssp. *magnifolia*, *Dubautia waialeale*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia helleri*, *Labordia pumila*, *Lysimachia daphnoides*, *Lysimachia iniki*, *Lysimachia pendens*, *Lysimachia scopulensis*, *Lysimachia venosa*, *Melicope degeneri*, *Melicope pani!culata*, *Melicope puberula*, *Myrsine knudsenii*, *Myrsine mezii*, *Phyllostegia renovans*, *Pittosporum napaliense*, *Platydesma rostrata*, *Psychotria grandiflora*, *Psychotria hobdyi*, *Schiedea attenuata*, *Stenogyne kealiae*, *Tetraplasandra bisattenuata*, and *Tetraplasandra flynnii*; (2) Animals—akekee, akikiki, and *Drosophila attigua*.

#### Methods

As required by section 4(b) of the Act, we used the best scientific data available in determining those areas that contain the physical and biological features essential to the conservation of the 47 species proposed for listing in this rule, and for which designation of critical habitat is considered prudent, by identifying the occurrence data for each species and determining the ecosystems upon which they depend. This information was developed by using:

- The known locations of the 47 species, including site-specific species information from the Hawaii Biodiversity and Mapping Program (HBMP) database (HBMP 2007) and our own rare plant database;
- Species information from the plant database housed at NTBG;

- The Nature Conservancy's Ecoregional Assessment of the Hawaiian High Islands (2006), and ecosystem maps (2007);

- Color mosaic 1:19,000 scale digital aerial photographs for the Hawaiian Islands (April to May 2005);

- Island-wide Geographic Information System (GIS) coverage, e.g., Gap Analysis Program (GAP) vegetation data 2005;

- 1:24,000 scale digital raster graphics of U.S. Geological Survey (USGS) topographic quadrangles;

- Geospatial data sets associated with parcel data from Kauai County (2005);

- Designated critical habitat for listed species on the island of Kauai (68 FR 9116, February 27, 2003);

- Recent biological surveys and reports; and

- Discussions with qualified individuals familiar with these species and ecosystems (HBMP 2007; TNCH 2007; NTBG in litt. 2007).

Based upon all of this data, we determined that the 47 species addressed in this proposed rule are all found in or dependent upon one or more of the six ecosystems described in this rule: lowland mesic (TNC 2006b), lowland wet (TNC 2006c), montane mesic (TNC 2006e), montane wet (TNC 2006f), dry cliff (TNC 2006a), and wet cliff (TNC 2006d).

#### Primary Constituent Elements

In accordance with section 3(5)(A)(i) and 4(b)(1)(A) of the Act and the regulations at 50 CFR 424.12, in determining which areas to propose as critical habitat, we consider the physical and biological features that are essential to the conservation of the species to be the primary constituent elements laid out in the appropriate quantity and spatial arrangement for conservation of the species. These physical and biological features provide the essential life history requirements of the species which may include, but are not limited to, the following:

(1) Space for individual and population growth, and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, rearing (or development) of offspring, germination, or seed dispersal; and generally;

(5) Habitats that are protected from disturbance or are representative of the historical geographical and ecological distributions of a species.

As required by 50 CFR 424.12(b), we are to list the known primary constituent elements (PCEs) with our description of critical habitat. The primary constituent elements provided by the physical and biological features upon which the designation is based may include, but are not limited to, the following: Roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types.

In this proposal, we derived the PCEs for each of the 47 species primarily based on those physical and biological features that support the successful functioning of the ecosystem upon which that species depends. As each species is dependent upon a functioning ecosystem to provide its fundamental life requirements, such as a certain soil type, minimum level of rainfall, or conditions conducive to supporting the presence of a certain species of plant for foraging or larval development, we considered the physical and biological features of the ecosystems described in this rule to be PCEs for each species. The PCEs collectively provide the suite of environmental conditions within each ecosystem essential to meeting the requirements of each species, including the appropriate microclimatic conditions for germination and growth of the plants (e.g., light availability, soil nutrients, hydrologic regime, temperature); habitat for shelter, foraging, nesting, and raising young in the case of the akikiki and akekee; larval

host plants in the case of the picture-wing fly; and in all cases, space within the appropriate habitats for population growth and expansion, as well as to maintain the historical geographical and ecological distribution of each species.

In many cases, due to our limited knowledge of the specific life-history requirements for these species that are little-studied and occur in remote and/or inaccessible areas, the more general description of the physical and biological features that provide for the successful function of the ecosystem that is essential to the conservation of the species represents the best, and in many cases, the only, scientific information available. Table 3 identifies the PCEs of a functioning ecosystem for each of the ecosystem types identified in this proposed rule; these are termed "ecosystem-level PCEs," and each species identified in this rule requires the ecosystem-level PCEs for each ecosystem in which that species occurs, as noted in Table 4. The ecosystem-level PCEs are defined here by elevation, annual levels of precipitation, substrate type and slope, and the characteristic native plant genera that are found in the canopy, subcanopy, and understory levels of the vegetative community, where applicable. If further information is available indicating additional, specific life-history requirements for some species, PCEs relating to these requirements are described separately and are termed "species-specific PCEs," which are also identified in Table 4. The PCEs for each species are therefore composed of the PCEs for the functioning of its associated ecosystem(s) in combination with additional species-specific requirements, if any, as shown in Table 4. Note that the ecosystem-level PCEs identified in Table 4 for each species are presented in detail in Table 3, thus both Table 3 and Table 4 must be read together to fully describe all of the PCEs for each species.

TABLE 3.—ECOSYSTEM-LEVEL PRIMARY CONSTITUENT ELEMENTS (PCEs) FOR EACH SPECIES (READ IN ASSOCIATION WITH TABLE 4)

Ecosystem	Primary Constituent Elements					
	Elevation	Annual Precipitation	Substrate	One or More of these Associated Native Plants (by Genus)		
				Canopy	Subcanopy	Understory
Lowland Mesic <sup>1</sup>	< 3,000 ft (<1,000 m)	50-75 in (127-190 cm)	shallow soils, little to no herbaceous layer	<i>Acacia, Diospyros, Metrosideros, Myrsine, Pouteria, Santalum</i>	<i>Dodonaea, Freycinetia, Leptecophylla, Melanthera, Osteomeles, Pleomele Psydrax</i>	<i>Carex, Dicranopteris, Diplazium, Elaphoglossum, Peperomia</i>
Lowland Wet <sup>2</sup>	< 3,000 ft (<1,000 m)	> 75 in (> 190 cm)	clays, ashbeds, deep well-drained soils, lowland bogs	<i>Antidesma, Metrosideros, Myrsine, Pisonia, Psychotria</i>	<i>Cibotium, Claoxylon, Hedyotis, Melicope</i>	<i>Alyxia, Cyrtandra, Dicranopteris, Diplazium, Microlepia, Machaerina,</i>
Montane Mesic <sup>3</sup>	3,000 to 6,600 ft (1,000 to 2,000 m)	50-75 in (127-190cm)	weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils	<i>Acacia, Metrosideros, Psychotria, Tetraplasandra, Zanthoxylum</i>	<i>Cheirodendron, Coprosma, Hedyotis, Illex, Myoporum, Myrsine</i>	<i>Bidens, Dryopteris, Leptecophylla, Poa, Scaevola, Sophora</i>
Montane Wet <sup>4</sup>	3,000 to 6,600 ft (1,000 to 2,000 m)	> 75 in (> 190 cm)	well-developed soils, montane bogs	<i>Acacia, Charpentiera, Cheirodendron, Metrosideros</i>	<i>Broussaisia, Cibotium, Eurya, Illex, Myrsine</i>	Ferns, <i>Carex, Coprosma, Leptecophylla, Oreobolus, Rhynchospora, Vaccinium</i>
Dry Cliff <sup>5</sup>	unrestricted	< 75 in (< 190 cm)	> 65 degree slope, rocky talus	none	<i>Antidesma, Chamaesyce, Diospyros, Dodonaea,</i>	<i>Bidens, Eragrostis, Melanthera, Schiedea</i>
Wet Cliff <sup>6</sup>	unrestricted	> 75 in (> 190 cm)	> 65 degree slope, shallow soils, weathered lava	none	<i>Broussaisia, Cheirodendron, Leptecophylla, Metrosideros</i>	Ferns, Bryophytes, <i>Coprosma, Dubautia, Hedyotis, Peperomia</i>

<sup>1</sup> The PCEs for species in the lowland mesic ecosystem apply to the following critical habitat units: Kauai – Lowland Mesic Units 1, 2, 3, 4, and 5.  
<sup>2</sup> The PCEs for species in the lowland wet ecosystem apply to the following critical habitat units: Kauai – Lowland Wet Units 1, 2, 3, 4, 5, and 6.  
<sup>2</sup> The PCEs for species in the lowland wet ecosystem apply to the following critical habitat units: Kauai – Lowland Wet Units 1, 2, 3, 4, 5, and 6.  
<sup>3</sup> The PCEs for species in the montane mesic ecosystem apply to the following critical habitat units: Kauai – Montane Mesic Units 1, 2, and 3.  
<sup>3</sup> The PCEs for species in the montane mesic ecosystem apply to the following critical habitat units: Kauai – Montane Mesic Units 1, 2, and 3.  
<sup>4</sup> The PCEs for species in the montane wet ecosystem apply to the following critical habitat units: Kauai – Montane Wet Units 1, 2, and 3.  
<sup>5</sup> The PCEs for species in the dry cliff ecosystem apply to the following critical habitat units: Kauai – Dry Cliff Units 1 and 2.  
<sup>6</sup> The PCEs for species in the wet cliff ecosystem apply to the following critical habitat units: Kauai – Wet Cliff Units 1, 2, and 3.

TABLE 4.— PRIMARY CONSTITUENT ELEMENTS FOR THE KAUAI SPECIES ARE A COMBINATION OF THE ECOSYSTEM-LEVEL PCEs (SEE TABLE 3) FOR THE APPLICABLE ECOSYSTEM(S) AS WELL AS SPECIES-SPECIFIC PCEs, IF ANY ARE IDENTIFIED

Species	Ecosystem-level PCEs						Species-specific PCEs
	Lowland Mesic	Lowland Wet	Montane Mesic	Montane Wet	Dry Cliff	Wet Cliff	
Plants							
<i>Astelia waialealae</i>				X			Hummocks in bogs
<i>Canavalia napaliensis</i>	X						
<i>Chamaesyce eleanoriae</i>	X				X		

TABLE 4.— PRIMARY CONSTITUENT ELEMENTS FOR THE KAUAI SPECIES ARE A COMBINATION OF THE ECOSYSTEM-LEVEL PCES (SEE TABLE 3) FOR THE APPLICABLE ECOSYSTEM(S) AS WELL AS SPECIES-SPECIFIC PCES, IF ANY ARE IDENTIFIED—Continued

Species	Ecosystem-level PCes						Species-specific PCes
	Lowland Mesic	Lowland Wet	Montane Mesic	Montane Wet	Dry Cliff	Wet Cliff	
<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>		X				X	
<i>Chamaesyce remyi</i> var. <i>remyi</i>	X	X	X	X		X	
<i>Charpentiera densiflora</i>	X	X					
<i>Cyanea dolichopoda</i>						X	
<i>Cyanea eleeeensis</i>		X					
<i>Cyanea kolekoleensis</i>		X					
<i>Cyanea kuhihewa</i>		X					
<i>Cyrtandra oenobarba</i>		X				X	
<i>Cyrtandra paliku</i>						X	
<i>Diellia mannii</i>			X				
<i>Doryopteris angelica</i>	X						
<i>Dryopteris crinalis</i> var. <i>podosorus</i>				X			
<i>Dubautia imbricata</i> ssp. <i>imbricata</i>		X					
<i>Dubautia kalalauensis</i>				X			
<i>Dubautia kenwoodii</i>	X						
<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>						X	
<i>Dubautia waialealae</i>				X			bogs
<i>Geranium kauaiense</i>				X			bogs
<i>Keysseria erici</i>				X			bogs
<i>Keysseria helenae</i>				X			bogs
<i>Labordia helleri</i>	X	X	X	X			
<i>Labordia pumila</i>				X			bogs
<i>Lysimachia daphnoides</i>				X			bogs
<i>Lysimachia iniki</i>						X	
<i>Lysimachia pendens</i>						X	
<i>Lysimachia scopulensis</i>					X		
<i>Lysimachia venosa</i>						X	
<i>Melicope degeneri</i>				X			
<i>Melicope paniculata</i>		X					
<i>Melicope puberula</i>		X		X			
<i>Myrsine knudsenii</i>			X				
<i>Myrsine mezii</i>			X	X			

TABLE 4.— PRIMARY CONSTITUENT ELEMENTS FOR THE KAUAI SPECIES ARE A COMBINATION OF THE ECOSYSTEM-LEVEL PCEs (SEE TABLE 3) FOR THE APPLICABLE ECOSYSTEM(S) AS WELL AS SPECIES-SPECIFIC PCEs, IF ANY ARE IDENTIFIED—Continued

Species	Ecosystem-level PCEs						Species-specific PCEs
	Lowland Mesic	Lowland Wet	Montane Mesic	Montane Wet	Dry Cliff	Wet Cliff	
<i>Phyllostegia renovans</i>		X		X			
<i>Pittosporum napaliense</i>	X						
<i>Platydesma rostrata</i>	X	X	X	X		X	
<i>Psychotria grandiflora</i>			X	X			
<i>Psychotria hobbyi</i>	X						
<i>Schiedea attenuata</i>					X		
<i>Stenogyne kealiae</i>		X	X		X		
<i>Tetraplasandra bisattenuata</i>	X	X					
<i>Tetraplasandra flynnii</i>			X	X			
Animals							
Akekee			X	X			arthropod prey
Akikiki				X			arthropod prey
<i>Drosophila attigua</i>			X	X			larval host plants <i>Cheirodendron</i> sp.

Some of the species addressed in this proposed rule occur in more than one ecosystem. The PCEs for these species are described separately for each ecosystem in which they occur. The reasoning behind this approach is that each species requires a different suite of environmental conditions depending upon the ecosystem in which it occurs. For example, an individual plant of the species *Stenogyne kealiae* will require a different level of annual precipitation, will occur on different soils and slopes, and will grow in association with different native plant species when it is growing in the dry cliff ecosystem as opposed to the lowland wet and montane mesic ecosystems in which it also is found. All of the primary constituent elements as described for each ecosystem in which the species occurs are essential to the conservation of the species to retain its geographical and ecological distribution across the different ecosystem types in which it may occur, and to retain the genetic representation that allows this species to successfully adapt to different environmental conditions in various native ecosystems. It should be noted that, although these species are flexible enough to occur in multiple native ecosystems, the declining abundance of these species in the face of ongoing

threats, such as increasing numbers of nonnative plant competitors, indicates that these species are not such broad habitat generalists as to be able to persist in highly altered habitats. To the best of our knowledge, functioning native ecosystems provide the fundamental biological requirements for all of these species.

Some examples may help to clarify our approach to describing the PCEs for each individual species. If we want to determine the PCEs for the plant *Cyanea dolichopoda*, we look at Table 4 and see that the PCEs for *C. dolichopoda* are provided by the ecosystem-level PCEs for the wet cliff ecosystem. Referring back to Table 3 tells us that the PCEs for the wet cliff ecosystem include no restrictions on elevation; annual precipitation greater than 75 inches; shallow soils or weathered lava at greater than 65 degrees slope; no canopy vegetation; a subcanopy that includes native plants in the genera *Broussaisia*, *Cheirodendron*, *Leptecophylla*, and *Metrosideros*; and an understory of native plants including ferns, bryophytes, and representatives of the genera *Coprosma*, *Dubautia*, *Hedyotis*, and *Peperomia*. As there are no species-specific PCEs identified for *C. dolichopoda*, and this plant is found only in the wet cliff ecosystem, the

ecosystem-level PCEs for the wet cliff ecosystem describe the PCEs for *C. dolichopoda* in their entirety. As another example, Table 4 tells us that the PCEs for the picture-wing fly *Drosophila attigua* include the ecosystem-level PCEs for the montane mesic and montane wet ecosystems, and also that this species has an additional species-specific PCE, the presence of larval host plants in the genus *Cheirodendron*. The PCEs for *D. attigua* are thus composed of the PCEs for each of the two ecosystems it occupies, as described in Table 3 for the montane mesic and montane wet ecosystems, as well as the larval host plant *Cheirodendron*. Table 4 is read in a similar fashion in conjunction with Table 3 to describe the PCEs for each of the 47 species for which we are proposing to designate critical habitat in this proposed rule.

**Criteria Used to Identify Critical Habitat Boundaries**

We considered several factors in the selection and proposal of specific boundaries for critical habitat for these 47 species. We propose to designate critical habitat on lands that contain the physical and biological features essential to conserving multiple species, based on their shared dependence on

the functioning ecosystems they have in common. Because each of the six ecosystems addressed in this rule does not form a single contiguous area, the ecosystems are divided into geographic subunits that we refer to as "sections." The 6 ecosystem areas are divided into a total of 22 separate geographic sections. Although we do not usually refer to areas of critical habitat as sections, compliance with **Federal Register** publication requirements necessitated the subdivision of the ecosystem areas presented here into smaller subunits to correspond with existing critical habitat units currently published in the Code of Federal Regulations (CFR), since much of the proposed critical habitat for the plant species overlies critical habitat already designated for other plants on the island of Kauai. We thus refer to ecosystem "sections" here in order to retain the focus on the contiguous ecosystem areas of interest in this proposed rule, while recognizing that from a legal standpoint, multiple critical habitat units may comprise these sections. Further details are provided under the section titled "Proposed Critical Habitat Designation," below.

The proposed critical habitat is a combination of areas currently occupied by the species in that ecosystem, as well as areas that may be currently unoccupied. Due to the extremely remote and inaccessible nature of the area, surveys are relatively infrequent and may be limited in scope; therefore it is difficult to say with certainty whether individual representatives of a rare species may or may not be present. The occupied areas provide the physical and biological features essential to the conservation of the species that occur there by providing for the successful functioning of the ecosystem on which the species depend. However, due to the small population sizes, few numbers of

individuals, and reduced geographic range of each of the 47 species for which critical habitat is proposed here, we have determined that a designation limited to the known present range of each species would be inadequate to achieve the conservation of those species. The areas believed to be unoccupied have been determined to be essential for the conservation and recovery of the species because they provide the physical and biological features necessary for the expansion of existing wild populations and reestablishment of wild populations within the historical range of the species. For four of the plant species, *Cyanea eleeeleensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, and *Lysimachia venosa*, we are proposing to designate unoccupied areas only, since these species are not believed to be extant in the wild and thus unoccupied areas are essential for their recovery. Critical habitat boundaries were delineated to clearly depict and promote the recovery and conservation of these species by protecting the functioning ecosystems on which they depend.

In some cases, we have identified areas of critical habitat for species in multiple ecosystems. With the exception of the four species described above that are no longer known to be extant in the wild, all of the critical habitat units in these ecosystems contain some areas that are occupied by the species and some areas that are currently unoccupied, but have been determined to be essential for the conservation of the species. Because of the small numbers of individuals or low population sizes of each of the 47 species, each requires suitable habitat and space for the expansion of existing populations to achieve a level that could approach recovery. For example, although *Platydesma rostrata* is found in multiple critical habitat units across

five ecosystem types, only a total of approximately 100 individuals comprise this entire distribution. The unoccupied areas of each unit are essential for the expansion of this species to achieve viable population numbers and maintain its historical geographical and ecological distribution.

The current and historical species location information was used to develop initial critical habitat boundaries (polygons) in each of the 6 ecosystems that would individually and collectively provide for the conservation of the 47 species addressed in this proposed rule. The initial polygons were superimposed over digital topographic maps of the island of Kauai and further evaluated. We also considered the correlation of these areas with areas already designated as critical habitat for other listed species. Land areas that were identified as highly degraded were removed from the proposed critical habitat units, and natural or manmade features (e.g., ridge lines, valleys, streams, coastlines, roads, obvious land features, etc.) were used to delineate the proposed critical habitat boundaries.

The critical habitat areas described below constitute our best assessment of the physical and biological features essential for the recovery and conservation of the 47 species and habitat that is essential to the conservation of the species for population expansion. The approximate size of each of the 22 critical habitat ecosystem sections and the status of their land ownership is identified in Table 5. The species that currently occupy each of the 22 sections are identified in Table 6; this table also identifies the sections that have been designated for the four species that are presumably no longer extant in the wild, and are therefore currently unoccupied by those species.

TABLE 5.—CRITICAL HABITAT PROPOSED FOR 47 KAUAI SPECIES (TOTALS MAY NOT SUM DUE TO ROUNDING)

Proposed critical habitat area	Size of section in acres	Size of section in hectares	Land ownership (acres)		Corresponding critical habitat units and maps in the Code of Federal Regulations (CFR)
			State	Private	
Kauai—Lowland Mesic					
—Section 1	2,007	812	2,007	0	Plants: 50 CFR 17.99, Unit 11, Map 66a
—Section 2	379	154	379	0	Plants: 50 CFR 17.99, Unit 11, Map 66a
—Section 3	124	50	124	0	Plants: 50 CFR 17.99, Unit 11, Map 66a

TABLE 5.—CRITICAL HABITAT PROPOSED FOR 47 KAUAI SPECIES (TOTALS MAY NOT SUM DUE TO ROUNDING)—Continued

Proposed critical habitat area	Size of section in acres	Size of section in hectares	Land ownership (acres)		Corresponding critical habitat units and maps in the Code of Federal Regulations (CFR)
			State	Private	
—Section 4	81	33	81	0	Plants: 50 CFR 17.99, Unit 11, Map 66a
—Section 5	37	15	0	37	Plants: 50 CFR 17.99, Unit 7, Map 23a
TOTAL Lowland Mesic	2,628	1,064	2,590	37	
Kauai—Lowland Wet					
—Section 1	1,164	471	117	1,047	Plants: 50 CFR 17.99, Unit 11, Map 70a; Unit 21, Map 217d.
—Section 2	172	70	172	0	Plants: 50 CFR 17.99, Unit 11, Map 70a
—Section 3	756	306	0	756	Plants: 50 CFR 17.99, Unit 11, Map 70a
—Section 4	591	239	10	581	Plants: 50 CFR 17.99, Unit 11, Map 70a
—Section 5	1,541	624	442	1,099	Plants: 50 CFR 17.99, Unit 10, Map 36a
—Section 6	789	319	134	655	Plants: 50 CFR 17.99, Unit 10, Map 36a
TOTAL Lowland Wet	5,013	2,029	875	4,138	
Kauai—Montane Mesic					
—Section 1	2,462	996	2,462	0	Plants: 50 CFR 17.99, Unit 11, Map 76c. Akekee: 50 CFR 17.95(b), Unit 1 – Montane Mesic. Picture-wing fly: 50 CFR 17.95(i), Unit 1 – Montane Mesic.
—Section 2	376	152	376	0	Plants: 50 CFR 17.99, Unit 11, Map 70c; Unit 22, map 217e. Akekee: 50 CFR 17.95(b), Unit 2 – Montane Mesic. Picture-wing fly: 50 CFR 17.95(i), Unit 2 – Montane Mesic.
—Section 3	138	56	138	0	Plants: 50 CFR 17.99, Unit 23, Map 217f. Akekee: 50 CFR 17.95(b), Unit 3 – Montane Mesic. Picture-wing fly: 50 CFR 17.95(i), Unit 3 – Montane Mesic.
TOTAL Montane Mesic	2,976	1,204	2,976	0	
Kauai—Montane Wet					

TABLE 5.—CRITICAL HABITAT PROPOSED FOR 47 KAUAI SPECIES (TOTALS MAY NOT SUM DUE TO ROUNDING)—Continued

Proposed critical habitat area	Size of section in acres	Size of section in hectares	Land ownership (acres)		Corresponding critical habitat units and maps in the Code of Federal Regulations (CFR)
			State	Private	
—Section 1	14,107	5,709	12,629	1,478	Plants: 50 CFR 17.99, Unit 10, Map 35a; Unit 11, Map 74a; Unit 18, Map 217a; Unit 24, Map 217g; Unit 25, Map 217h. Akekee and akikiki: 50 CFR 17.95(b), Unit 1 – Montane Wet. Picture-wing fly: 50 CFR 17.95(i), Unit 1 – Montane Wet.
—Section 2	790	320	790	0	Plants: 50 CFR 17.99, Unit 11, Map 64a. Akekee and akikiki: 50 CFR 17.95(b), Unit 2 – Montane Wet. Picture-wing fly: 50 CFR 17.95(i), Unit 2 – Montane Wet.
—Section 3	413	167	156	257	Plants: 50 CFR 17.99, Unit 11, Map 64a. Akekee and akikiki: 50 CFR 17.95(b), Unit 3 – Montane Wet. Picture-wing fly: 50 CFR 17.95(i), Unit 3 – Montane Wet.
TOTAL Montane Wet	15,310	6,196	13,575	1,735	
Kauai—Dry Cliff					
—Section 1	404	163	404	0	Plants: 50 CFR 17.99, Unit 11, Map 67a.
—Section 2	308	125	308	0	Plants: 50 CFR 17.99, Unit 11, map 67a.
TOTAL Dry Cliff	712	288	712	0	
Kauai—Wet Cliff					
—Section 1	190	77	190	0	Plants: 50 CFR 17.99, Unit 11, Map 70b.
—Section 2	784	317	778	7	Plants: 50 CFR 17.99, Unit 10, Map 36b; Unit 19, Map 217b.
—Section 3	61	24	8	53	Plants: 50 CFR 17.99, Unit 4, Map 5a; Unit 20, map 217c.
TOTAL Wet Cliff	1,035	418	976	60	
TOTAL ALL SECTIONS	27,674	11,199	21,706	5,970	

TABLE 6.—SPECIES FOR WHICH CRITICAL HABITAT IS DESIGNATED IN EACH ECOSYSTEM

Species	Critical Habitat Units					
	Lowland Mesic	Lowland Wet	Montane Mesic	Montane Wet	Dry Cliff	Wet Cliff
Plants						
<i>Astelía waialealae</i>				X		

TABLE 6.—SPECIES FOR WHICH CRITICAL HABITAT IS DESIGNATED IN EACH ECOSYSTEM—Continued

Species	Critical Habitat Units					
	Lowland Mesic	Lowland Wet	Montane Mesic	Montane Wet	Dry Cliff	Wet Cliff
<i>Canavalia napaliensis</i>	X					
<i>Chamaesyce eleanoriae</i>	X				X	
<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>		X				X
<i>Chamaesyce remyi</i> var. <i>remyi</i>	X	X	X	X		X
<i>Charpentiera densiflora</i>	X	X				
<i>Cyanea dolichopoda</i>						X
<i>Cyanea eleeleensis</i> *		X				
<i>Cyanea kolekoleensis</i> *		X				
<i>Cyanea kuhihewa</i> *		X				
<i>Cyrtandra oenobarba</i>		X				X
<i>Cyrtandra paliku</i>						X
<i>Diellia mannii</i>			X			
<i>Doryopteris angelica</i>	X					
<i>Dryopteris crinalis</i> var. <i>podosorus</i>				X		
<i>Dubautia imbricata</i> ssp. <i>imbricata</i>		X				
<i>Dubautia kalalauensis</i>				X		
<i>Dubautia kenwoodii</i>	X					
<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>						X
<i>Dubautia waialealae</i>				X		
<i>Geranium kuauaiense</i>				X		
<i>Keysseria erici</i>				X		
<i>Keysseria helenae</i>				X		
<i>Labordia helleri</i>	X	X	X	X		
<i>Labordia pumila</i>				X		

TABLE 6.—SPECIES FOR WHICH CRITICAL HABITAT IS DESIGNATED IN EACH ECOSYSTEM—Continued

Species	Critical Habitat Units					
	Lowland Mesic	Lowland Wet	Montane Mesic	Montane Wet	Dry Cliff	Wet Cliff
<i>Lysimachia daphnoides</i>				X		
<i>Lysimachia iniki</i>						X
<i>Lysimachia pendens</i>						X
<i>Lysimachia scopulensis</i>					X	
<i>Lysimachia venosa*</i>						X
<i>Melicope degeneri</i>				X		
<i>Melicope paniculata</i>		X				
<i>Melicope puberula</i>		X		X		
<i>Melicope knudsenii</i>			X			
<i>Myrsine mezii</i>			X	X		
<i>Phyllostegia renovans</i>		X		X		
<i>Pittosporum napaliense</i>	X					
<i>Platydesma rostrata</i>	X	X	X	X		X
<i>Psychotria grandiflora</i>			X	X		
<i>Psychotria hobdyi</i>	X					
<i>Schiedea attenuata</i>					X	
<i>Stenogyne kealiae</i>		X	X		X	
<i>Tetraplasandra bisattenuata</i>	X	X				
<i>Tetraplasandra flynnii</i>			X	X		
Animals						
<i>Akikiki (Oreomystis bairdi)</i>			X	X		
<i>Akekee (Loxops caeruleirostris)</i>				X		
<i>Picture-wing fly (Drosophila attigua)</i>			X	X		

\* Species with an asterisk are those that, to the best of our knowledge, no longer occur naturally in the wild, therefore there is no known occupied critical habitat for these species. The critical habitat units for these species have been determined to be essential to the conservation of the species because the area provides for the reestablishment of populations within the species' historical range.

When determining proposed critical habitat boundaries within this proposed rule, we made every effort to avoid including developed areas such as buildings, paved areas, and other structures that lack the physical and biological features essential for the conservation of the 47 species. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed areas. Any such structures and the land under them inadvertently left inside critical habitat boundaries shown on the maps of this proposed rule have been excluded by text in the proposed rule and are not proposed for designation as critical habitat. Therefore, Federal actions involving these areas would not trigger section 7 consultation with respect to critical habitat unless the specific action would affect the adjacent critical habitat or its primary constituent elements.

#### Special Management Considerations or Protections

The term critical habitat is defined in section 3(5)(A) of the Act, in part, as geographic areas on which are found those physical or biological features essential to the conservation of the species and “which may require special management considerations or protection.” Accordingly, in identifying critical habitat in occupied areas, we determine whether those areas that contain the features essential to the conservation of the species may require any special management actions. Although the determination that special management may be required is not a prerequisite to designating critical habitat in unoccupied areas, special management is needed throughout all of the proposed critical habitat units; the following discussion of special management needs is therefore applicable to each of the 47 Kauai species for which we are proposing to designate critical habitat in this proposed rule.

The 47 Kauai species for which we are proposing to designate critical habitat in this proposed rule include 43 species that are currently found in the wild, and four species that are not currently extant in the wild. For each of the 43 Kauai species currently found in the wild and for which we are proposing critical habitat, we have determined that the features essential to their conservation are primarily dependent on the successful functioning of the ecosystem(s) in which they occur (Tables 3 and 4). As described earlier, in some cases, additional species-specific primary constituent elements were also

identified (Table 4). Special management considerations or protections are necessary throughout the critical habitat areas proposed here to avoid further degradation or destruction of the habitat that provides those features essential to their conservation. The primary threats to the physical and biological features essential to the conservation of all of these species include habitat destruction and modification by feral ungulates, competition with nonnative species, hurricanes, landslides, flooding, and climate change. The reduction of these threats will require the implementation of special management actions within each of the critical habitat areas identified in this proposed rule.

All proposed critical habitat requires active management to address the ongoing degradation and loss of native habitat caused by feral ungulates (pigs, goats, black-tailed deer). Feral ungulates also impact the habitat through predation and trampling. Without this special management, habitat containing the features that are essential for the conservation of these species will continue to be degraded and destroyed.

All proposed critical habitat requires active management to address the ongoing degradation and loss of native habitat caused by nonnative plants. Special management is also required to prevent the introduction of new alien plant species into native habitats. Particular attention is required in nonnative plant control efforts to avoid creating additional disturbances that may facilitate the further introduction and establishment of invasive plant seeds. Precautions are also required to avoid the inadvertent trampling of listed plant species in the course of management activities. The active control of nonnative plant species will help to address the threat posed by fire to three of the critical habitat areas in particular (Kauai—Lowland Mesic—Section 1, Kauai—Montane Mesic—Section 2, and Kauai—Dry Cliff—Section 1; see Table 5 for corresponding CFR unit numbers). This threat is largely a result of the presence of nonnative species, such as the grasses *Andropogon* sp. and *Setaria* sp., that increase the fuel load and quickly regenerate after a fire. These species can outcompete native plants that are not adapted to fire, creating a grass-fire cycle that alters ecosystem functions (D’Antonio and Vitousek 1992, pp. 64-66; Brooks *et al.* 2004, p. 680).

In addition, five sections of the critical habitat areas (Kauai—Dry Cliff—Section 1, Kauai—Dry Cliff—Section 2, Kauai—Wet Cliff—Section 1, Kauai—Wet Cliff—Section 2, and Kauai—Wet

Cliff—Section 3; see Table 5 for corresponding CFR unit numbers) may require special management to reduce the threat of landslides and flooding, which threaten to further degrade the habitat conditions and have the potential to eliminate some species in their entirety (e.g., *Schiedea attenuata*).

In summary, we find that each of the areas we are proposing as critical habitat contains features essential to the conservation of the species that may require special management considerations or protection to ensure the conservation of the 47 Kauai species. These special management considerations and protections are required to preserve and maintain the essential features provided to these species by the ecosystems upon which they depend. A more detailed discussion of these threats is presented above (“Summary of Factors Affecting the Species”).

#### Proposed Critical Habitat Designation

We are proposing critical habitat in 6 ecosystem types as critical habitat for 47 species; this critical habitat falls within 12 critical habitat units for the plants, 6 critical habitat units for the birds, and 6 critical habitat units for the picture-wing fly (see Table 5, above, for details). In total, approximately 27,674 ac (11,199 ha) fall within the boundaries of this proposed critical habitat designation. Of these proposed units, 26,028 ac (10,533 ha), or 94 percent, are already designated as critical habitat for other listed species. The proposed critical habitat includes land under State and private ownership. The critical habitat units we describe below constitute our current best assessment of those areas that meet the definition of critical habitat for the 47 species of plants and animals.

Because much of the proposed critical habitat for the plants overlies critical habitat already designated for other plant species on the island of Kauai, we have incorporated the maps of the ecosystem areas identified in this proposed rule into the existing critical habitat unit numbering system established for plants on the island of Kauai in the Code of Federal Regulations (50 CFR 17.99(a)(1)). This required further subdividing some of the ecosystem areas that we identified as “sections” into units that correspond to both existing and new critical habitat unit numbers and map numbers as published in the CFR. The maps and area descriptions presented here represent the 6 essential ecosystem areas that we have identified for all 47 species, subdivided into a total of 22 sections. For the 44 plant species, the

critical habitat unit numbers that collectively comprise these ecosystem areas and the corresponding map numbers that will appear at 50 CFR 17.99 are additionally provided for ease of reference with the CFR. Critical habitat for each of the 3 animal species is published in a separate section of the CFR (50 CFR 17.95(b) for the akekee and akikiki, and 50 CFR 17.95(i) for the picture-wing fly), and thus have their own separate critical habitat unit numbers and map numbers; these numbers are also provided in each of the critical habitat descriptions below for reference in the CFR.

As provided under section 4(b)(2) of the Act, all or portions of each of these areas may be considered for exclusion from critical habitat when this rule is finalized. Exclusions are considered based on the relative costs and benefits of designating critical habitat, including information provided during the public comment period on potential economic impacts of this proposed critical habitat designation, and may be made at the

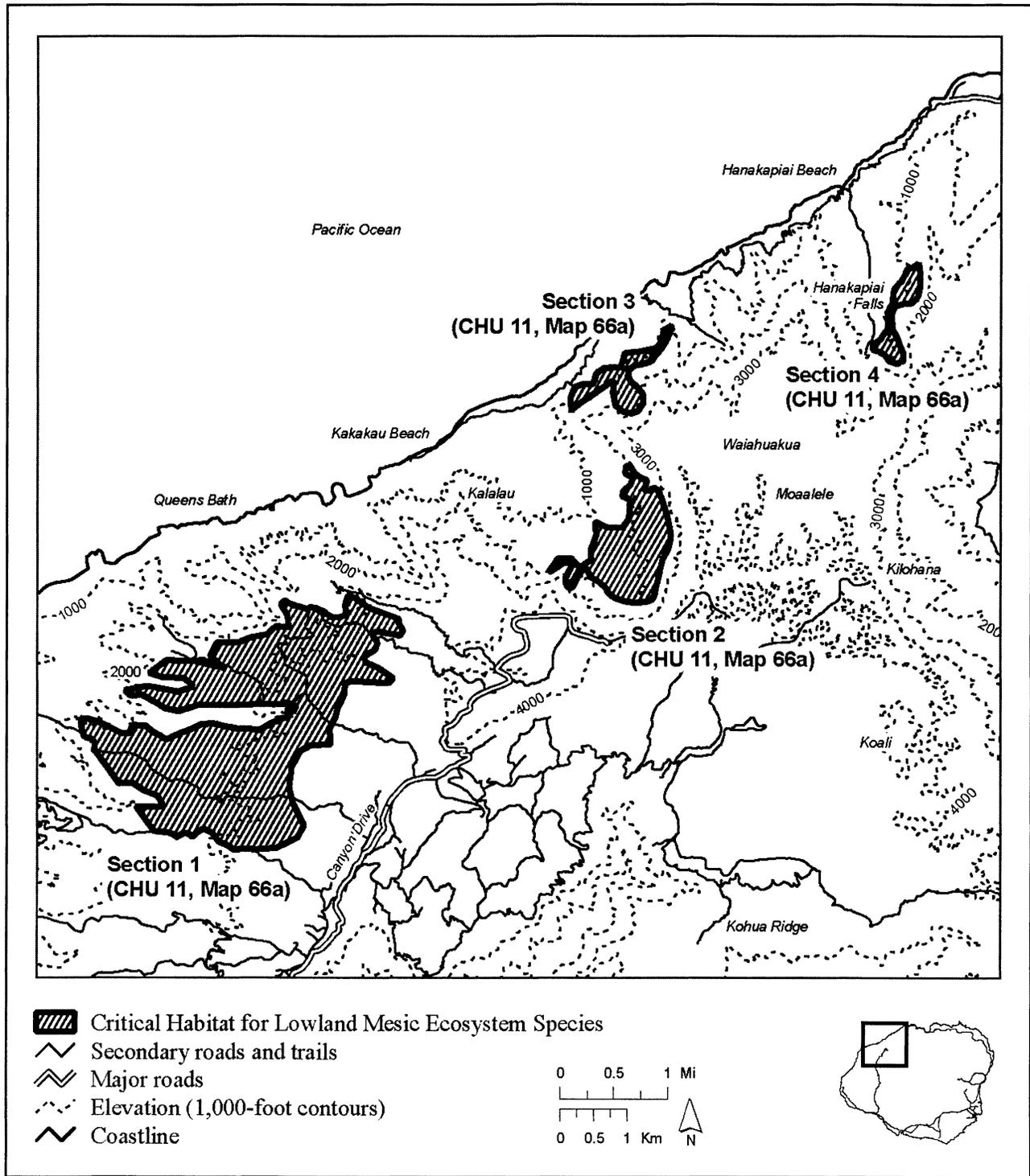
discretion of the Secretary. The consideration of potential economic impacts applies solely to the designation of critical habitat, and is not a factor in our assessment of whether a species warrants listing as a threatened or endangered species under the Act.

#### *Kauai—Lowland Mesic—Section 1*

Lowland Mesic – Section 1 consists of 2,007 ac (812 ha) in the lowland mesic ecosystem, including mesic forest extending from Awaawapuhi Trail south to Makaha Ridge, in the Na Pali Kona Forest Reserve and the Kuia NAR (Figure 1-A). The entire section is State-owned and within previously designated critical habitat; it falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 66a. This section is occupied by the plants *Doryopteris angelica*, *Labordia helleri*, *Platydesma rostrata* and *Psychotria hobyi*, and includes mesic forest, the moisture regime, and canopy, subcanopy, and understory native plant species identified as PCEs in the lowland mesic ecosystem (Table 3). This section also contains

unoccupied habitat that is essential to the conservation of these four species by providing the physical and biological features necessary for the expansion of the existing wild populations. Lowland Mesic – Section 1 is not known to be occupied by the species *Canavalia napaliensis*, *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Dubautia kenwoodii*, *Pittosporum napaliense*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland mesic species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

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**Figure 1-A.** Areas proposed for designation of critical habitat for 11 plant species in the Lowland Mesic Ecosystem (Sections 1-4). Critical habitat unit (CHU) numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Lowland Mesic—Section 2*

Lowland Mesic – Section 2 consists of 379 ac (154 ha) in the lowland mesic ecosystem, including mesic forest extending from Keanapuka to Kahuamaa Flat along the rim and cliffs of the Kalalau Valley, in the Na Pali Coast State Park (Figure 1-A, above). The entire section is State-owned and within previously designated critical habitat; it falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 66a. This section is occupied by the plants *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Dubautia kenwoodii*, *Pittosporum napaliense*, and *Psychotria hobdyi*, and includes mesic forest, the moisture regime, and canopy, subcanopy, and understory native plant species identified as PCEs in the lowland mesic ecosystem (Table 3). This section also contains unoccupied habitat that is essential to the conservation of these six species by providing the physical and biological features necessary for the expansion of the existing wild populations. Lowland Mesic – Section 2 is not known to be occupied by the species *Canavalia napaliensis*, *Doryopteris angelica*, *Labordia helleri*, *Platydesma rostrata*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland mesic species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

*Kauai—Lowland Mesic—Section 3*

Lowland Mesic – Section 3 consists of 124 ac (50 ha) in the lowland mesic ecosystem, including mesic forest extending from Manono Ridge, Pohakuao Valley, to Kanakuu, within the Na Pali Coast State Park (Figure 1-A, above). The entire section is State-owned and within previously designated critical habitat; it falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 66a. This section is occupied by the plants *Canavalia napaliensis*, *Chamaesyce eleanoriae*, and

*Charpentiera densiflora*, and includes mesic forest, the moisture regime, and canopy, subcanopy, and understory native plant species identified as PCEs in the lowland mesic ecosystem (Table 3). This section also contains unoccupied habitat that is essential to the conservation of these three species by providing the physical and biological features necessary for the expansion of the existing wild populations. Lowland Mesic – Section 3 is not known to be occupied by the species *Chamaesyce remyi* var. *remyi*, *Doryopteris angelica*, *Dubautia kenwoodii*, *Labordia helleri*, *Pittosporum napaliense*, *Platydesma rostrata*, *Psychotria hobdyi*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland mesic species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

*Kauai—Lowland Mesic—Section 4*

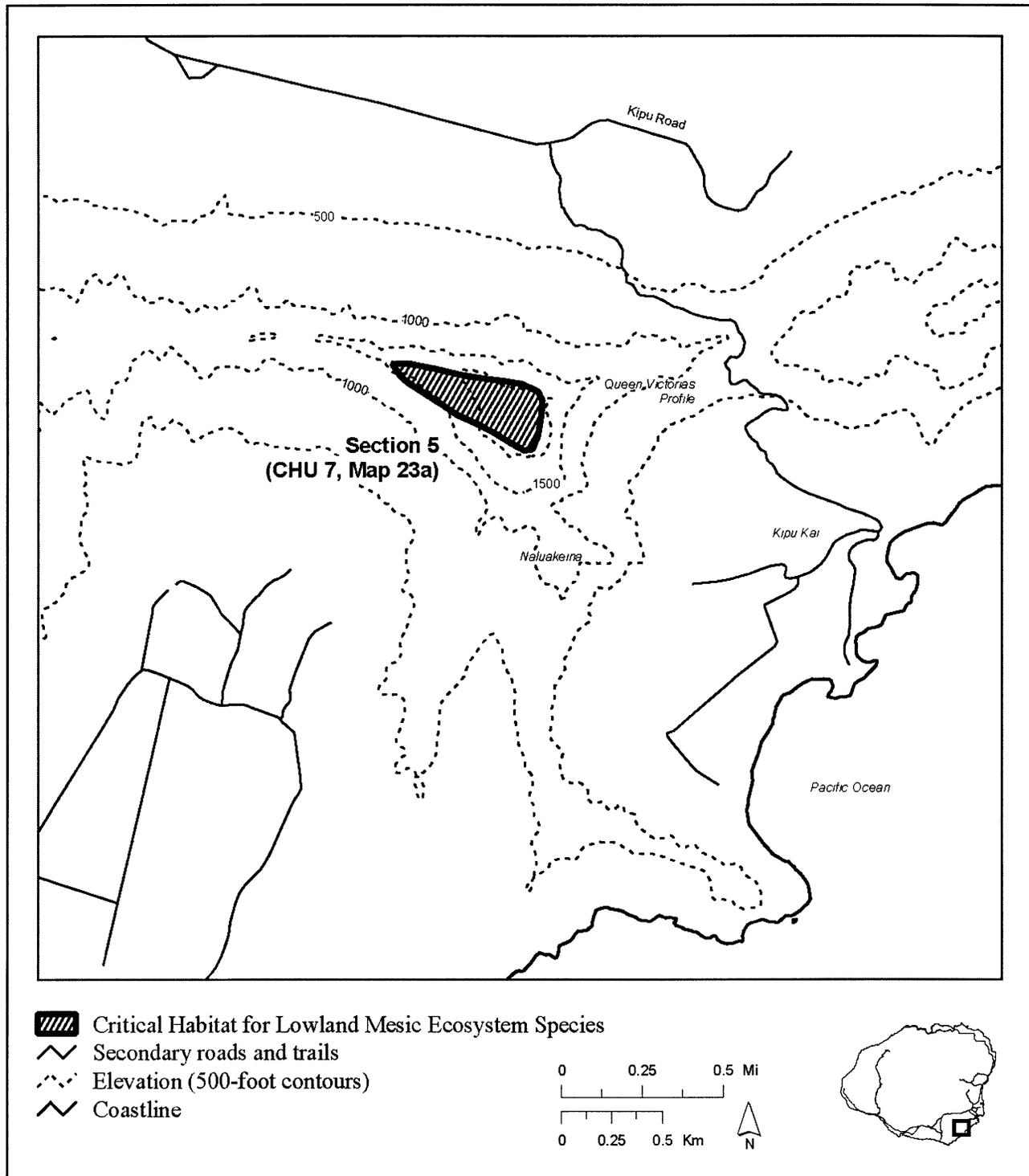
Lowland Mesic – Section 4 consists of 81 ac (33 ha) in the lowland mesic ecosystem, including mesic forest at the head of the Hanakapiai Valley, in the Na Pali Coast State Park (Figure 1-A, above). The entire section is State-owned and within previously designated critical habitat; it falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 66a. This section is occupied by the plant *Charpentiera densiflora*, and includes mesic forest, the moisture regime, and canopy, subcanopy, and understory native plant species identified as PCEs in the lowland mesic ecosystem (Table 3). This section also contains unoccupied habitat that is essential to the conservation of this species by providing the physical and biological features necessary for the expansion of the existing wild population. Lowland Mesic – Section 4 is not known to be occupied by the species *Canavalia napaliensis*, *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *remyi*, *Doryopteris angelica*, *Dubautia kenwoodii*, *Labordia helleri*, *Pittosporum napaliense*, *Platydesma*

*rostrata*, *Psychotria hobdyi*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland mesic species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

*Kauai—Lowland Mesic—Section 5*

Lowland Mesic – Section 5 consists of 37 ac (15 ha) in the lowland mesic ecosystem, including mesic forest on the slopes of Mt. Haupū, on privately owned land (Figure 1-B). The entire section is within previously designated critical habitat, and falls within Critical Habitat Unit 7 of 50 CFR 17.99, Map 23a. This section is occupied by the plants *Chamaesyce remyi* var. *remyi* and *Tetraplasandra bisattenuata*, and includes mesic forest and shrubland, the moisture regime, and subcanopy and understory native plant species identified as PCEs in the lowland mesic ecosystem (Table 3). This section also contains unoccupied habitat that is essential to the conservation of these two species by providing the physical and biological features necessary for the expansion of the existing wild populations. Lowland Mesic – Section 5 is not known to be occupied by the species *Canavalia napaliensis*, *Chamaesyce eleanoriae*, *Charpentiera densiflora*, *Doryopteris angelica*, *Dubautia kenwoodii*, *Labordia helleri*, *Pittosporum napaliense*, *Platydesma rostrata*, and *Psychotria hobdyi*. We have, however, determined this area to be essential for the conservation and recovery of these lowland mesic species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

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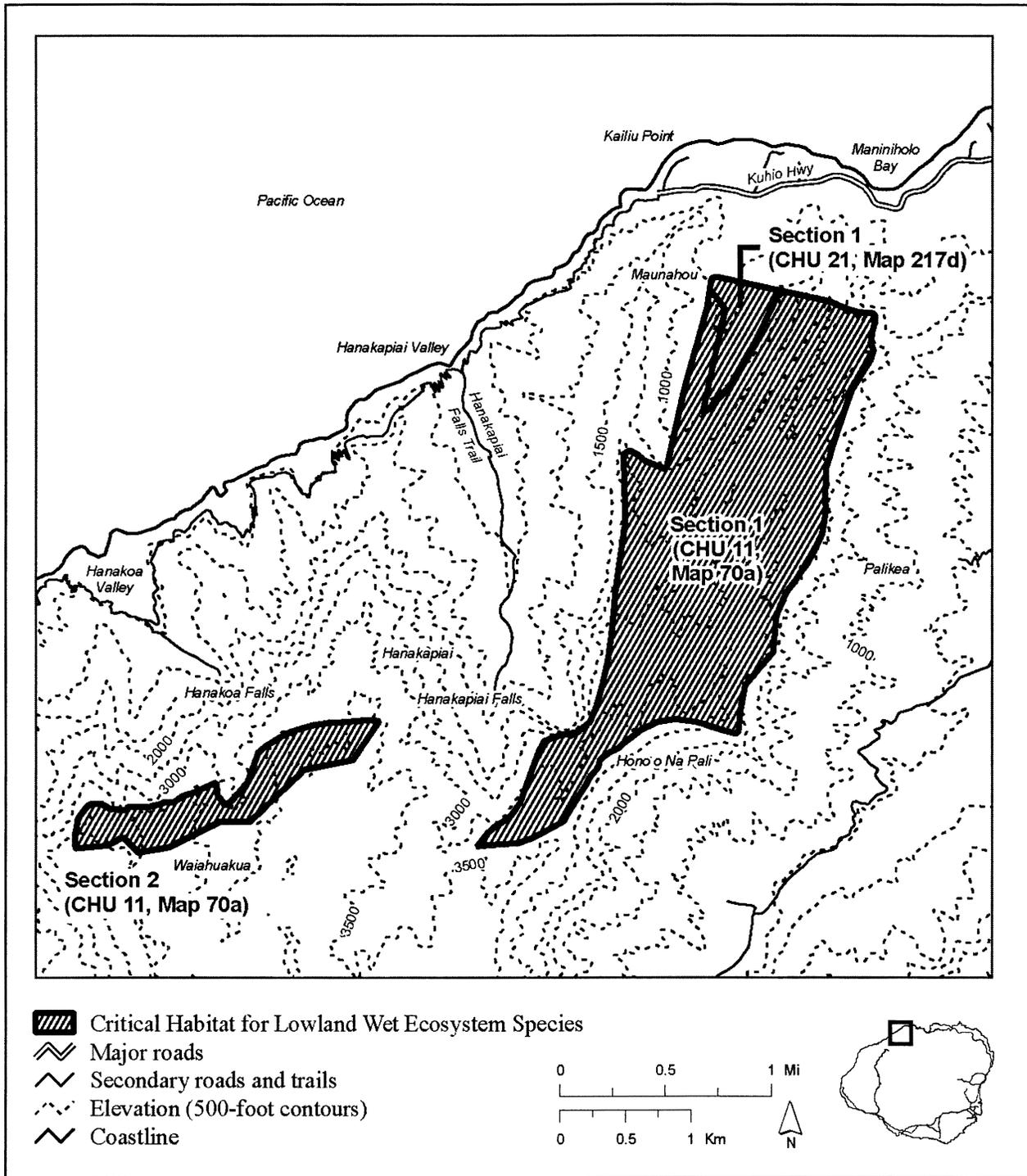
**Figure 1-B.** Areas proposed for designation of critical habitat for 11 plant species in the Lowland Mesic Ecosystem (Section 5). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Lowland Wet—Section 1*

Lowland Wet – Section 1 consists of 1,164 ac (471 ha) in the lowland wet ecosystem (117 ac (47.4 ha) on State land; 1,047 ac (424 ha) on private land), including wet forest extending from Kulanalilia into Limahuli Valley to Honoonapali, in the Halelea Forest Reserve (Figure 2-A). The section includes 1,099 ac (445 ha) of State and privately owned land within previously designated critical habitat and 65 ac (26 ha) of newly proposed critical habitat on private land. The area that falls within designated critical habitat lies within Critical Habitat Unit 11 of 50 CFR 17.99, Map 70a, and proposed new Critical Habitat Unit 21, Map 217d. This section

is occupied by the plants *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Labordia helleri*, and *Phyllostegia renovans*. This section also contains unoccupied habitat that is essential to the conservation of these three species by providing the physical and biological features necessary for the expansion of the existing wild populations. This section includes the lowland wet forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the lowland wet ecosystem (Table 3). Lowland Wet – Section 1 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis*, *Cyanea eleelensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*,

*Cyrtandra oenobarba*, *Dubautia imbricata* ssp. *imbricata*, *Melicope paniculata*, *Melicope puberula*, *Platydesma rostrata*, *Stenogyne kealiae*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.



**Figure 2-A.** Areas proposed for designation of critical habitat for 15 plant species in the Lowland Wet Ecosystem (Sections 1-2). Section 1 overlies an existing critical habitat unit (CHU) on Kauai (CHU 11) and an area not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Lowland Wet—Section 2*

Lowland Wet – Section 2 consists of 172 ac (70 ha) in the lowland wet ecosystem, including wet forest extending from Alealau to Pohakea, within the Hono o Na Pali NAR and the Na Pali Coast State Park (Figure 2-A, above). The entire section is State-owned and within previously designated critical habitat; it falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 70a, and is occupied by the plant *Melicope puberula*. This section also contains unoccupied habitat that is essential to the conservation of this species by providing the physical and biological features necessary for the expansion of the existing wild population. This section includes the lowland wet forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the lowland wet ecosystem (Table 3). Lowland Wet – Section 2 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea eleelensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Cyrtandra oenobarba*, *Dubautia imbricata* ssp. *imbricata*, *Labordia helleri*, *Melicope paniculata*, *Phyllostegia renovans*,

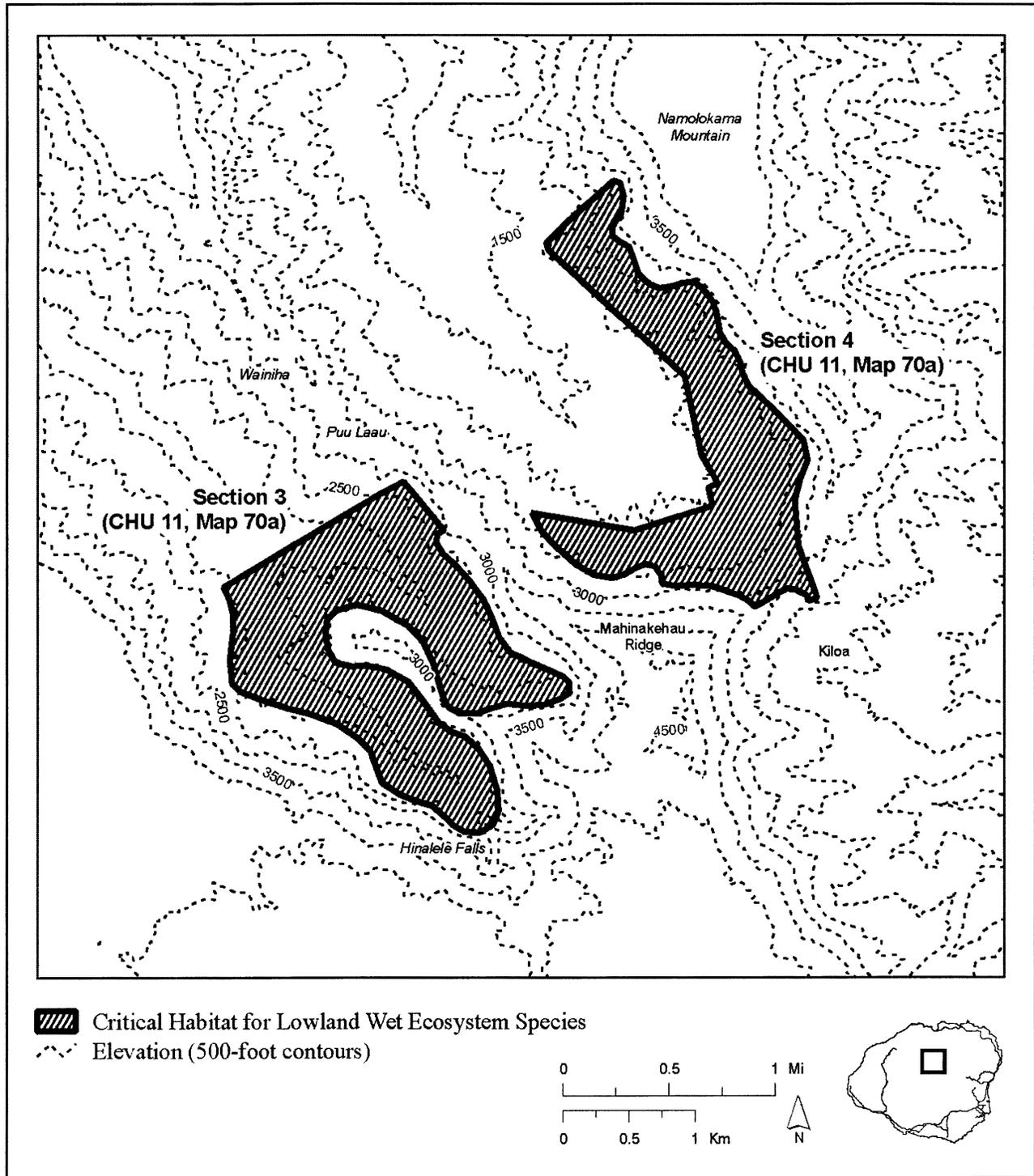
*Platydesma rostrata*, *Stenogyne kealiae*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

*Kauai—Lowland Wet—Section 3*

Lowland Wet – Section 3 consists of 756 ac (306 ha) in the lowland wet ecosystem, including wet forest in upper Wainiha Valley, on privately owned land in the Halelea Forest Reserve (Figure 2-B). The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 11 of 50 CFR 17.99, Map 70a, and is occupied by the plants *Chamaesyce remyi* var. *kauaiensis*, *Cyrtandra oenobarba*, *Melicope puberula*, and *Stenogyne kealiae*. This section also contains unoccupied habitat that is essential to the conservation of these

four species by providing the physical and biological features necessary for the expansion of the existing wild populations. This section includes the lowland wet forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the lowland wet ecosystem (Table 3). Lowland Wet – Section 3 is not known to be occupied by the species *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea eleelensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Dubautia imbricata* ssp. *imbricata*, *Labordia helleri*, *Melicope paniculata*, *Phyllostegia renovans*, *Platydesma rostrata*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

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**Figure 2-B.** Areas proposed for designation of critical habitat for 15 plant species in the Lowland Wet Ecosystem (Sections 3-4). Critical habitat unit (CHU) numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Lowland Wet—Section 4*

Lowland Wet – Section 4 consists of 591 ac (239 ha) in the lowland wet ecosystem, including wet forest at the head of Lumahai Valley, on State (10 ac, 4.1 ha) and privately owned (581 ac, 235 ha) land in the Halelea Forest Reserve (Figure 2-B, above). The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 11 of 50 CFR 17.99, Map 70a, and is occupied by the plants *Chamaesyce remyi* var. *remyi*, *Cyrtandra oenobarba*, *Melicope paniculata*, *Phyllostegia renovans*, and *Platydesma rostrata*. This section also contains unoccupied habitat that is essential to the conservation of these five species by providing the physical and biological features necessary for the expansion of the existing wild populations. This section includes the lowland wet forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the lowland wet ecosystem (Table 3). Lowland Wet – Section 4 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis*, *Charpentiera densiflora*, *Cyanea eleelensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Dubautia imbricata* ssp. *imbricata*, *Labordia helleri*, *Melicope puberula*, *Stenogyne kealiae*,

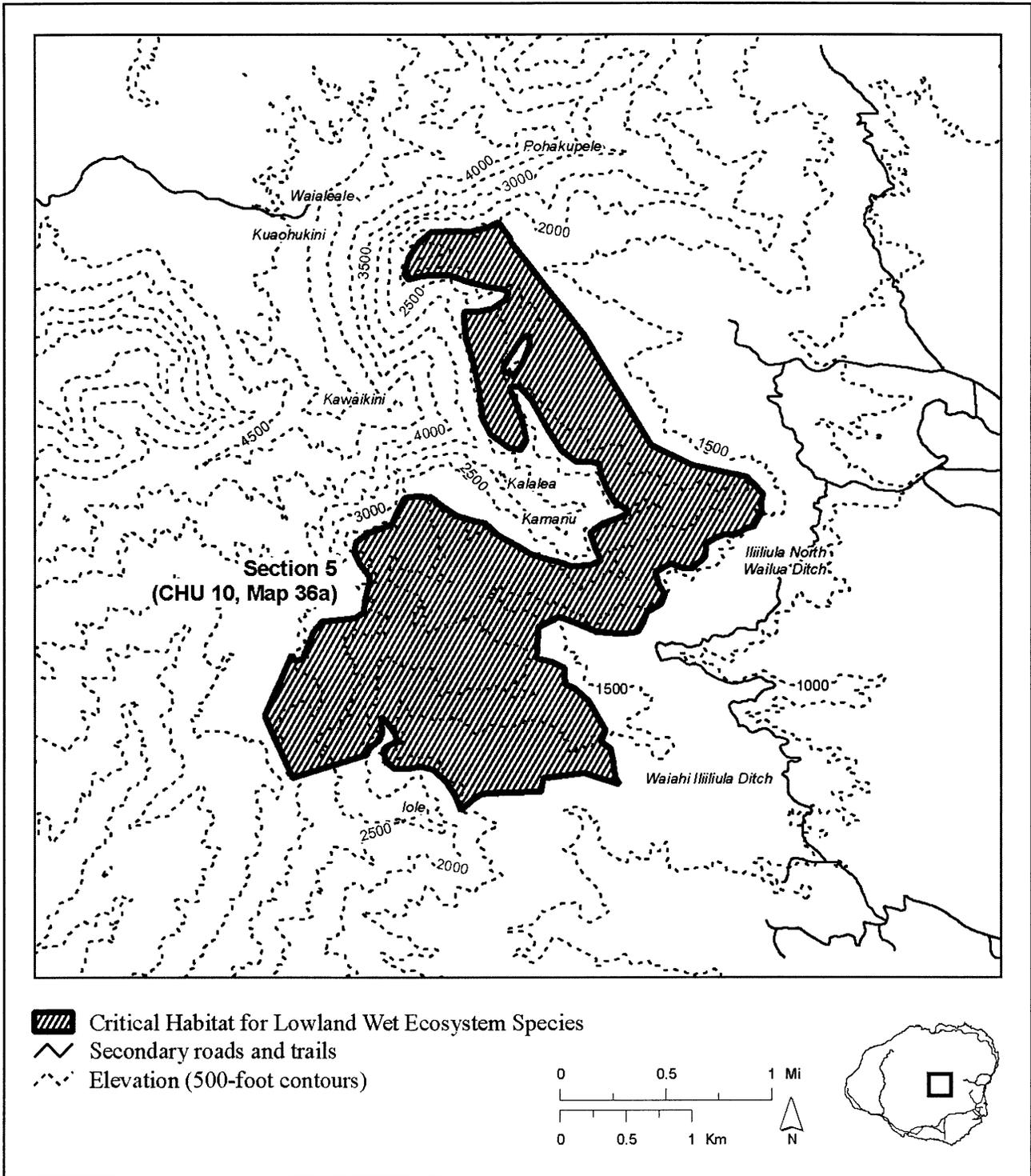
and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

*Kauai—Lowland Wet—Section 5*

Lowland Wet – Section 5 consists of 1,541 ac (624 ha) in the lowland wet ecosystem, including wet forest extending from the headwaters of the Wailua River at “Blue Hole” south to Iole, on State (442 ac, 179 ha) and privately owned (1,099 ac, 445 ha) land in the Lihue-Koloa Forest Reserve (Figure 2-C). The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 10 of 50 CFR 17.99, Map 36a, and is occupied by the plants *Cyrtandra oenobarba*, *Dubautia imbricata* ssp. *imbricata*, *Melicope paniculata*, and *Platydesma rostrata*. This section also contains unoccupied habitat that is essential to

the conservation of these four species by providing the physical and biological features necessary for the expansion of the existing wild populations. This section includes the lowland wet forest, the moisture regime, and canopy, subcanopy and understory plant species identified as PCEs in the lowland wet ecosystem (Table 3). Lowland Wet – Section 5 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea eleelensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Labordia helleri*, *Melicope puberula*, *Phyllostegia renovans*, *Stenogyne kealiae*, and *Tetraplasandra bisattenuata*. We have, however, determined this area to be essential for the conservation and recovery of these lowland wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

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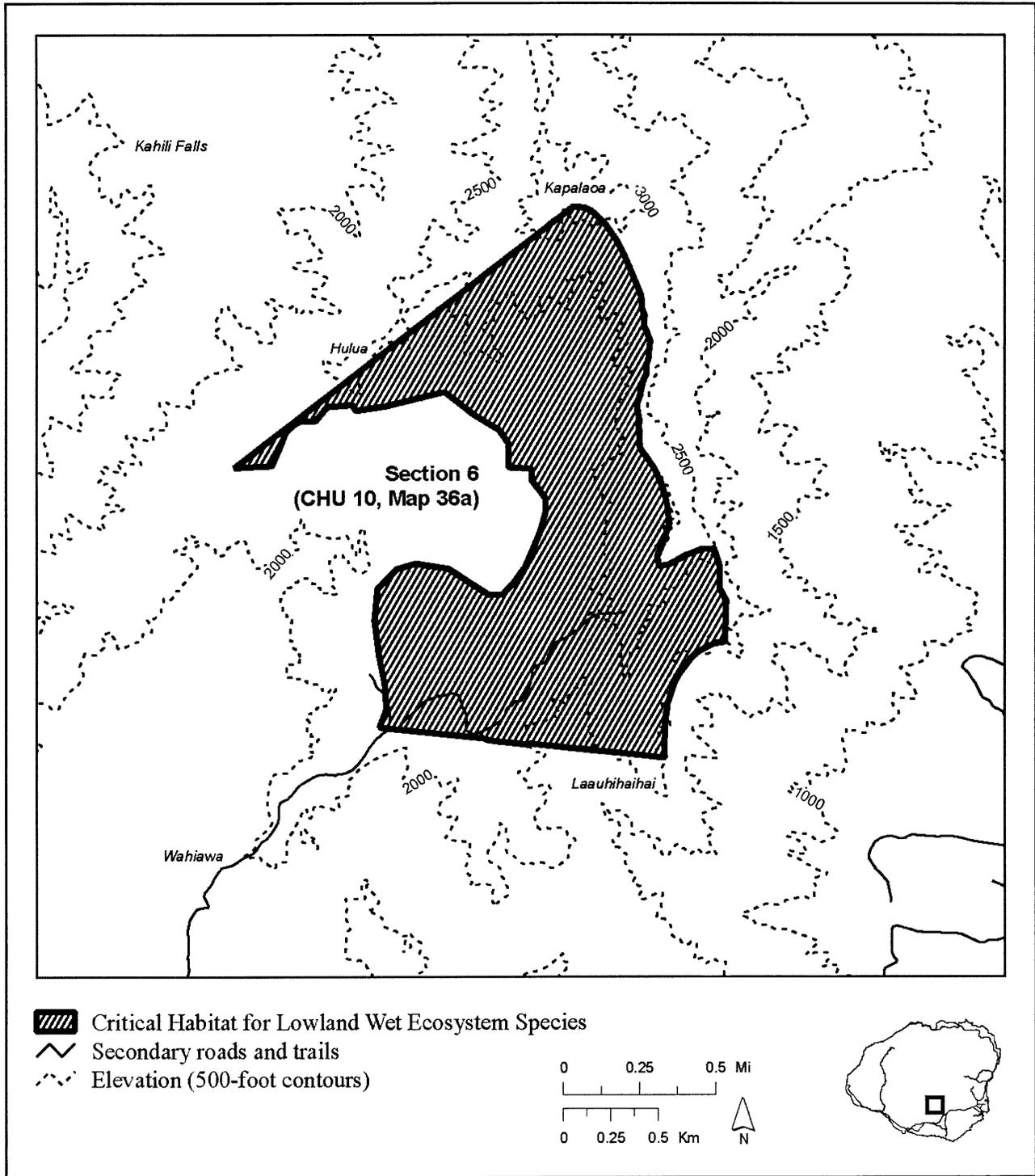
**Figure 2-C.** Areas proposed for designation of critical habitat for 15 plant species in the Lowland Wet Ecosystem (Section 5). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Lowland Wet—Section 6*

Lowland Wet – Section 6 consists of 789 ac (319 ha) in the lowland wet ecosystem, including wet forest extending from Kapalaoa to Kanaele Bog and Lauahihaihai in the Wahiawa Mountains, on State (134 ac, 54 ha) and privately owned (655 ac, 265 ha) land in the Lihue-Koloa Forest Reserve (Figure 2-D). The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 10 of 50 CFR 17.99, Map 36a, and is occupied by the plants *Chamaesyce remyi* var. *remyi*, *Cyrtandra oenobarba*, *Dubautia imbricata* ssp. *imbricata*, *Platydesma*

*rostrata*, and *Tetraplasandra bisattenuata*. This section also contains unoccupied habitat that is essential to the conservation of these five species by providing the physical and biological features necessary for the expansion of the existing wild populations. This section includes the lowland wet forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the lowland wet ecosystem (Table 3). Lowland Wet – Section 6 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis*, *Charpentiera densiflora*, *Cyanea eleelensis*, *Cyanea kolekoleensis*,

*Cyanea kuhihewa*, *Labordia helleri*, *Melicope paniculata*, *Melicope puberula*, *Phyllostegia renovans*, and *Stenogyne kealiae*. We have, however, determined this area to be essential for the conservation and recovery of these lowland wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.



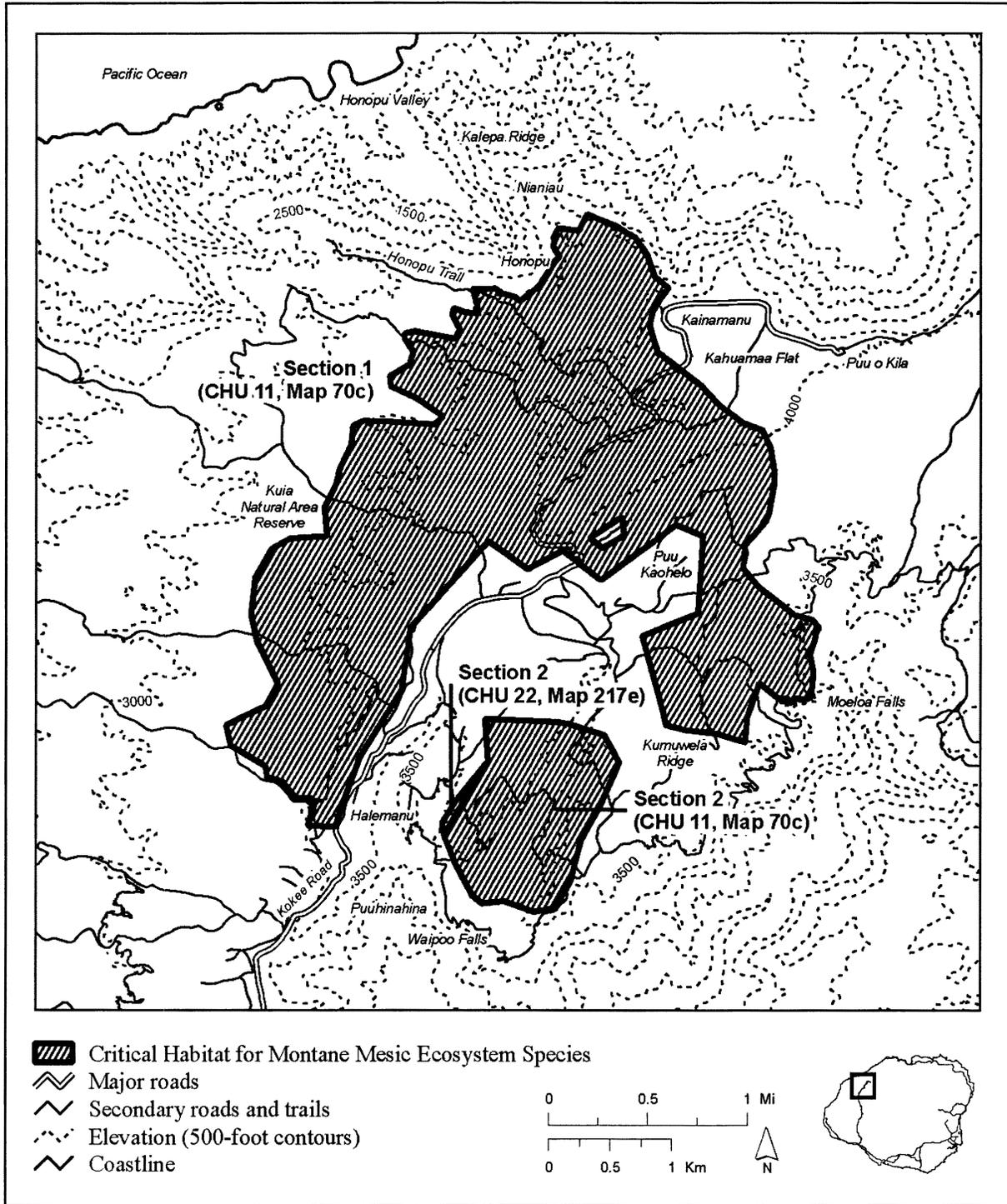
**Figure 2-D.** Areas proposed for designation of critical habitat for 15 plant species in the Lowland Wet Ecosystem (Section 6). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Montane Mesic—Section 1*

Montane Mesic – Section 1 consists of 2,462 ac (996 ha) in the montane mesic ecosystem, including the area above Honopu Valley to Mahanaloa Valley, on State-owned land in Kokee State Park, the Na Pali-Kona Forest Reserve, and Kuia NAR (Figure 3-A). The entire section is within previously designated critical habitat for the plant species, falling within Critical Habitat Unit 11 of 50 CFR 17.99, Map 70C, and is occupied by the plants *Chamaesyce remyi* var. *remyi*, *Labordia helleri*, *Myrsine knudsenii*, *Platydesma rostrata*, *Psychotria grandiflora*, *Stenogyne kealiae*, and *Tetraplasandra flynnii*. This section is also occupied by the bird

akekee, and the picture-wing fly *Drosophila attigua*; maps of critical habitat for these species can be found at 50 CFR 17.95(b) for the akekee (Unit 1 – Montane Mesic), and at 50 CFR 17.95(i) for the picture-wing fly (Unit 1 – Montane Mesic). This section also contains unoccupied habitat that is essential to the conservation of these nine species by providing the physical and biological features necessary for the expansion of the existing wild populations. This section includes the montane mesic forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the montane mesic ecosystem (Table 3), as well as species-specific PCEs for the akekee (arthropod prey)

and picture-wing fly (the larval-stage host plant, *Cheirodendron* sp.). Montane Mesic – Section 1 is not known to be occupied by the species *Diellia mannii* and *Myrsine mezii*. We have, however, determined this area to be essential for the conservation and recovery of these montane mesic species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.



**Figure 3-A.** Areas proposed for designation of critical habitat for 9 plant species, the akekee, and the picture-wing fly in the Montane Mesic Ecosystem (Sections 1-2). Section 2 overlies an existing critical habitat unit (CHU) on Kauai (CHU 11) and an area not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Montane Mesic—Section 2*

Montane Mesic – Section 2 consists of 376 ac (152 ha) in the montane mesic ecosystem and includes a portion of the area surrounding a tributary of Nawaimaka Stream east to Kumuwela Ridge (Figure 3-A). The entire section is State-owned within Kokee State Park, and includes 8 ac (3 ha) of newly proposed critical habitat. This section is occupied by *Diellia mannii* and the picture-wing fly *Drosophila attigua* and includes the montane mesic forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the montane mesic ecosystem (Table 3), as well as the larval-stage host plant (*Cheirodendron* sp.) associated with the picture-wing fly. This section also contains unoccupied habitat that is essential to the conservation of these two species by providing the physical and biological features necessary for the expansion of the existing wild populations. Montane Mesic – Section 2 is not known to be occupied by the plants *Chamaesyce remyi* var. *remyi*, *Labordia helleri*, *Myrsine knudsenii*, *Myrsine mezii*, *Platydesma rostrata*, *Psychotria grandiflora*, *Stenogyne kealiae*, and *Tetraplasandra flynnii*; or by the bird akekee. We have, however, determined this area to be essential for the conservation and recovery of these montane mesic species because it provides the physical and biological

features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

For the plants, that portion of the section that overlies previously designated critical habitat falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 70c. The previously undesignated land comprises proposed Critical Habitat Unit 22 of 50 CFR 17.99, Map 217e. Maps of critical habitat for the akekee can be found at 50 CFR 17.95(b) (Unit 2 – Montane Mesic), and for the picture-wing fly at 50 CFR 17.95(i) (Unit 2 – Montane Mesic).

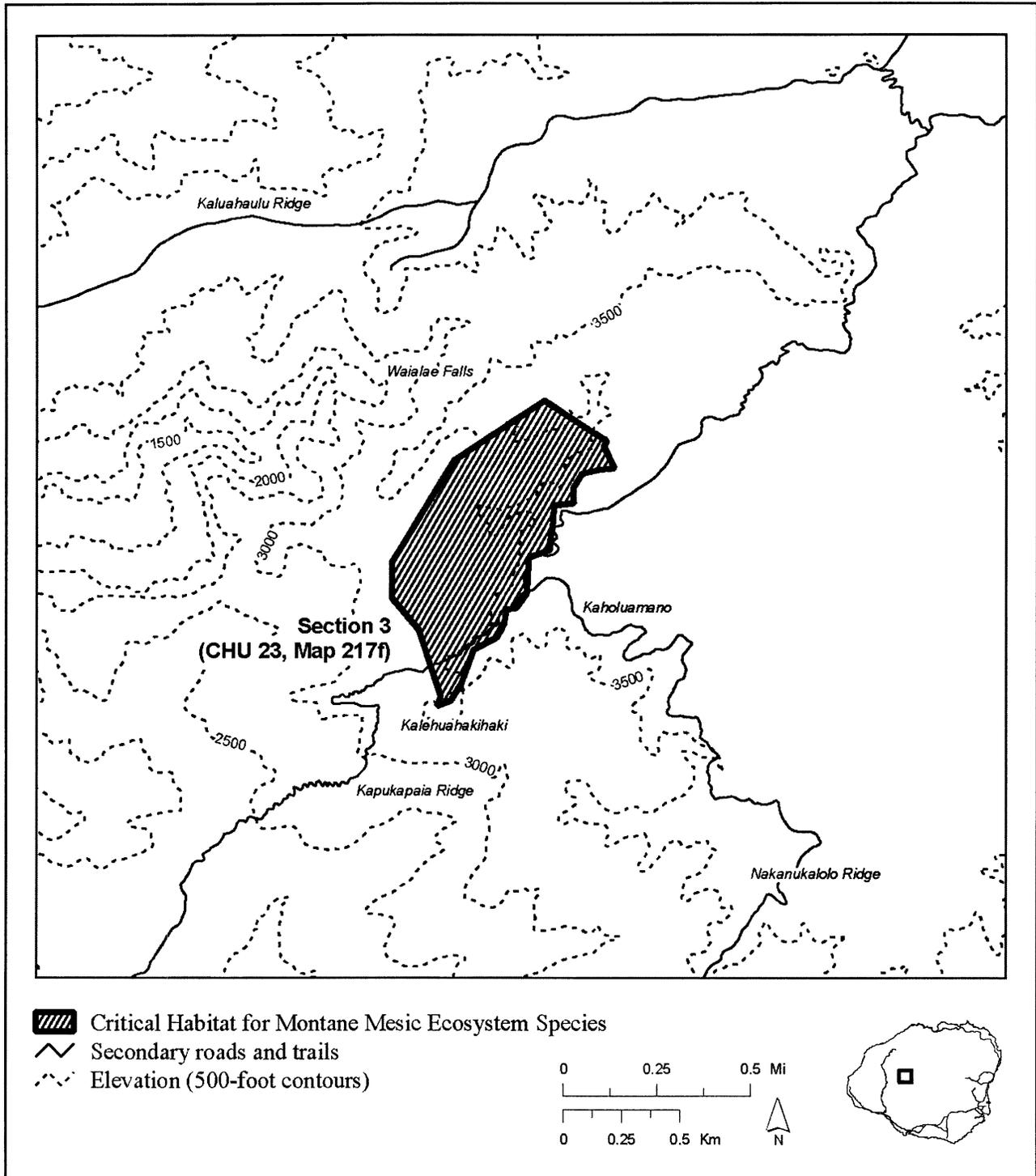
*Kauai—Montane Mesic—Section 3*

Montane Mesic – Section 3 consists of 138 ac (56 ha) in the montane mesic ecosystem, including the upper portion of the Nawaimaka Valley up to Kapukapaia Ridge, on State-owned land in the Na Pali-Kona Forest Reserve (Figure 3-B). This section is not in previously designated critical habitat and includes the only montane mesic forest occupied by the plant *Myrsine mezii*, and the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the montane mesic ecosystem (Table 3).

This section also contains unoccupied habitat that is essential to the conservation of this species by providing the physical and biological features necessary for the expansion of the existing wild population. Montane Mesic - Section 3 is not known to be occupied by the plants *Chamaesyce remyi* var. *remyi*, *Labordia helleri*, *Myrsine knudsenii*, *Myrsine mezii*, *Platydesma rostrata*, *Psychotria grandiflora*, *Stenogyne kealiae*, and *Tetraplasandra flynnii*; by the bird akekee; or by the picture-wing fly *Drosophila attigua*. We have, however, determined this area to be essential for the conservation and recovery of these montane mesic species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

For the plants, this section comprises proposed Critical Habitat Unit 23 of 50 CFR 17.99, Map 217f. Maps of critical habitat for the akekee can be found at 50 CFR 17.95(b) (Unit 3 – Montane Mesic), and for the picture-wing fly at 50 CFR 17.95(i) (Unit 3 – Montane Mesic).

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**Figure 3-B.** Areas proposed for designation of critical habitat for 9 plant species, the akekee, and the picture-wing fly in the Montane Mesic Ecosystem (Section 3). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Montane Wet—Section 1*

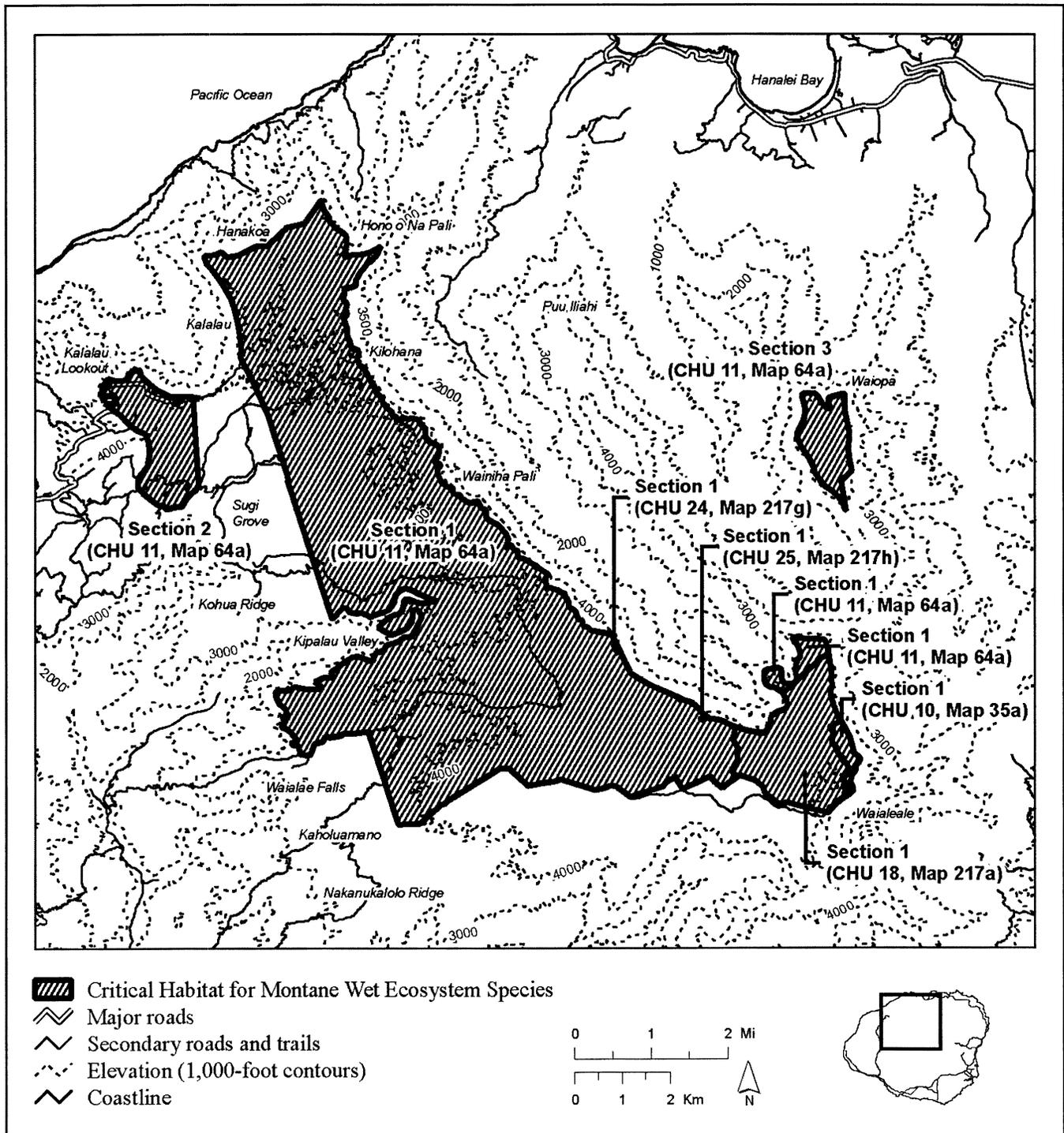
Montane Wet – Section 1 consists of 14,107 ac (5,709 ha) in the montane wet ecosystem, extending across the Alakai Plateau from Hanakoa to Mount Waialeale, on State (12,629 ac, 5,111 ha) and privately owned (1,478 ac, 598 ha) land in the Na Pali Coast State Park, the Alakai Wilderness Preserve, the Na Pali-Kona and Halelea forest reserves, and Hono o Na Pali NAR (Figure 4). This section includes 1,116 ac (452 ha) of privately owned land that is newly proposed as critical habitat. It is occupied by the plants *Astelia waialealae*, *Chamaesyce remyi* var. *remyi*, *Dryopteris crinalis* var. *podosorus*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia helleri*, *Labordia pumila*, *Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Myrsine mezii*, *Phyllostegia renovans*, and *Platydesma rostrata*; by the akekee and akikiki; and by the picture-wing fly. This section also contains unoccupied habitat that is

essential to the conservation of these 18 species by providing the physical and biological features necessary for the expansion of the existing wild populations. This section includes the montane wet forest, the moisture regime, and canopy, subcanopy, and understory plant species identified as PCEs in the montane wet ecosystem (Table 3), and the species-specific PCEs including (1) bogs (identified as PCEs for *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia pumila*, *Lysimachia daphnoides*); (2) bog hummocks (identified as PCEs for *Astelia waialealae*); (3) arthropod prey (identified as PCEs for the akekee and the akikiki); and (4) larval-stage host plants, *Cheirodendron* sp., (identified as a PCE for the picture-wing fly).

Montane Wet – Section 1 is not known to be occupied by the plants *Dubautia kalalauensis*, *Psychotria grandiflora*, and *Tetraplasandra flynnii*. We have, however, determined this area to be essential for the conservation and

recovery of these montane wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

For the plants, those portions of the section that overlie previously designated critical habitat falls within two existing Critical Habitat Units of 50 CFR 17.99: Unit 10, Map 35a and Unit 11, Map 64a. The previously undesignated land comprises proposed Critical Habitat Unit 18 of 50 CFR 17.99, Map 217a; proposed Unit 24, Map 217g; and proposed Unit 25, Map 217h. Maps of critical habitat for the akekee and akikiki can be found at 50 CFR 17.95(b) (Unit 1 – Montane Wet), and for the picture-wing fly *Drosophila attigua* at 50 CFR 17.95(i) (Unit 1 – Montane Wet).



**Figure 4.** Areas proposed for designation of critical habitat for 18 plant species, the akekee and akikiki, and the picture-wing fly in the Montane Wet Ecosystem (Sections 1-3). Section 1 overlies two existing critical habitat units (CHU) on Kauai (CHU 10 and CHU 11) and areas not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations, are provided for ease of referencing.

*Kauai—Montane Wet—Section 2*

Montane Wet - Section 2 consists of 790 ac (320 ha) in the montane wet ecosystem, extending from Kahuamaa Flat south to the edge of Waimea Canyon, on State-owned land in Kokee State Park (Figure 4, above). The entire section is within previously designated critical habitat, and is occupied by the plants *Chamaesyce remyi* var. *remyi*, *Dubautia kalalauensis*, *Melicope puberula*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynnii*, and by the akekee. This section includes the montane wet forest, the moisture regime, and canopy, subcanopy and understory plant species identified as PCEs in the montane wet ecosystem (Table 3), and arthropod prey (identified as a species-specific PCE for the akekee). Montane Wet - Section 2 is not known to be occupied by the plants *Astelia waialeale*, *Dryopteris crinalis* var. *podosorus*, *Dubautia waialeale*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia helleri*, *Labordia pumila*, *Lysimachia daphnoides*, *Melicope degeneri*, *Myrsine mezii*, and *Phyllostegia renovans*; by the bird akikiki; or by the picture-wing fly, *Drosophila attigua*. We have, however, determined this area to be essential for the conservation and recovery of these montane wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or

reintroduction to achieve a population level that could approach recovery.

For the plants, critical habitat falls within previously designated Critical Habitat Unit 11 of 50 CFR 17.99, Map 64a. Maps of critical habitat for the akekee and akikiki can be found at 50 CFR 17.95(b) (Unit 2 – Montane Wet), and for the picture-wing fly *Drosophila attigua* at 50 CFR 17.95(i) (Unit 2 – Montane Wet).

*Kauai—Montane Wet—Section 3*

Montane Wet - Section 3 consists of 413 ac (167 ha) in the montane wet ecosystem, encompasses the summit of Namolokama, on State (156 ac, 63 ha) and privately owned (257 ac, 104 ha) land in the Halelea Forest Reserve (Figure 4). It is entirely within previously designated critical habitat, and is occupied by the plants *Keysseria erici* and *Labordia pumila*. This section includes the montane wet forest, the moisture regime, and the canopy, subcanopy, and understory plant species identified as PCEs in the montane wet ecosystem (Table 3), and bogs (identified as a species-specific PCE for *K. erici*). Montane Wet - Section 3 is not known to be occupied by the plants *Astelia waialeale*, *Chamaesyce remyi* var. *remyi*, *Dryopteris crinalis* var. *podosorus*, *Dubautia kalalauensis*, *Dubautia waialeale*, *Geranium kauaiense*, *Keysseria helenae*, *Labordia helleri*, *Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Myrsine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynnii*; by the birds akekee and akikiki; or by the picture-wing fly, *Drosophila attigua*.

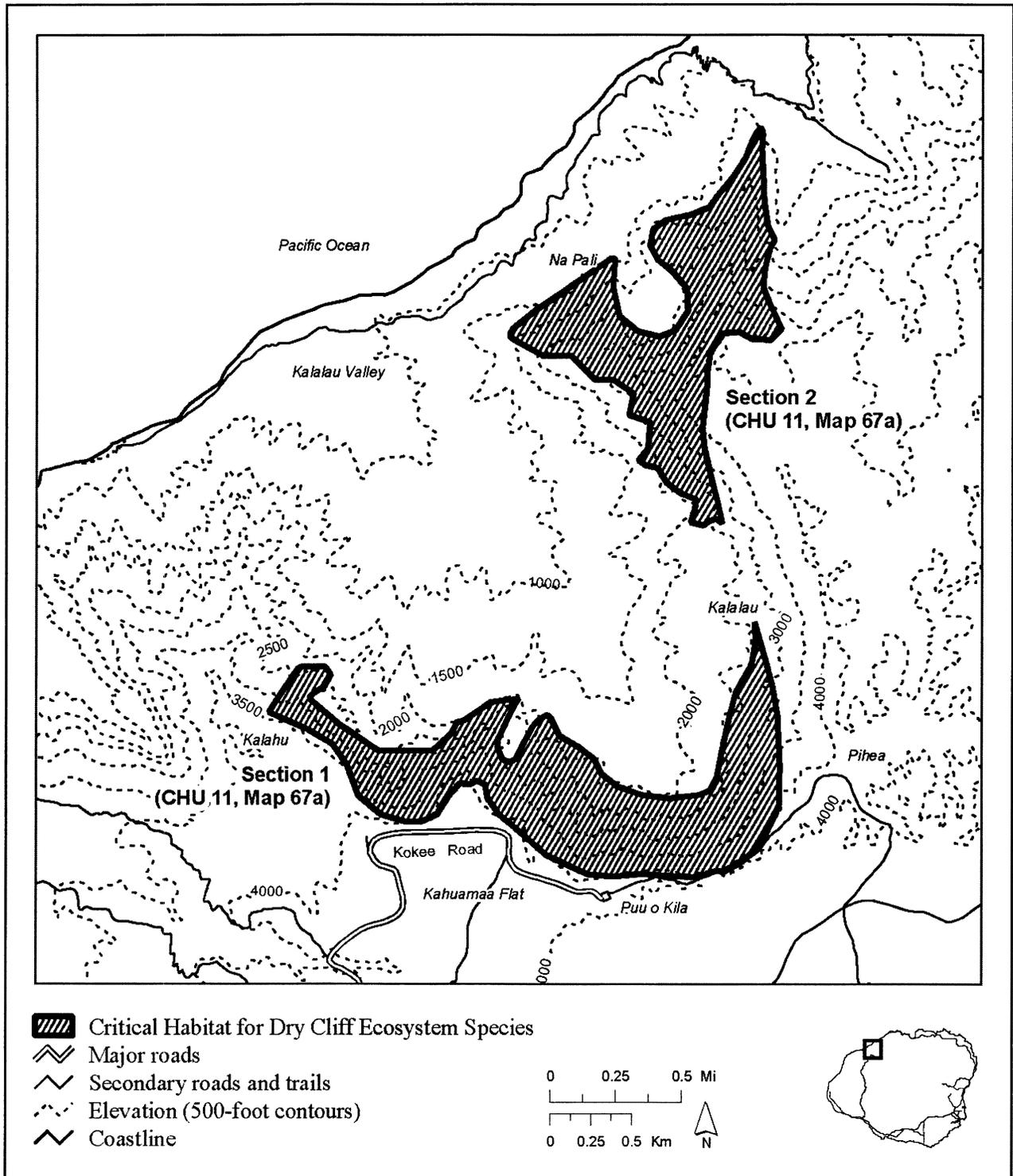
We have, however, determined this area to be essential for the conservation and recovery of these montane wet species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

For the plants, critical habitat falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 64a. Maps of critical habitat for the akekee and akikiki can be found at 50 CFR 17.95(b) (Unit 3 – Montane Wet), and for the picture-wing fly *Drosophila attigua* at 50 CFR 17.95(i) (Unit 3 – Montane Wet).

*Kauai—Dry Cliff—Section 1*

Dry Cliff - Section 1 consists of 404 ac (163 ha) in the dry cliff ecosystem, along cliffs from Kalanu to Pihea peak, within the Na Pali Coast State Park (Figure 5). The entire section is within previously designated critical habitat and is State-owned; it falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 67a. This section is occupied by the plants *Chamaesyce eleanoriae*, *Lysimachia scopulensis*, *Schiedea attenuata*, and *Stenogyne kealiae*. This section includes the dry cliffs, the moisture regime, and subcanopy and understory plant species identified as PCEs in the dry cliff ecosystem (Table 3).

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**Figure 5.** Areas proposed for designation of critical habitat for 4 plant species in the Dry Cliff Ecosystem (Sections 1-2). Critical habitat unit (CHU) numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Dry Cliff—Section 2*

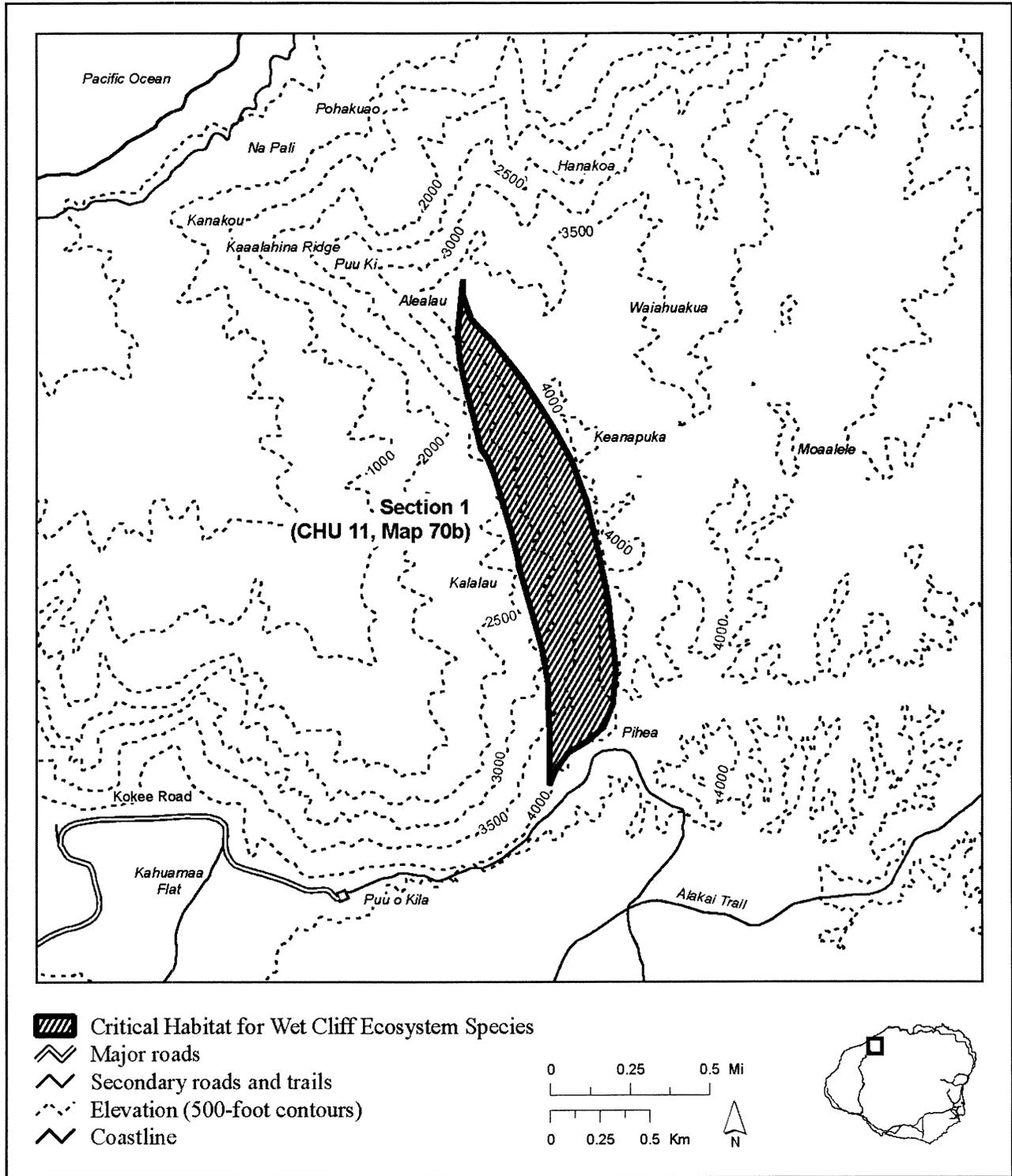
Dry Cliff - Section 2 consists of 308 ac (125 ha) in the dry cliff ecosystem, including cliffs and ridges extending from Kanakou to Keanapuka and along Manono Ridge, surrounding the hanging valley Pohakuao, in the Na Pali Coast State Park (Figure 5). The entire section is State-owned and within previously designated critical habitat; it falls within Critical Habitat Unit 11 of 50 CFR 17.99, Map 67a. This section is occupied by the plant *Chamaesyce eleanoriae* and includes the dry cliffs, the moisture regime, and subcanopy and understory plant species identified as PCEs in the dry cliff ecosystem (Table 3). Dry Cliff - Section 3 is not known to be occupied by the plants *Lysimachia scopulensis*, *Schiedea attenuata*, and *Stenogyne kealiae*. We have, however, determined this area to be essential for the conservation and recovery of these dry cliff species because it provides the physical and biological features

necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.

*Kauai—Wet Cliff—Section 1*

Wet Cliff - Section 1 consists of 190 ac (77 ha) in the wet cliff ecosystem, including cliffs along the rim of Kalalau Valley from Alealeau to Pihea, on State-owned land in the Na Pali Coast State Park and the Hono o Na Pali NAR (Figure 6-A). The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 11 of 50 CFR 17.99, Map 70b, and is occupied by the plant *Chamaesyce remyi* var. *remyi*. This section includes the wet cliffs, the moisture regime, and subcanopy and understory plant species

identified as PCEs in the wet cliff ecosystem (Table 3). Wet Cliff - Section 1 is not known to be occupied by the plants *Chamaesyce remyi* var. *kauaiensis*, *Cyanea dolichopoda*, *Cyrtandra oenobarbara*, *Cyrtandra paliku*, *Dubautia plantaginea* ssp. *magnifolia*, *Lysimachia iniki*, *Lysimachia pendens*, *Lysimachia venosa*, and *Platydesma rostrata*. We have, however, determined this area to be essential for the conservation and recovery of these wet cliff species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.



**Figure 6-A.** Area proposed for designation of critical habitat for 10 plant species in the Wet Cliff Ecosystem (Section 1). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

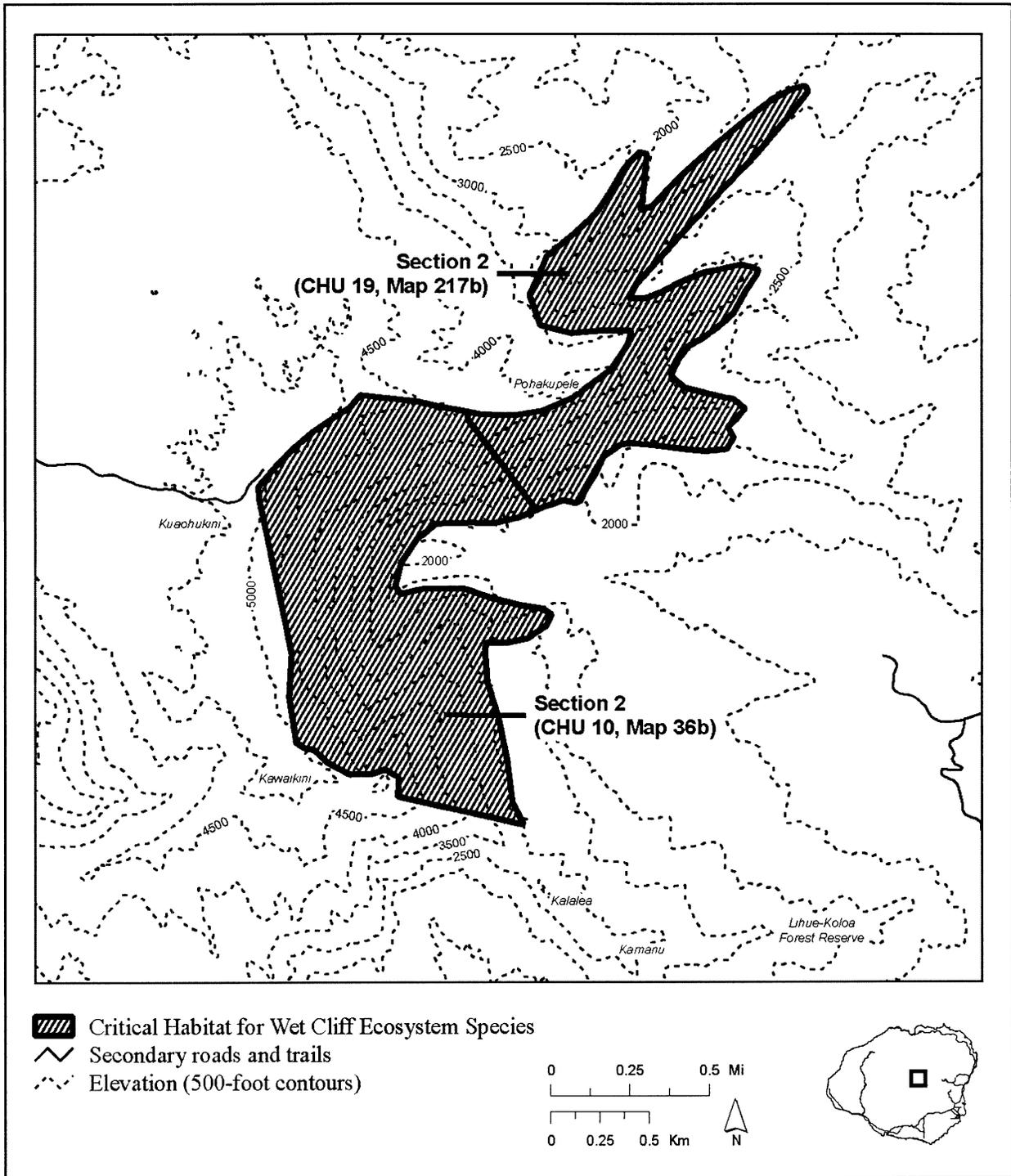
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## Kauai—Wet Cliff—Section 2

Wet Cliff - Section 2 consists of 784 ac (317 ha) in the wet cliff ecosystem, and includes the cliffs at the headwaters of the Wailua River or “Blue Hole,” on State (778 ac, 315 ha) and privately owned (7 ac, 3 ha) land in the Lihue-Koloa Forest Reserve (Figure 6-B). There are 489 ac (198 ha) within previously designated critical habitat and 296 ac (120 ha) of newly proposed critical habitat on State-owned land. The portion of the section that is in previously designated critical habitat

falls within Critical Habitat Unit 10 of 50 CFR 17.99, Map 36b. The newly proposed portion of the section comprises Critical Habitat Unit 19 of 50 CFR 17.99, Map 217b. This section is occupied by the plants *Chamaesyce remyi* var. *kauaiensis*, *Cyanea dolichopoda*, *Cyrtandra oenobarba*, *Dubautia plantaginea* ssp. *magnifolia*, *Lysimachia iniki*, *Lysimachia pendens*, and *Platydesma rostrata*. The section includes the wet cliffs, the moisture regime, and subcanopy and understory plant species identified as PCEs in the wet cliff ecosystem (Table 3). Wet Cliff - Section 2 is not known to be occupied

by the plants *Chamaesyce remyi* var. *remyi*, *Cyrtandra paliku*, and *Lysimachia venosa*. We have, however, determined this area to be essential for the conservation and recovery of these wet cliff species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.



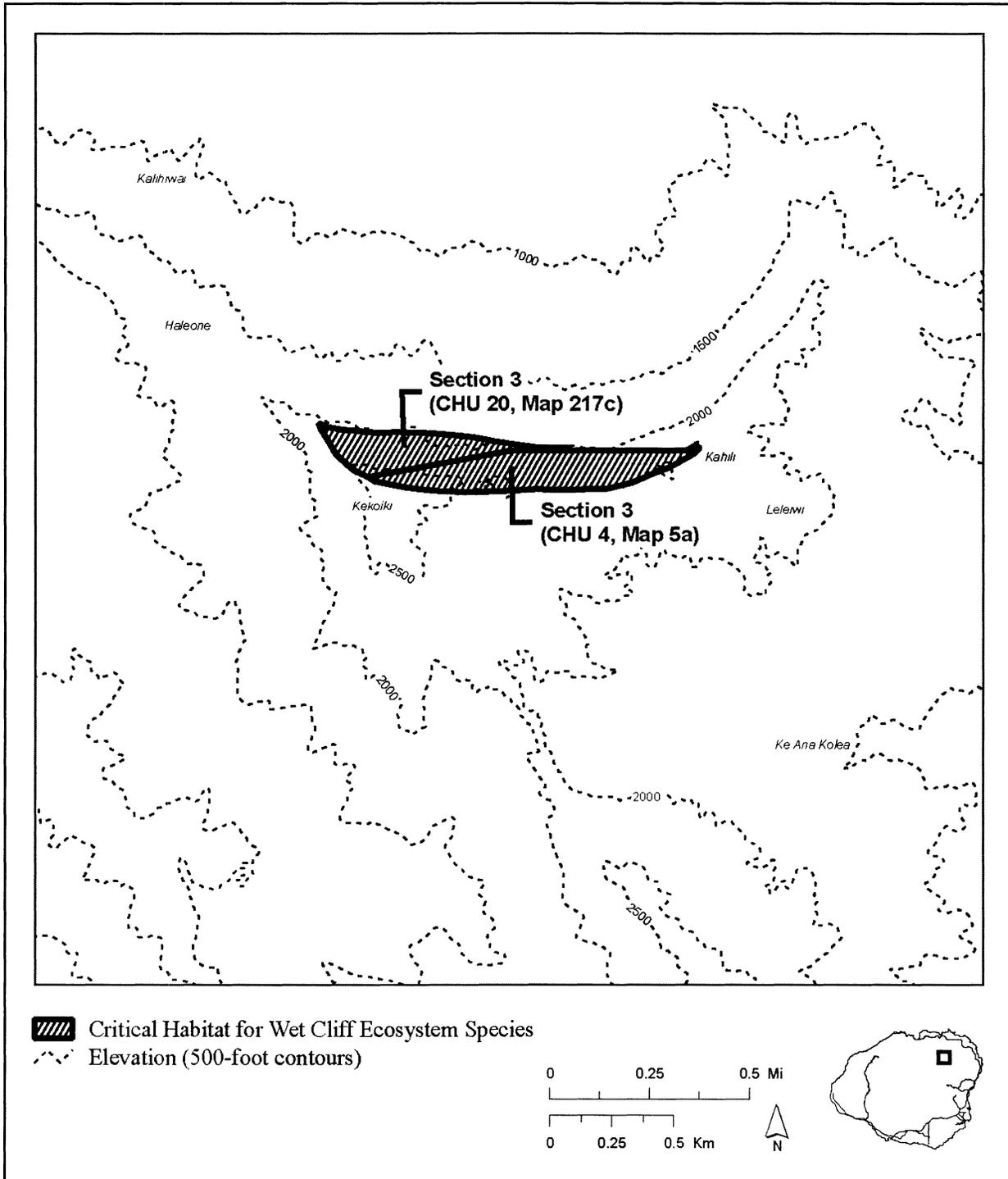
**Figure 6-B.** Area proposed for designation of critical habitat for 10 plant species in the Wet Cliff Ecosystem (Section 2). Section 2 overlies an existing critical habitat unit (CHU) on Kauai (CHU 10) and an area not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

*Kauai—Wet Cliff—Section 3*

Wet Cliff - Section 3 consists of 61 ac (24 ha) in the wet cliff ecosystem, including cliffs below Kekoiki, on State (8 ac, 3 ha) and privately owned (53 ac, 22 ha) land in the Halelea, Moloaa and Kealia forest reserves (Figure 6-C). There are 23 ac (9 ha) of newly proposed critical habitat on privately owned land within this section. That portion of the section that falls within previously designated critical habitat falls within Critical Habitat Unit 4 of 50 CFR 17.99, Map 5a. The newly proposed portion of

the section comprises Critical Habitat Unit 20 of 50 CFR 17.99, Map 217c. This section is occupied by the plant *Cyrtandra paliku*, and includes the wet cliffs, the moisture regime, and subcanopy and understory plant species identified as PCEs in the wet cliff ecosystem (Table 3). Wet Cliff - Section 3 is not known to be occupied by the plants *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Cyanea dolichopoda*, *Cyrtandra oenobarbara*, *Dubautia plantaginea* ssp. *magnifolia*, *Lysimachia iniki*, *Lysimachia pendens*, *Lysimachia*

*venosa*, and *Platydesma rostrata*. We have, however, determined this area to be essential for the conservation and recovery of these wet cliff species because it provides the physical and biological features necessary for the reestablishment of wild populations within the historical range of the species. Due to the small numbers of individuals or low population sizes of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve a population level that could approach recovery.



**Figure 6-C.** Areas proposed for designation of critical habitat for 10 plant species in the Wet Cliff Ecosystem (Section 3). Section 3 overlies an existing critical habitat unit (CHU) on Kauai (CHU 4) and an area not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99), are provided for ease of referencing.

## Effects of Critical Habitat Designation

### Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical habitat. Decisions by the 5th and 9th Circuit Court of Appeals have invalidated our definition of “destruction or adverse modification” (50 CFR 402.02) (see *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, 378 F. 3d 1059 (9th Cir. 2004) and *Sierra Club v. U.S. Fish and Wildlife Service et al.*, 245 F.3d 434, 442F (5th Cir. 2001)), and we do not rely on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat. Under the statutory provisions of the Act, an important factor in determining whether an action will destroy or adversely modify critical habitat is whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional (or retain the current ability for the PCEs to be functionally established) to serve its intended conservation role for the species.

If a species is listed or critical habitat is designated, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Consultation may be concluded through our issuance, as appropriate, of:

- (1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or
- (2) A biological opinion for Federal actions that may affect, and are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. We define “Reasonable and prudent alternatives” at 50 CFR 402.02 as alternative actions identified during consultation that:

- Can be implemented in a manner consistent with the intended purpose of the action,

- Can be implemented consistent with the scope of the Federal agency’s legal authority and jurisdiction,
- Are economically and technologically feasible, and
- Would, in the Director’s opinion, avoid jeopardizing the continued existence of the listed species or destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency’s discretionary involvement or control is authorized by law). Consequently, Federal agencies may sometimes need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Federal activities that may affect the species included in this proposed rule or their designated critical habitat require section 7 consultation under the Act. Activities on State, Tribal, local, or private lands requiring a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from us under section 10 of the Act) or involving some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency) are subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat, and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or permitted, do not require section 7 consultations.

### Application of the “Adverse Modification” Standard

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species, or would retain its current

ability for the primary constituent elements to be functionally established. Activities that may destroy or adversely modify critical habitat are those that alter the PCEs to an extent that appreciably reduces the conservation value of critical habitat for the species included in this proposed rule. Generally, the role of the critical habitat areas is to support the essential conservation needs of the 47 species identified in this proposed rule; we have determined that this critical habitat is not only necessary for the species’ survival, but is also essential to achieve the recovery of these species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation. Activities that, when carried out, funded, or authorized by a Federal agency, may destroy or adversely modify critical habitat for the 47 species, and therefore may be affected by this proposed designation, include, but are not limited to:

- (1) Activities that might appreciably degrade or destroy the primary constituent elements for the species including, but not limited to, the following: Overgrazing; maintaining or increasing feral ungulate levels; clearing or cutting native live trees and shrubs (e.g., woodcutting, bulldozing, construction, road building, mining, herbicide application); and taking actions that pose a risk of fire.

(2) Activities that may alter watershed characteristics in ways that would appreciably reduce groundwater recharge or alter natural, wetland, or vegetative communities. Such activities include new water diversion or impoundment, excess groundwater pumping, and manipulation of vegetation through activities such as the ones mentioned above.

- (3) Recreational activities that may appreciably degrade vegetation.

- (4) Mining sand or other minerals.

- (5) Introducing or encouraging the spread of nonnative plant species.

- (6) Importing nonnative species for research, agriculture, and aquaculture, and releasing biological control agents.

### Exemptions and Exclusions

Application of Section 4(a)(3) of the Act

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108-136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i)

of the Act (16 U.S.C. 1533(a)(3)(B)(i)) now provides: "The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

There are no Department of Defense lands with a completed integrated natural resources management plan within the proposed critical habitat designation.

#### Application of Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary must designate and revise critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the legislative history is clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

Under section 4(b)(2) of the Act, in considering whether to exclude a particular area from the designation, we must identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and determine whether the benefits of exclusion outweigh the benefits of inclusion. If based on this analysis, we make this determination, then we can exclude the area only if such exclusion would not result in the extinction of the species.

Under section 4(b)(2) of the Act, we must consider all relevant impacts, including economic impacts. In addition to economic impacts, we consider a number of factors in a section 4(b)(2) analysis. For example, we consider whether there are lands owned or managed by the Department of Defense (DOD) where a national security impact might exist. We also consider whether landowners have developed any habitat conservation plans (HCPs)

for the area, or whether there are conservation partnerships that would be encouraged or discouraged by designation of, or exclusion from, critical habitat in an area. In addition, we look at the presence of Tribal lands or Tribal trust resources that might be affected, and consider the government-to-government relationship of the United States with Tribal entities. We also consider any social impacts the might occur because of the designation.

This discussion of the potential economic and other impacts of critical habitat designation is separate from and has not been considered in the proposed listing rule. The inclusion of this information in the proposed rule is solely for the purpose of soliciting public comments on the proposed critical habitat designation, not the proposed listing.

In developing this proposal, we have determined that the lands within the proposed designation of critical habitat for the 47 species are not owned or managed by the Department of Defense, there are currently no HCPs for these species, and the proposed designation does not include any Tribal lands or trust resources. As such, we do not anticipate any impacts to national security, Tribal lands, or HCPs from this proposed critical habitat designation.

#### Economic Analysis

On May 28, 2002, we published a document in the **Federal Register** announcing the availability of the draft economic analysis (DEA) for the proposed designation of 99,206 acres (40,147 ha) of critical habitat on Kauai for 83 Kauai plants (67 FR 36851). The draft economic analysis covered the 10-year timeframe from 2002-2012, and characterizes both the total section 7 consultation cost, and the costs attributable to critical habitat (DEA VI-1). On February 27, 2003, the final rule (2003 rule) designated 52,549 acres (21,266 ha) as critical habitat on Kauai and 357 acres (145 ha) on Niihau, in 217 critical habitat units (68 FR 9116). The final economic analysis addendum was adjusted to delete costs related to units that were excluded or modified for biological reasons and to respond to public comments. No critical habitat units in the proposed rule were excluded or modified in the final rule because of economic impacts.

Ninety-four percent (26,026 acres of 27,674 acres) of the critical habitat in this proposed rule, encompassing all or part of 21 sections, occurs within 6 of the units that were designated in 2003. Proposed ecosystem sections Lowland Mesic 1, 2, 3, 4, 5; Lowland Wet 1, 2, 3, 4, 5, 6; Montane Mesic 1, 2; Montane

Wet 1, 2, 3; Dry Cliff 1, 2; and Wet Cliff 1, 2, 3 overlap in whole or in part with critical habitat units designated in the 2003 rule. Only proposed Montane Mesic – Section 3 does not overlap any previously designated critical habitat unit. (See Table 5 for cross-reference of ecosystem section numbers with critical habitat unit numbers in the CFR).

The final economic analysis for the 2003 rule estimates that the listing of the 83 plants and the designation of this critical habitat could result in potential direct economic effects ranging from approximately \$170,000 to \$520,000. Of that, we estimate that \$37,388 to \$293,030 could be attributable to critical habitat in the units that overlap with the areas proposed in this proposed rule.

On March 29, 2002, we published a notice in the **Federal Register** (67 FR 15159), announcing the availability of a draft economic analysis for the proposed designation of 16.3 miles (26.3 kilometers (km)) of main stream channel in nine critical habitat units for Newcomb's snail (*Erinna newcombi*) on Kauai. The draft economic analysis covers the 10-year timeframe from 2002-2012, and identifies the total section 7 consultation costs, and the incremental costs attributable to critical habitat (DEA ES-7).

On August 20, 2002, the final rule (67 FR 54026) designated eight stream segments and associated tributaries, springs and seeps, and adjacent riparian areas on the island of Kauai totaling 12.28 miles of stream channel and 4,479 acres (1,813 ha) as critical habitat for Newcomb's snail. It was determined that the designation could result in potential economic effects of \$28,500, with \$19,500 of this cost attributable to critical habitat. No critical habitat units in the proposed rule were excluded or modified in the final rule because of economic impacts.

The Na Pali Coast Streams/Critical Habitat Unit I designated as critical habitat for the Newcomb's snail (67 FR 54054), encompasses 609 acres (246 ha)). This unit is under State ownership and partially overlaps with three of the proposed critical habitat areas in this rule (Dry Cliff – Section 2, Lowland Mesic – Section 2, and Lowland Mesic – Section 4; see Table 5 for cross-reference with critical habitat unit numbers in the CFR). Of the \$19,500 in potential costs that were identified in the Newcomb's snail final critical habitat designation, we estimate that \$1,574 could be attributable to the area overlapping this proposal. The three critical habitat areas identified above also overlap with areas that were designated as critical habitat in the 2003 final rule for 83 Kauai plants.

The PCEs described in the 2003 rule and those for the 47 species proposed here are similar. Because of this similarity, no additional economic costs are anticipated for the 26,026 acres (10,523 ha) of proposed critical habitat that overlaps with the 2003 rule beyond those identified in the previous economic analyses. Any management actions that may be necessary to avoid adverse modification of the existing critical habitat and PCEs in the 26,026 overlapping acres (10,532 ha) would likely coincidentally be adequate to avoid adverse modification of critical habitat for the additional species being considered in this proposed rule. Furthermore, in both cases the adverse modification standard considered both the conservation and recovery of the species as the goal of critical habitat. We are unaware of any new potential impacts in these overlap areas that were not considered in the previous economic analyses, but are seeking updated information from the public during the comment period on this proposed rule.

We are proposing to designate as critical habitat approximately 1,646 acres (667 ha) in six ecosystem areas that do not completely overlap with existing critical habitat units designated in the final rules for the 83 Kauai species and/or Newcomb's snail. Montane Mesic – Section 2 includes 7.8 acres (3.16 ha) classified as State Parks and Recreation lands; Montane Mesic – Section 3 includes 138 acres (55.8 ha) classified as State Forest Reserve lands; Montane Wet – Section 1 includes 1,116 acres (452 ha) classified as State Forest Reserve lands (the remainder of the unit is classified as State Conservation Area); Wet Cliff – Section 2 includes 296 acres (3 ha) classified as State Forest Reserve lands; Lowland Wet – Section 1 includes 65 acres (26.3) in the Limahuli Garden and Preserve, which is owned by the National Tropical Botanical Garden (NTBG); and Wet Cliff – Section 3 includes 23 acres of privately owned land (see Table 5 for cross-reference with critical habitat unit numbers in the CFR). There is no history of section 7 consultation in these areas, nor are we aware of any planned activities in any of these areas that would require section 7 consultation in the future. To the extent there may be consultations in the future on, for example, Federal grants to assist the NTBG in managing its lands or maintenance of an existing power transmission line on the private land in Wet Cliff – Section 3, any additional costs are expected to be minimal. However, we are also seeking public comment on the potential costs of

critical habitat designation in these areas.

In summary, the areas being proposed as critical habitat are remote, lack development potential, and overlap with existing critical habitat units by approximately 94 percent. The economic analyses for the 83 Kauai plants and the Newcomb's snail final critical habitat rules took into account the potential economic costs of critical habitat designation over a 10-year timeframe (2002-2012). We have determined that over that timeframe, \$38,862 to \$294,604 in costs could be attributable to critical habitat designation in the units that overlap with the critical habitat areas proposed in this rule. Moreover, since these designations in 2002 and 2003, we have had no section 7 consultations for any of those overlapping lands. The management actions that may be necessary to avoid adverse modification in existing critical habitat units would likely also be adequate to avoid adverse modification of critical habitat being proposed for the 47 Kauai species in this rule because of the similar PCEs, and in both cases the consideration of possible adverse modification similarly holds to the standard of species recovery. The remaining 6 percent (1,646 acres, 667 ha) of land we are proposing as critical habitat in this rule that does not overlap with existing critical habitat is managed as State Parks and Recreation Land (7.8 acres, 3.16 ha), State Forest Reserve (1,550 acres, 627 ha), or is owned by private individuals (88 acres, 35.6 ha). We have no section 7 consultation history in these areas and are unaware of any planned activities that would require consultation.

Our draft analysis of the potential economic impacts posed by the critical habitat designation proposed here is available by mail from the Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**) or for download at <http://www.regulations.gov>.

We do not anticipate more than minimal (if any) economic or other impacts that would be additive to those already identified above. To ensure that our final critical habitat determination is based on the best available data, we are requesting updated information on potential effects of this additional designation in overlap areas, as well as information on potential impacts from critical habitat designation on lands not currently designated (e.g., the non-overlap areas), during the comment period. We will fully consider any new information or data in our final determination. We are hereby soliciting comments from the public on any

potential economic or other impacts of this proposed critical habitat designation (see "Public Comments" section). We are not proposing to exclude any areas under section 4(b)(2) of the Act at this time. However, based on public comment on this proposed critical habitat designation, we may exclude areas from the final critical habitat designation under section 4(b)(2) of the Act.

#### Peer Review

In accordance with our joint policy published in the **Federal Register** on July 1, 1994 (59 FR 34270), we are obtaining the expert opinions of at least three appropriate independent specialists regarding this proposed rule. The purpose of peer review is to ensure that our critical habitat designation is based on scientifically sound data, assumptions, and analyses. We have posted our proposed peer review plan on our website at <http://www.fws.gov/pacific/informationquality/index.htm>. We will send these peer reviewers copies of this proposed rule, immediately following publication in the **Federal Register**. We have invited these peer reviewers to comment during this public comment period on our specific assumptions and conclusions in this proposed designation of critical habitat.

We will consider all comments and information we receive during the comment period on this proposed rule during our preparation of a final determination. Accordingly, our final decision may differ from this proposal.

#### Public Hearings

The Act provides for one or more public hearings on this proposal, if we receive any requests for hearings. We must receive your request for a public hearing within 45 days after the date of this **Federal Register** publication. Send your request to the person named in the **FOR FURTHER INFORMATION CONTACT** section, above. We will schedule public hearings on this proposal, if any are requested, and announce the dates, times, and place of the hearing, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the first public hearing.

Persons needing reasonable accommodations to attend and participate in a public hearing should contact the Pacific Islands Fish and Wildlife Office at (808) 792-9400 as soon as possible. To allow sufficient time to process requests, please call no later than one week before the hearing date. Information regarding this

proposal is available in alternative formats upon request.

### Required Determinations

#### *Regulatory Planning and Review*

The Office of Management and Budget (OMB) has determined that this rule is not significant under Executive Order 12866 (E.O. 12866). OMB bases its determination upon the following four criteria:

(a) Whether the rule will have an annual effect of \$100 million or more on the economy or adversely affect an economic sector, productivity, jobs, the environment, or other units of the government.

(b) Whether the rule will create inconsistencies with other Federal agencies' actions.

(c) Whether the rule will materially affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients.

(d) Whether the rule raises novel legal or policy issues.

#### *Regulatory Flexibility Act (5 U.S.C. 601 et seq.)*

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency must publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended RFA to require Federal agencies to provide a statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

Small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; as well as small businesses. Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than \$5 million in annual sales, general and heavy construction businesses with less than \$27.5 million in annual business,

special trade contractors doing less than \$11.5 million in annual business, and agricultural businesses with annual sales less than \$750,000. To determine if potential economic impacts to these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule, as well as the types of project modifications that may result. In general, the term "significant economic impact" is meant to apply to a typical small business firm's business operations.

To determine if a designation of critical habitat could significantly affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities (e.g., housing development, grazing, oil and gas production, timber harvesting). We apply the "substantial number" test individually to each industry to determine if certification is appropriate. However, the SBREFA does not explicitly define "substantial number" or "significant economic impact." Consequently, to assess whether a "substantial number" of small entities is affected by this designation, this analysis considers the relative number of small entities likely to be impacted in an area. In some circumstances, especially with critical habitat designations of limited extent, we may aggregate across all industries and consider whether the total number of small entities affected is insubstantial. In estimating the number of small entities potentially affected, we also consider whether their activities have any Federal involvement.

Designation of critical habitat only affects activities carried out, funded, or permitted by Federal agencies. Some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. If there is a Federal nexus, Federal agencies will be required to consult with us under section 7 of the Act on activities they fund, permit, or carry out that may affect critical habitat. If we conclude, in a biological opinion, that a proposed action is likely to destroy or adversely modify critical habitat, we can offer "reasonable and prudent alternatives." Reasonable and prudent alternatives are alternative actions that can be implemented in a manner consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that would avoid destroying or adversely modifying critical habitat. A Federal agency and an applicant may elect to implement a reasonable and prudent alternative

associated with a biological opinion that has found adverse modification of critical habitat. An agency or applicant could alternatively choose to seek an exemption from the requirements of the Act or proceed without implementing the reasonable and prudent alternative. However, unless an exemption were obtained, the Federal agency or applicant would be at risk of violating section 7(a)(2) of the Act if it chose to proceed without implementing the reasonable and prudent alternatives. We may also identify discretionary conservation recommendations designed to minimize or avoid the adverse effects of a proposed action on critical habitat, help implement recovery plans, or to develop information that could contribute to the recovery of the species.

Within the proposed critical habitat designation, the types of actions or authorized activities that we have identified as potential concerns and that are subject to consultation under section 7 if there is a Federal nexus include:

- Activities that might degrade or destroy the primary constituent elements for the species including, but not limited to, the following: Grazing; maintaining or increasing feral ungulate levels; clearing or cutting native live trees and shrubs (e.g., woodcutting, bulldozing, construction, road building, mining, herbicide application); and taking actions that pose a risk of fire.

- Activities that may alter watershed characteristics in ways that would reduce groundwater recharge or alter natural, wetland, or vegetative communities. Such activities include new water diversion or impoundment, groundwater pumping, and manipulation of vegetation through activities such as the ones mentioned above.

- Recreational activities that may degrade vegetation.

- Mining sand or other minerals.

- Introducing or encouraging the spread of nonnative plant species.

- Importing nonnative species for research, agriculture, and aquaculture, and releasing biological control agents.

None of the proposed critical habitat units contains significant residential, commercial, industrial, or golf-course projects; crop farming; or intensive livestock operations. Few projects are planned for locations in the proposed critical habitat. This situation reflects the fact that (1) most of the land is unsuitable for development, farming, or other economic activities due to the rugged mountain terrain, lack of access, and remote locations; and (2) existing land-use controls severely limit development and most other economic

activities in the mountainous interior of Kauai. Although some existing and continuing activities involve the operation and maintenance of existing manmade features and structures in certain areas, these areas do not contain the primary constituent elements for the species, and would not be impacted by the designation. Any existing and planned projects, land uses, and activities that could affect the proposed critical habitat but have no Federal involvement would not require section 7 consultation with the Service, so they are not restricted by the requirements of the Act. Finally, for the anticipated projects and activities that will have Federal involvement, many are conservation efforts that will not negatively impact the species or their habitat, so they will be subject to a minimal level of informal section 7 consultation. We anticipate that a developer or other project proponent could modify a project or take measures to protect the 47 Kauai species. The kinds of actions that may be included if future reasonable and prudent alternatives become necessary include conservation set-asides, management of competing nonnative species, restoration of degraded habitat, and regular monitoring. These measures are not likely to result in a significant economic impact to project proponents.

In addition, Federal agencies may also need to reinstate a previous consultation if discretionary involvement or control over the Federal action has been retained or is authorized by law and the activities may affect critical habitat. However, between 2002 and 2007, there have been no formal consultations and 55 informal consultations on Kauai, in addition to consultations on Federal grants to State wildlife programs (which would not affect small entities). The majority of the consultations were related to project effects on seabird flyways, nesting by endangered waterbirds, or roosting by the endangered Hawaiian hoary bat or ope ape a. Several consultations were conducted with the U.S. Department of Agriculture (Natural Resources Conservation Service (NRCS)) for proposed funding for habitat restoration projects under the auspices of the Wildlife Habitat Incentives Program (WHIP), and one was conducted with the Navy for weed removal at the Pacific Missile Range Facility (PMRF). Five of the 55 informal consultations concerned designated critical habitat, and we concurred with each agency's determination that the project, as proposed, was not likely to adversely affect critical habitat. In this rule, we are

proposing to designate critical habitat on a total of 27,674 ac (11,199 ha) of land. Ninety-four percent (26,028 ac (10,533 ha)) of this proposed critical habitat designation is already designated critical habitat for one or more species, and six percent (1,646 ac (666 ha)) of the proposed designation is on lands newly proposed as critical habitat. However, none of the Federal actions that were subject to previous section 7 consultation are on the lands we are proposing as critical habitat in this rule. Therefore, there is no requirement to reinstate consultation for any ongoing Federal projects.

Moreover, in the 2001 economic analysis of the designation of critical habitat for 83 species of plants from the islands of Kauai and Niihau, we evaluated the potential economic effects on small business entities resulting from the protection of these plant species and their habitat related to the proposed designation of critical habitat and determined that it would not have a significant economic impact on a substantial number of small entities. The RFA/SBREFA defines "small governmental jurisdiction" as the government of a city, county, town, school district, or special district with a population of less than 50,000. By this definition, Kauai County is not a small governmental jurisdiction because its population was 58,463 in 2000. Certain State agencies may be affected by the proposed critical habitat designation—such as the Department of Land and Natural Resources and the State Department of Transportation. However, for the purposes of the RFA, State governments are considered independent sovereigns, not small governments. Because of Federal involvement, The Nature Conservancy in Hawaii (TNC) and the National Tropical Botanical Gardens (NTBG) could be affected by the proposed critical habitat designation and would possibly be considered to be small organizations. The SBREFA defines "small organization" as any not-for-profit enterprise which is independently owned and operated and is not dominant in its field. We determined that TNC and NTBG are both large organizations that are dominant in Kauai County in their respective fields. The significant overlap between the critical habitat designation for the 83 species and this proposed critical habitat designation is further evidence that this proposal will not have a significant economic impact on a substantial number of small entities.

We have made an initial RFA finding that the proposed designation of critical habitat for the 47 species will not have

a significant effect on a substantial number of small entities, for the reasons described above. However, we will defer making a final RFA finding in order to allow the public an opportunity to comment on potential economic consequences of this critical habitat proposal.

*Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)*

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.), we make the following findings:

(a) This designation of critical habitat will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or Tribal governments, or the private sector, and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are defined in 2 U.S.C. 658(5)-(7). "Federal intergovernmental mandate" includes a regulation that "would impose an enforceable duty upon State, local, or Tribal governments" with two exceptions. It excludes "a condition of Federal assistance." It also excludes "a duty arising from participation in a voluntary Federal program," unless the regulation "relates to a then-existing Federal program under which \$500,000,000 or more is provided annually to State, local, and Tribal governments under entitlement authority," if the provision would "increase the stringency of conditions of assistance" or "place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding," and the State, local, or Tribal governments "lack authority" to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; AFDC work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. "Federal private sector mandate" includes a regulation that "would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program."

(b) The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-

Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

We do not believe that this rule will significantly or uniquely affect small governments. The lands we are proposing for critical habitat designation are owned by the State of Hawaii and private citizens. None of these entities fit the definition of "small governmental jurisdiction." Therefore, a Small Government Agency Plan is not required.

#### Takings

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for each of the 47 species in a takings implications assessment. The takings implications assessment concludes that this designation of critical habitat for each of these species does not pose significant takings implications for lands within or affected by the proposed designation.

#### Federalism

In accordance with E.O. 13132 (Federalism), this proposed rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of, this proposed critical habitat designation with appropriate State resource agencies in Hawaii. The designation of critical habitat for each of these species (excluding *Pritchardia hardyi* for which no critical habitat has been proposed) would impose no additional restrictions to those currently in place and, therefore, would have little incremental impact on State and local governments and their activities. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species would be

more clearly defined, and the primary constituent elements of the habitat necessary to the conservation of the species would be specifically identified. This information would not alter where and what federally sponsored activities may occur. However, it may assist local governments in long-range planning (rather than having them wait for case-by-case section 7 consultations to occur).

#### Civil Justice Reform

In accordance with E.O. 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We have issued this proposed critical habitat designation in accordance with the provisions of the Act. This proposed rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs of each of the species being considered in this proposed rule.

#### Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

#### National Environmental Policy Act

It is our position that, outside the jurisdiction of the United States Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA (42 U.S.C. 4321 *et seq.*) in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This assertion was upheld by the United States Court of Appeals for the Ninth Circuit (*Douglas County v. Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

#### Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain

language. This means that each rule we publish must:

- (a) Be logically organized;
- (b) Use the active voice to address readers directly;
- (c) Use clear language rather than jargon;
- (d) Be divided into short sections and sentences; and
- (e) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in the **ADDRESSES** section. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

#### Government-to-Government Relationship with Tribes

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We have determined that there are no Tribal lands essential for the conservation of the 48 Kauai species. Therefore, this proposed designation of critical habitat does not involve any Tribal lands.

#### Energy Supply, Distribution, or Use

On May 18, 2001, the President issued an Executive Order (E.O. 13211; Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) on regulations that significantly affect energy supply, distribution, and use. E.O. 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. This proposed rule to designate critical habitat for 47 of the 48 species is not a significant regulatory action under E.O. 12866 and we do not expect it to significantly affect energy supplies, distribution, or use because

these areas are not presently used for energy production, and we are unaware of any future plans in this regard. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

**References Cited**

A complete list of references cited in this rule is available upon request from the Field Supervisor, Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**, above) or at <http://www.regulations.gov>.

**Author(s)**

The authors of this document are the staff of the Fish and Wildlife Service.

**List of Subjects in 50 CFR Part 17**

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

**Proposed Regulation Promulgation**

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

**PART 17—[AMENDED]**

1. The authority citation for part 17 continues to read as follows:

**Authority:** 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h), the List of Endangered and Threatened Wildlife, as follows:

a. By adding entries for “Akekee (honeycreeper)” and “Akikiki (honeycreeper)” in alphabetical order under BIRDS; and

b. By adding an entry for “Fly, Hawaiian picture-wing” (*Drosophila attigua*) in alphabetical order under INSECTS, to read as set forth below.

**§ 17.11 Endangered and threatened wildlife.**

\* \* \* \* \*  
(h) \* \* \*

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
BIRDS							
Akekee (honeycreeper)	<i>Loxops caeruleirostris</i>	U.S.A. (HI)	Entire	E		17.95(b)	NA
INSECTS							
Fly, Hawaiian picture-wing	<i>Drosophila attigua</i>	U.S.A. (HI)	NA	E		17.95(i)	NA

3. Amend § 17.12(h), the List of Endangered and Threatened Plants, as follows:

a. By adding entries for *Astelia waialealae*, *Canavalia napaliensis*, *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea dolichopoda*, *Cyanea eleleensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Cyrtandra oenobarba*, *Cyrtandra paliku*, *Dubautia imbricata* ssp. *imbricate*, *Dubautia kalalauensis*, *Dubautia kenwoodii*,

*Dubautia plantaginea* ssp. *magnifolia*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia helleri*, *Labordia pumila*, *Lysimachia daphnoides*, *Lysimachia iniki*, *Lysimachia pendens*, *Lysimachia scopulensis*, *Lysimachia venosa*, *Melicope degeneri*, *Melicope paniculata*, *Melicope puberula*, *Myrsine knudsenii*, *Myrsine mezii*, *Phyllostegia renovans*, *Pittosporum napaliense*, *Platydesma rostrata*, *Pritchardia hardyi*, *Psychotria grandiflora*, *Psychotria hobbyi*, *Schiedea attenuata*, *Stenogyne*

*kealiae*, *Tetraplasandra bisattenuata*, and *Tetraplasandra flynnii* in alphabetical order under FLOWERING PLANTS; and

b. By adding entries for *Diellia manni*, *Dryopteris angelica*, and *Dryopteris crinalis* var. *podosorus* in alphabetical order under FERNS AND ALLIES, to read as set forth below.

**§ 17.12 Endangered and threatened plants.**

\* \* \* \* \*  
(h) \* \* \*

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
FLOWERING PLANTS							
*****							
<i>Astelia waialealae</i>	Painiu	U.S.A. (HI)	Asteliaceae	E		17.99(a)	NA
*****							
<i>Canavalia napaliensis</i>	Awikiwiki	U.S.A. (HI)	Fabaceae	E		17.99(a)	NA
*****							
<i>Chamaesyce eleanoriae</i>	Akoko	U.S.A. (HI)	Euphorbiaceae	E		17.99(a)	NA
*****							
<i>Chamaesyce remyi</i> <i>var. kauaiensis</i>	Akoko	U.S.A. (HI)	Euphorbiaceae	E		17.99(a)	NA
<i>Chamaesyce remyi</i> <i>var. remyi</i>	Akoko	U.S.A. (HI)	Euphorbiaceae	E		17.99(a)	NA
*****							
<i>Charpentiera densiflora</i>	Papala	U.S.A. (HI)	Amaranathaceae	E		17.99(a)	NA
*****							
<i>Cyanea dolichopoda</i>	Haha	U.S.A. (HI)	Campanulaceae	E		17.99(a)	NA
*****							
<i>Cyanea eleeleensis</i>	Haha	U.S.A. (HI)	Campanulaceae	E		17.99(a)	NA
*****							
<i>Cyanea kolekoleensis</i>	Haha	U.S.A. (HI)	Campanulaceae	E		17.99(a)	NA
*****							
<i>Cyanea kuhihewa</i>	Haha	U.S.A. (HI)	Campanulaceae	E		17.99(a)	NA
*****							
<i>Cyrtandra oenobarba</i>	Haiwale	U.S.A. (HI)	Gesneriaceae	E		17.99(a)	NA
<i>Cyrtandra paliku</i>	Haiwale	U.S.A. (HI)	Gesneriaceae	E		17.99(a)	NA
*****							
<i>Dubautia imbricata</i> <i>ssp. imbricata</i>	Naenae	U.S.A. (HI)	Asteraceae	E		17.99(a)	NA
<i>Dubautia kalalauensis</i>	Naenae	U.S.A. (HI)	Asteraceae	E		17.99(a)	NA
<i>Dubautia kenwoodii</i>	Naenae	U.S.A. (HI)	Asteraceae	E		17.99(a)	NA
*****							
<i>Dubautia plantaginea</i> <i>ssp. magnifolia</i>	Naenae	U.S.A. (HI)	Asteraceae	E		17.99(a)	NA
<i>Dubautia waialealae</i>	Naenae	U.S.A. (HI)	Asteraceae	E		17.99(a)	NA
*****							
<i>Geranium kauaiense</i>	Nohoanu	U.S.A. (HI)	Geraniaceae	E		17.99(a)	NA
*****							
<i>Keysseria erici</i>	No common name	U.S.A. (HI)	Asteraceae	E		17.99(a)	NA

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
<i>Keysseria helenae</i>	No common name	U.S.A. (HI)	Asteraceae	E		17.99(a)	NA
*****							
<i>Labordia helleri</i>	Kamakahala	U.S.A. (HI)	Loganiaceae	E		17.99(a)	NA
*****							
<i>Labordia pumila</i>	Kamakahala	U.S.A. (HI)	Loganiaceae	E		17.99(a)	NA
*****							
<i>Lysimachia daphnoides</i>	Lehua makanoe	U.S.A. (HI)	Myrsinaceae	E		17.99(a)	NA
*****							
<i>Lysimachia iniki</i>	No common name	U.S.A. (HI)	Myrsinaceae	E		17.99(a)	NA
*****							
<i>Lysimachia pendens</i>	No common name	U.S.A. (HI)	Myrsinaceae	E		17.99(a)	NA
<i>Lysimachia scopulensis</i>	No common name	U.S.A. (HI)	Myrsinaceae	E		17.99(a)	NA
<i>Lysimachia venosa</i>	No common name	U.S.A. (HI)	Myrsinaceae	E		17.99(a)	NA
*****							
<i>Melicope degeneri</i>	Alani	U.S.A. (HI)	Rutaceae	E		17.99(a)	NA
*****							
<i>Melicope paniculata</i>	Alani	U.S.A. (HI)	Rutaceae	E		17.99(a)	NA
<i>Melicope puberula</i>	Alani	U.S.A. (HI)	Rutaceae	E		17.99(a)	NA
*****							
<i>Myrsine knudsenii</i>	Kolea	U.S.A. (HI)	Myrsinaceae	E		17.99(a)	NA
*****							
<i>Myrsine mezii</i>	Kolea	U.S.A. (HI)	Myrsinaceae	E		17.99(a)	NA
*****							
<i>Phyllostegia renovans</i>	No common name	U.S.A. (HI)	Lamiaceae	E		17.99(a)	NA
*****							
<i>Pittosporum napaliense</i>	Hoawa	U.S.A. (HI)	Pittosporaceae	E		17.99(a)	NA
*****							
<i>Platydesma rostrata</i>	Pilo kea lau lii	U.S.A. (HI)	Rutaceae	E		17.99(a)	NA
*****							
<i>Pritchardia hardyi</i>	Loulu	U.S.A. (HI)	Arecaceae	E		NA	NA
*****							
<i>Psychotria grandiflora</i>	Kopiko	U.S.A. (HI)	Rubiaceae	E		17.99(a)	NA
<i>Psychotria hobdyi</i>	Kopiko	U.S.A. (HI)	Rubiaceae	E		17.99(a)	NA
*****							
<i>Schiedea attenuata</i>	No common name	U.S.A. (HI)	Caryophyllaceae	E		17.99(a)	NA

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
*****							
<i>Stenogyne kealiae</i>	No common name	U.S.A. (HI)	Lamiaceae	E		17.99(a)	NA
*****							
<i>Tetraplasandra bisattenuata</i>	No common name	U.S.A. (HI)	Araliaceae	E		17.99(a)	NA
<i>Tetraplasandra flynnii</i>	No common name	U.S.A. (HI)	Araliaceae	E		17.99(a)	NA
*****							
FERNS AND ALLIES							
*****							
<i>Diellia mannii</i>	No common name	U.S.A. (HI)	Aspleniaceae	E		17.99(a)	NA
*****							
<i>Doryopteris angelica</i>	No common name	U.S.A. (HI)	Pteridaceae	E		17.99(a)	NA
<i>Dryopteris crinalis</i> var. <i>podosorus</i>	Palapalai aumakua	U.S.A. (HI)	Dryopteridaceae	E		17.99(a)	NA
*****							

4. Amend § 17.95 as follows:  
 a. In paragraph (b), by adding critical habitat for “Akekee (*Loxops caeruleirostris*)” and “Akikiki (*Oreomystis bairdi*)” in the same alphabetical order as these species occur in the table at § 17.11(h); and  
 b. In paragraph (i), by adding critical habitat for “Hawaiian picture-wing fly (*Drosophila attigua*)” in the same alphabetical order as this species occurs in the table at § 17.11(h), to read as set forth below.

**§ 17.95 Critical habitat—fish and wildlife.**

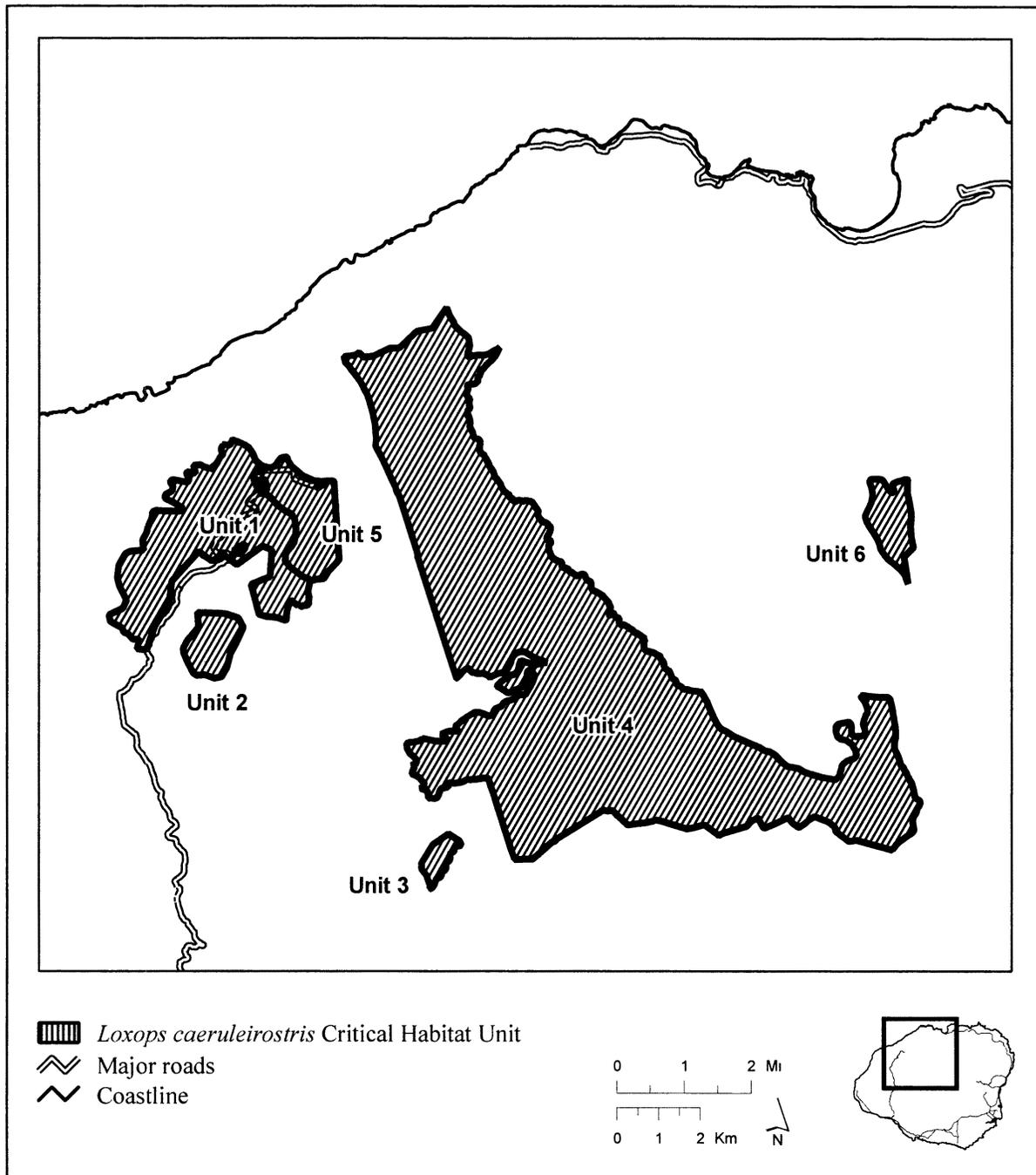
\* \* \* \* \*

(b) *Birds.*  
*Akekee (Loxops caeruleirostris)*  
 (1) Critical habitat units are depicted for Kauai County, Hawaii, on the maps below.  
 (2) *Primary constituent elements.*  
 (i) In units 1, 2, and 3, the primary constituent elements of critical habitat for Akekee (*Loxops caeruleirostris*) are:  
 (A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).  
 (C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.  
 (D) Canopy: *Acacia, Metrosideros, Psychotria, Tetraplasandra, Zanthoxylum.*  
 (E) Subcanopy: *Cheirodendron, Coprosma, Hedyotis, Ilex, Myoporum, Myrsine.*  
 (F) Understory: *Bidens, Dryopteris, Leptecophylla, Poa, Scaevola, Sophora.*  
 (G) Arthropod prey.  
 (ii) In units 4, 5, and 6, the primary constituent elements of critical habitat for Akekee (*Loxops caeruleirostris*) are:  
 (A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).  
 (B) Annual precipitation: Greater than 75 inches (190 centimeters).  
 (C) Substrate: Well-developed soils, montane bogs.  
 (D) Canopy: *Acacia, Charpentiera, Cheirodendron, Metrosideros.*  
 (E) Subcanopy: *Broussaisia, Cibotium, Eurya, Ilex, Myrsine.*

(F) Understory: Ferns, *Carex, Coprosma, Leptecophylla, Oreobolus, Rhynchospora, Vaccinium.*  
 (G) Arthropod prey.  
 (3) Existing manmade features and structures, such as buildings, roads, railroads, airports, runways, other paved areas, lawns, and other urban landscaped areas, do not contain one or more of the primary constituent elements. Federal actions limited to those areas, therefore, would not trigger a consultation under section 7 of the Act unless they may affect the species or primary constituent elements in adjacent critical habitat.  
 (4) Critical habitat maps. Maps were created in GIS, with coordinates in UTM Zone 4, units in meters using North American datum of 1983 (NAD 83).  
 (5) Index map of critical habitat units for Akekee (*Loxops caeruleirostris*) follows:  
**BILLING CODE 4310-55-S**

**Map 1**  
***Loxops caeruleirostris*—Index Map**

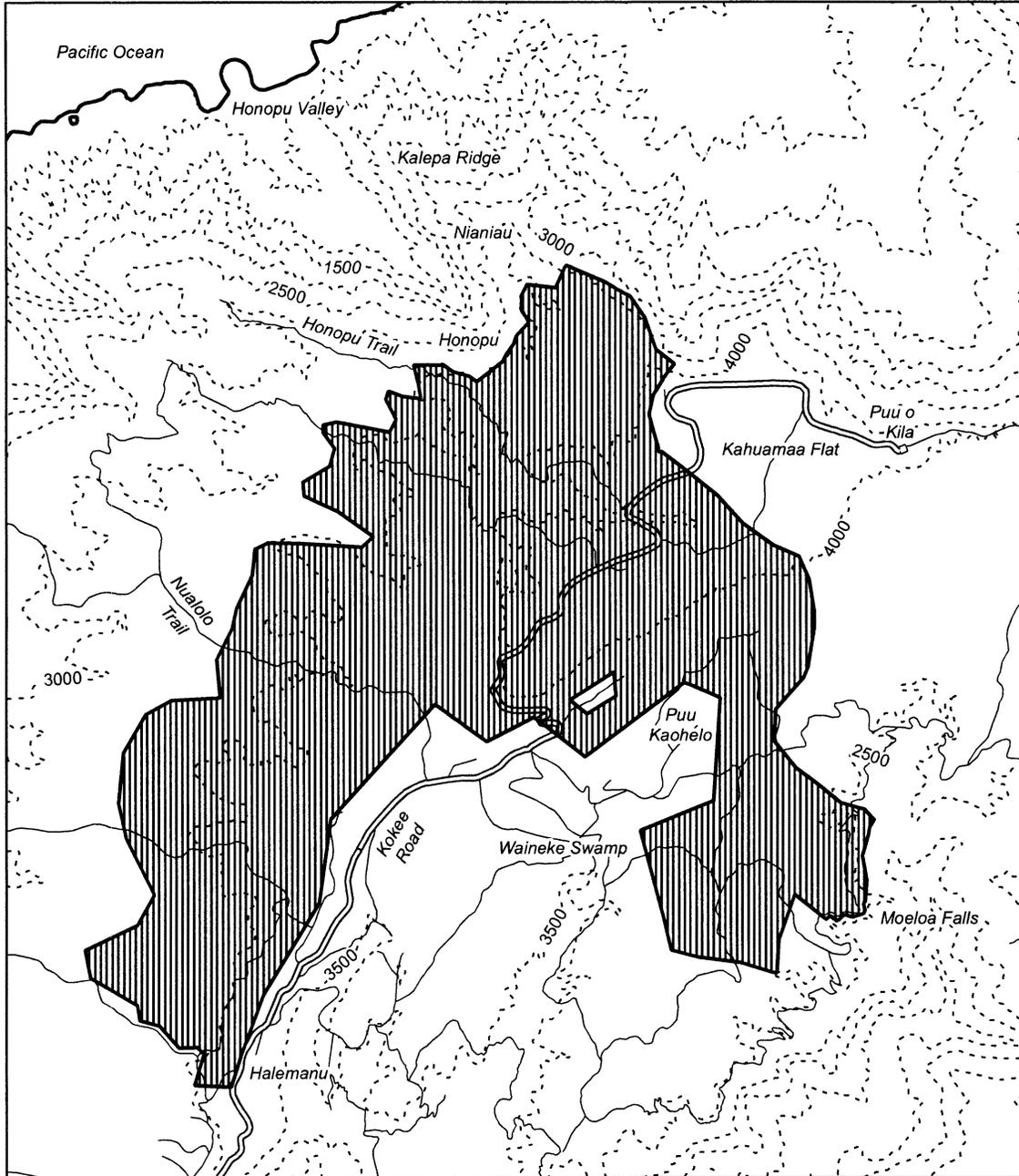


(6) Unit 1, Kauai County, Hawaii.

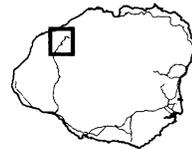
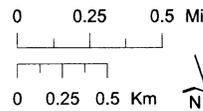
(i) [Reserved for textual description of unit.]

(ii) Map of Unit 1 for Akekee (*Loxops caeruleirostris*) follows:

### *Loxops caeruleirostris* Unit 1 - Montane Mesic



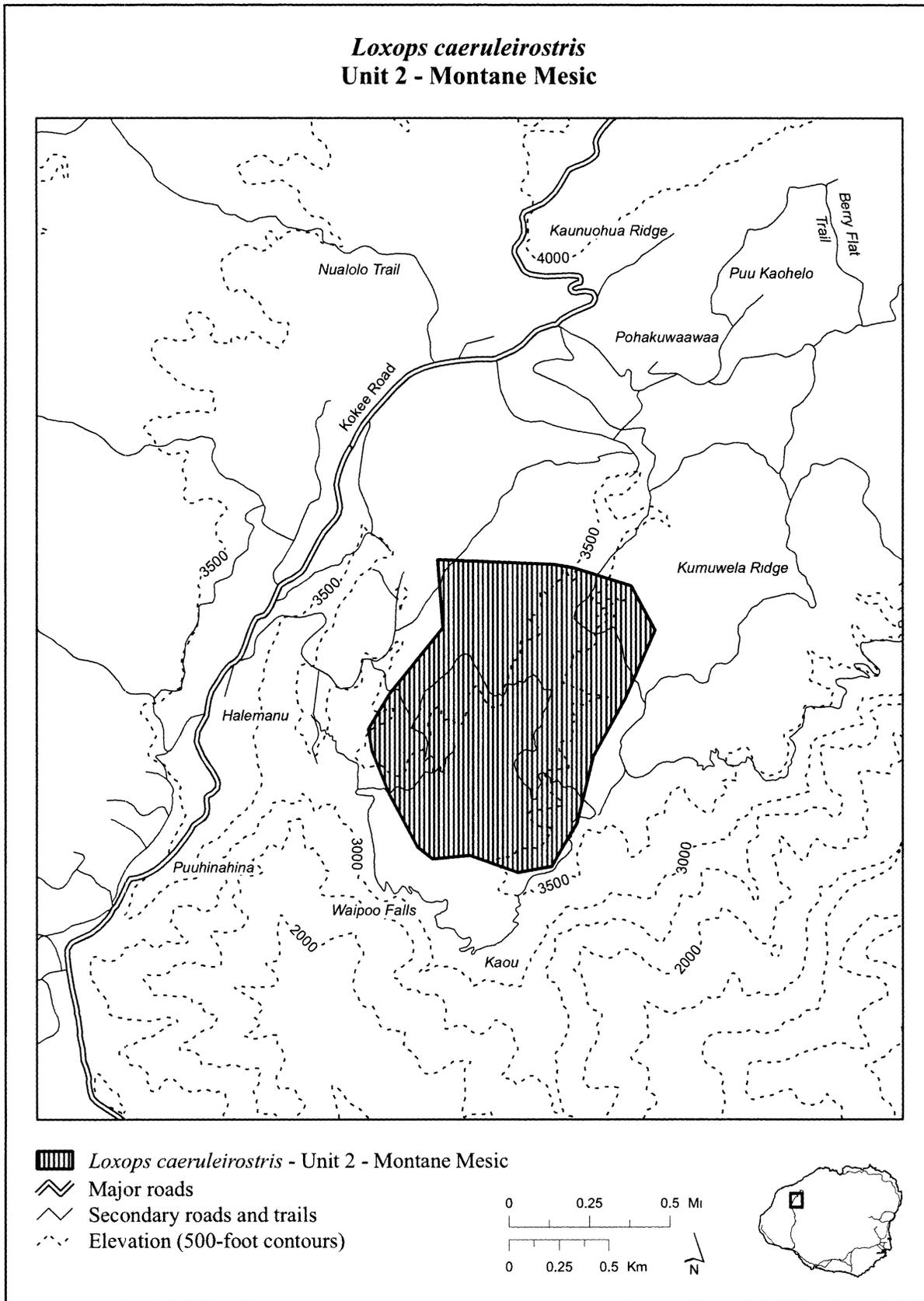
-  *Loxops caeruleirostris* - Unit 1 - Montane Mesic
-  Major roads
-  Secondary roads and trails
-  Elevation (500-foot contours)
-  Coastline



(7) Unit 2, Kauai County, Hawaii.

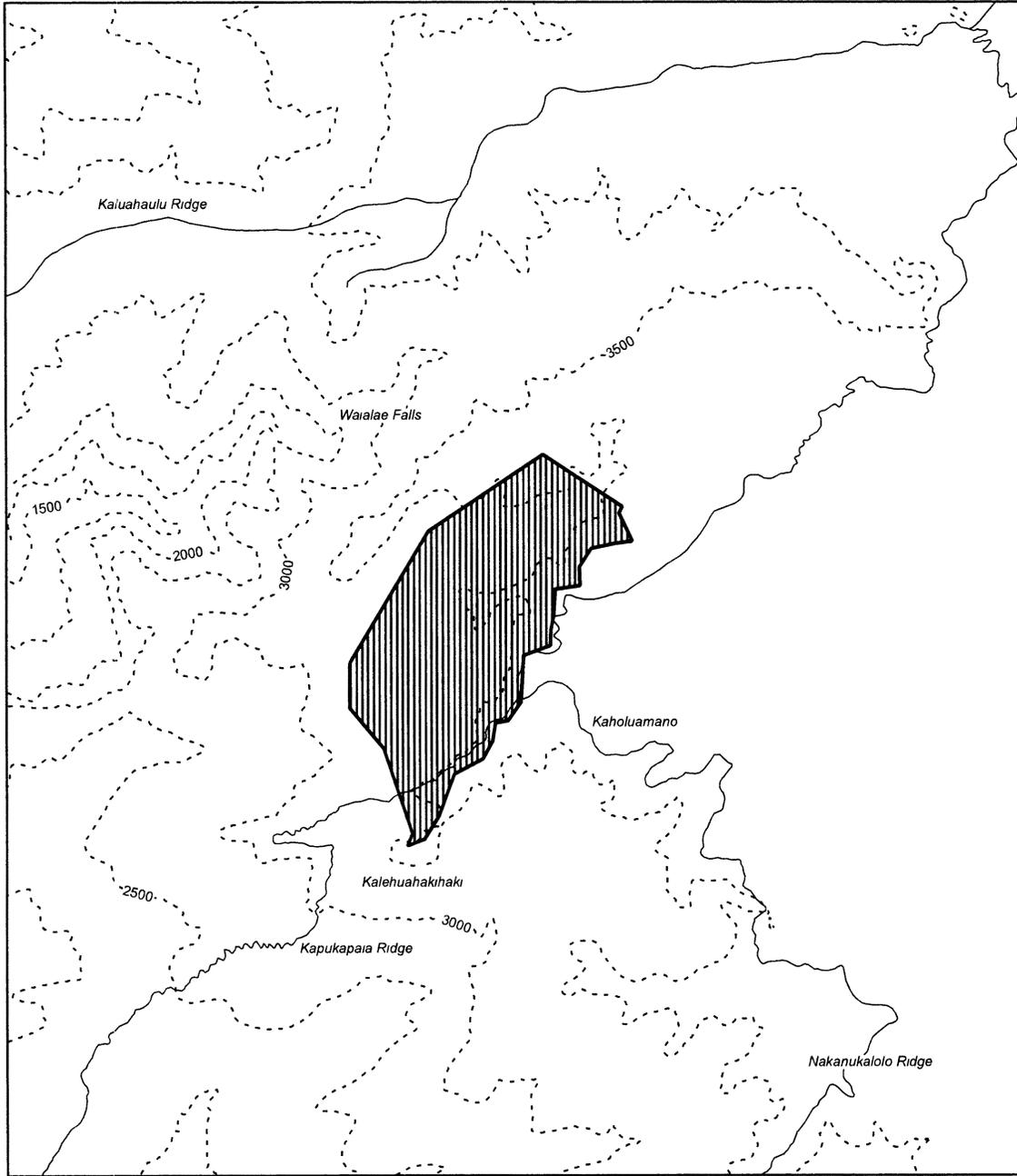
(i) [Reserved for textual description of unit.]

(ii) Map of Unit 2 for Akekee (*Loxops caeruleirostris*) follows:

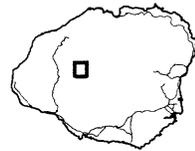
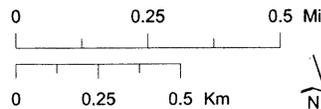


(8) Unit 3, Kauai County, Hawaii. (ii) Map of Unit 3 for Akekee (*Loxops caeruleirostris*) follows:  
 (i) [Reserved for textual description of unit.]

***Loxops caeruleirostris***  
**Unit 3 - Montane Mesic**

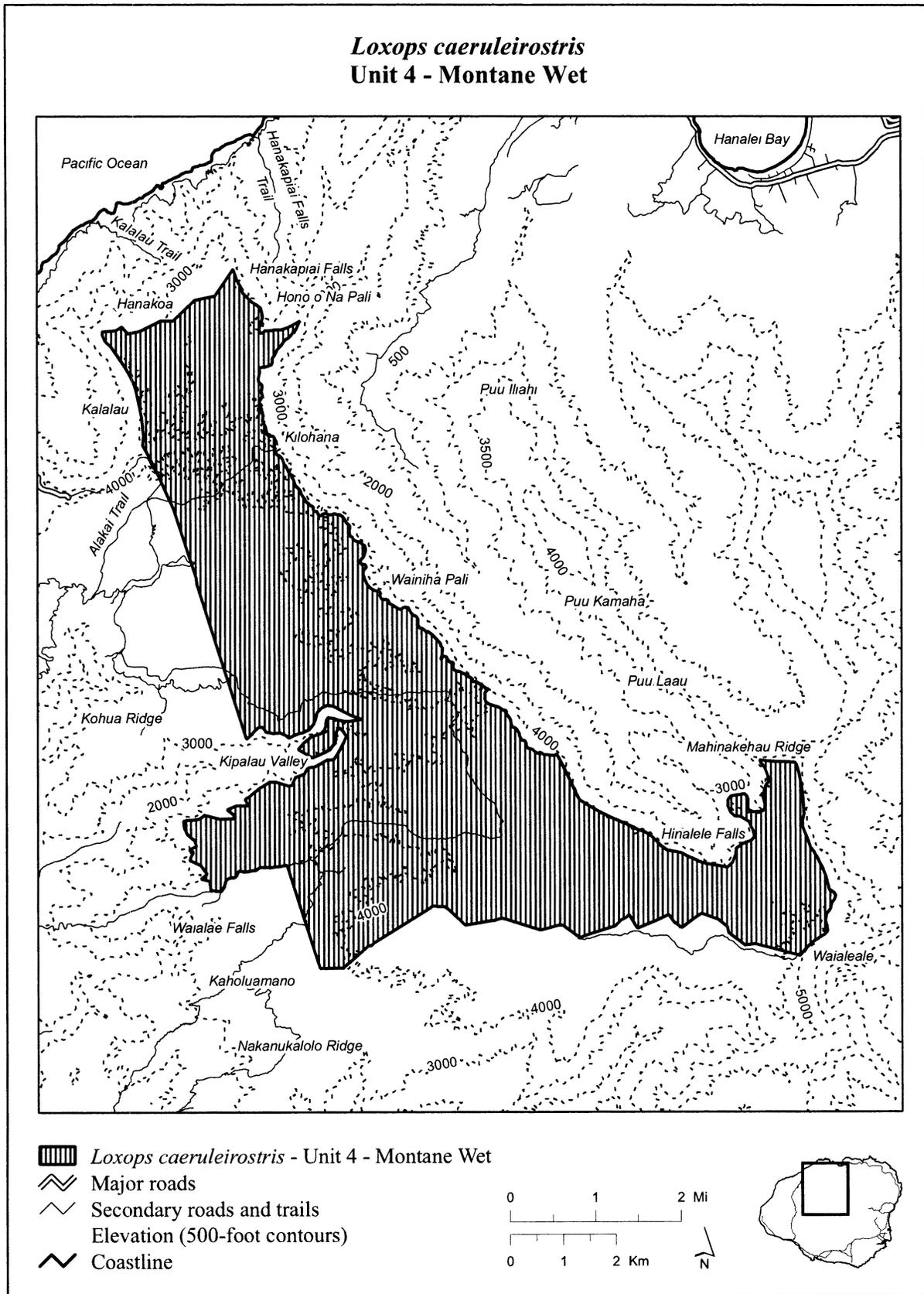


 *Loxops caeruleirostris* - Unit 3 - Montane Mesic  
 Secondary roads and trails  
 Elevation (500-foot contours)



(9) Unit 4, Kauai County, Hawaii.  
 (i) [Reserved for textual description of unit.]

(ii) Map of Unit 4 for Akekee (*Loxops caeruleirostris*) follows:

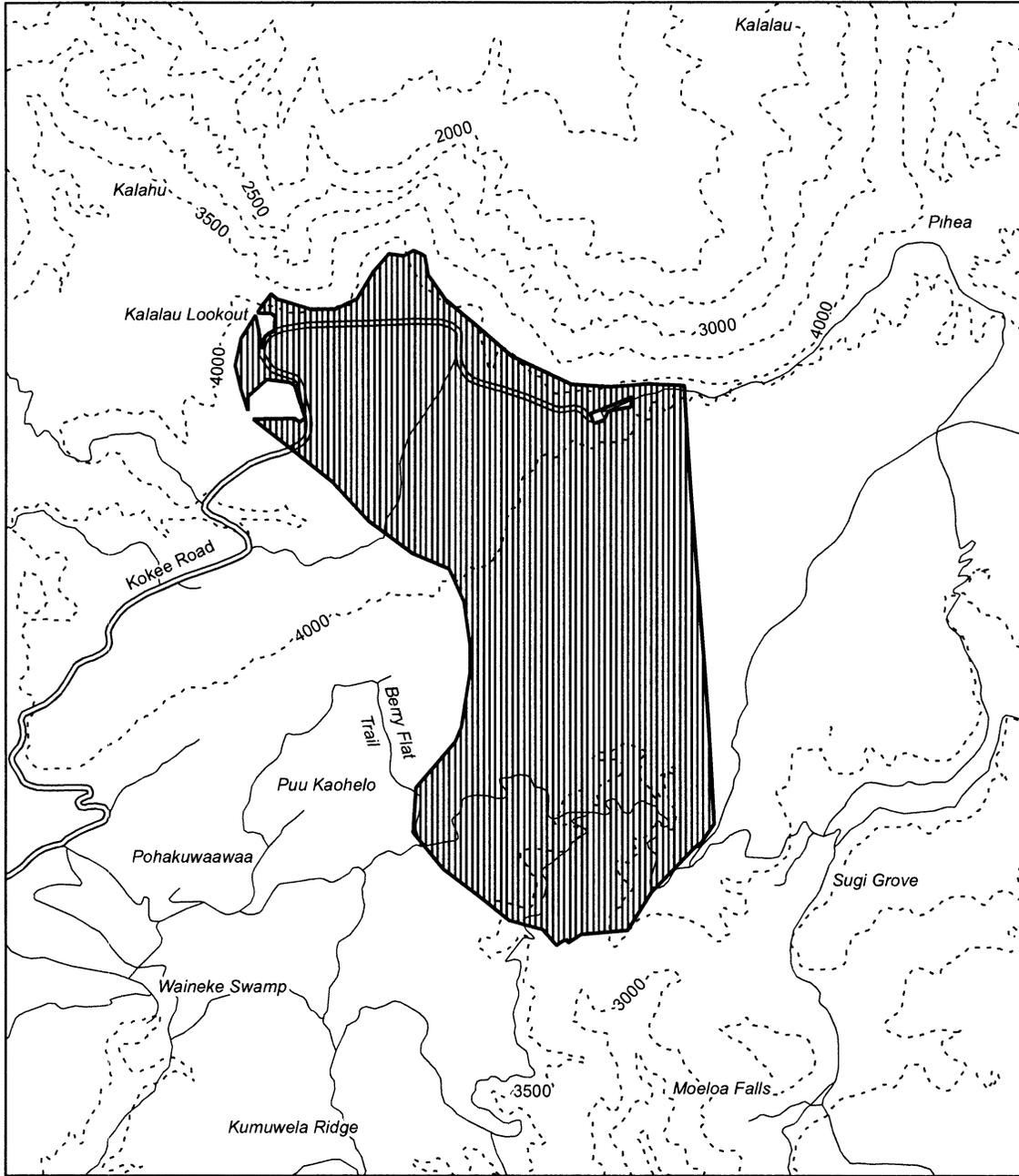


(10) Unit 5, Kauai County, Hawaii.

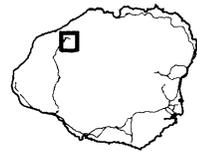
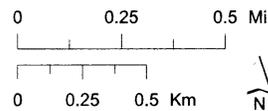
(ii) Map of Unit 5 for Akekee (*Loxops*

unit.] (i) [Reserved for textual description of *caeruleirostris* follows:

### *Loxops caeruleirostris* Unit 5 - Montane Wet



-  *Loxops caeruleirostris* - Unit 5 - Montane Wet
-  Major roads
-  Secondary roads and trails
-  Elevation (500-foot contours)

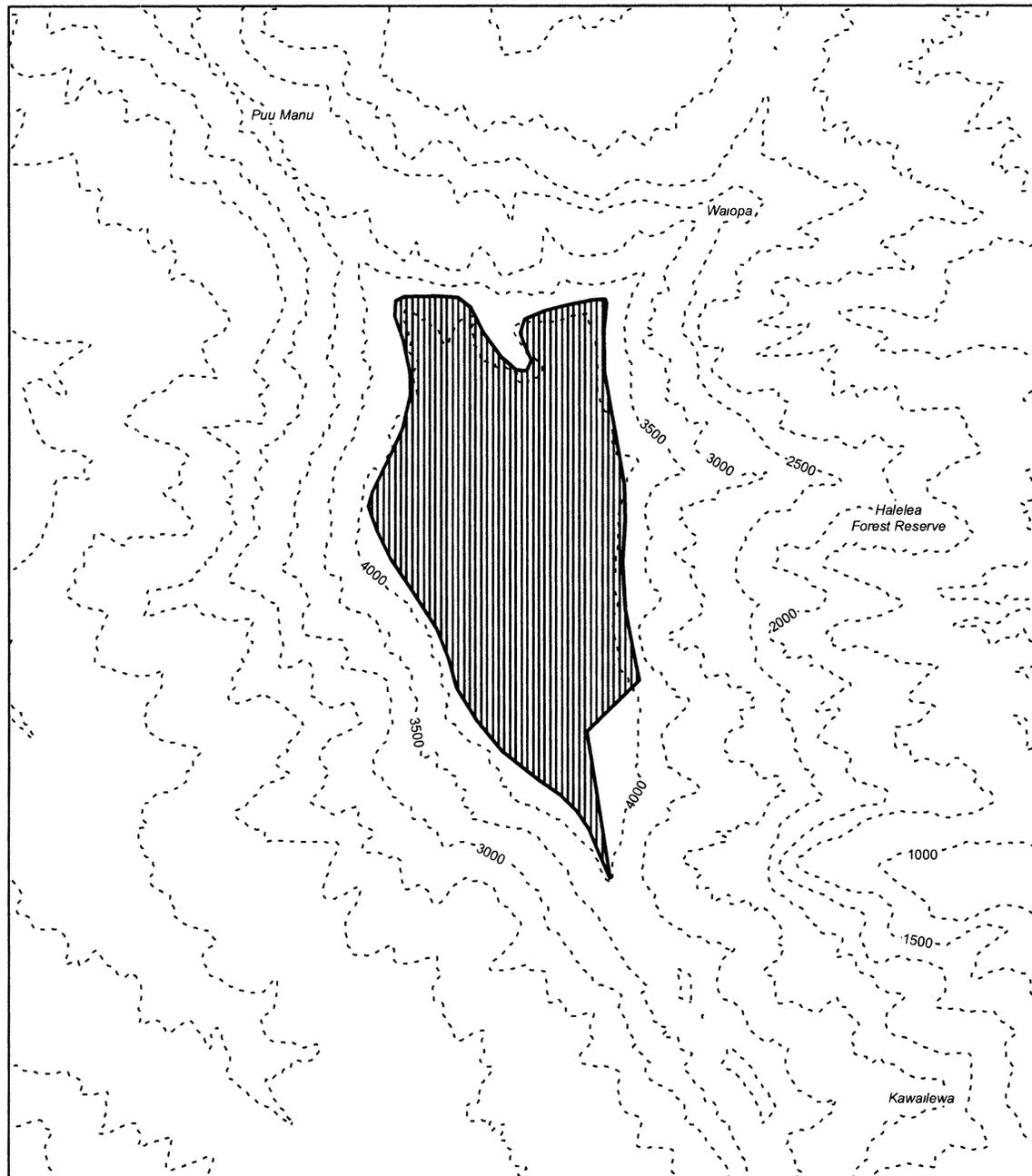


(11) Unit 6, Kauai County, Hawaii.

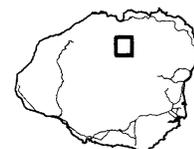
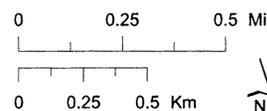
(ii) Map of Unit 6 for Akekee (*Loxops*

(i) [Reserved for textual description of unit.] *caeruleirostris*) follows:

***Loxops caeruleirostris*  
Unit 6 - Montane Wet**



 *Loxops caeruleirostris* - Unit 6 - Montane Wet  
 Elevation (500-foot contours)



Akikiki (*Oreomystis bairdi*)

(1) Critical habitat units are depicted for Kauai County, Hawaii, on the map below.

(2) The primary constituent elements of critical habitat for Akikiki (*Oreomystis bairdi*) are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Arthropod prey.

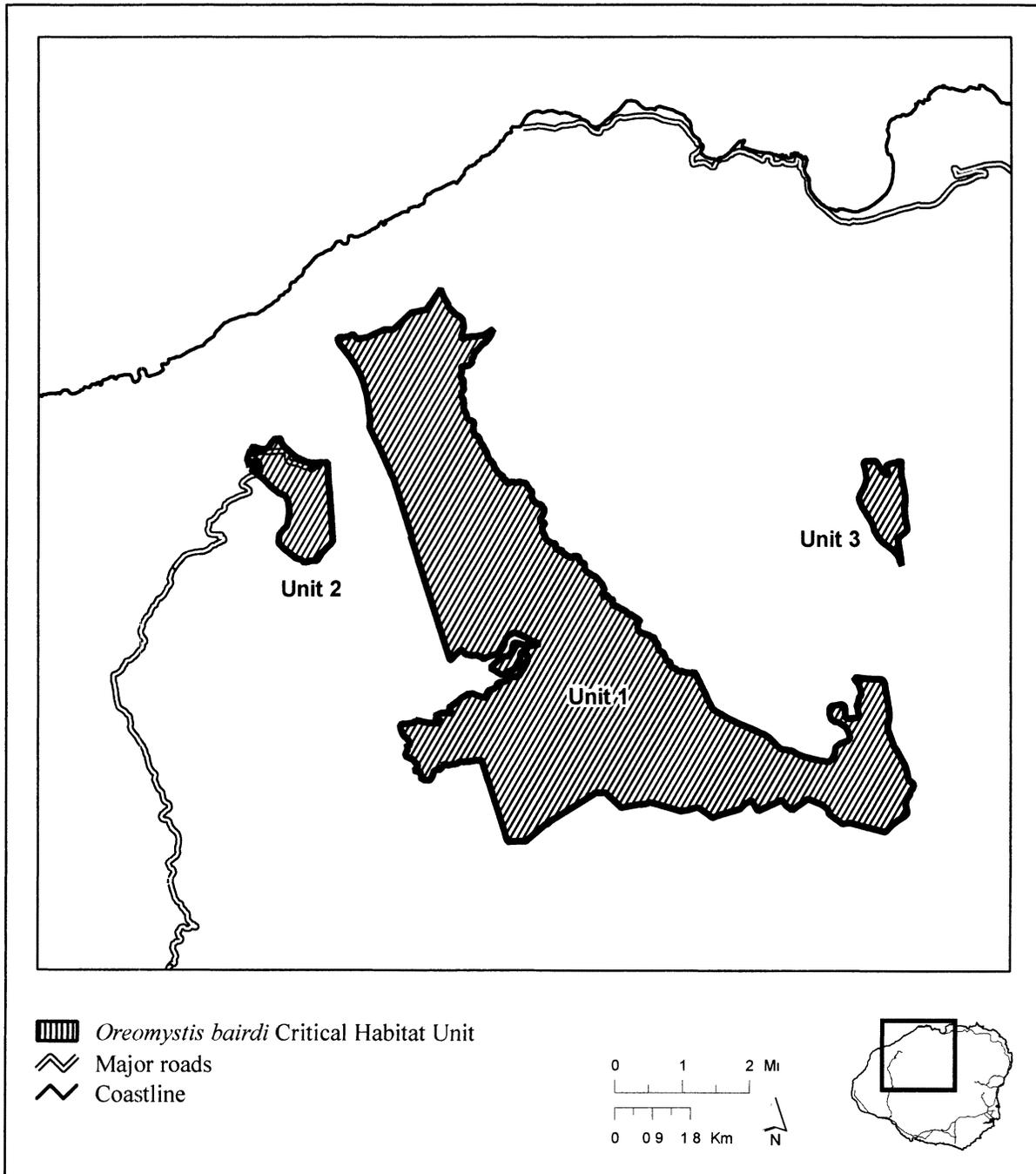
(3) Existing manmade features and structures, such as buildings, roads, railroads, airports, runways, other paved areas, lawns, and other urban landscaped areas, do not contain one or more of the primary constituent elements. Federal actions limited to

those areas, therefore, would not trigger a consultation under section 7 of the Act unless they may affect the species or primary constituent elements in adjacent critical habitat.

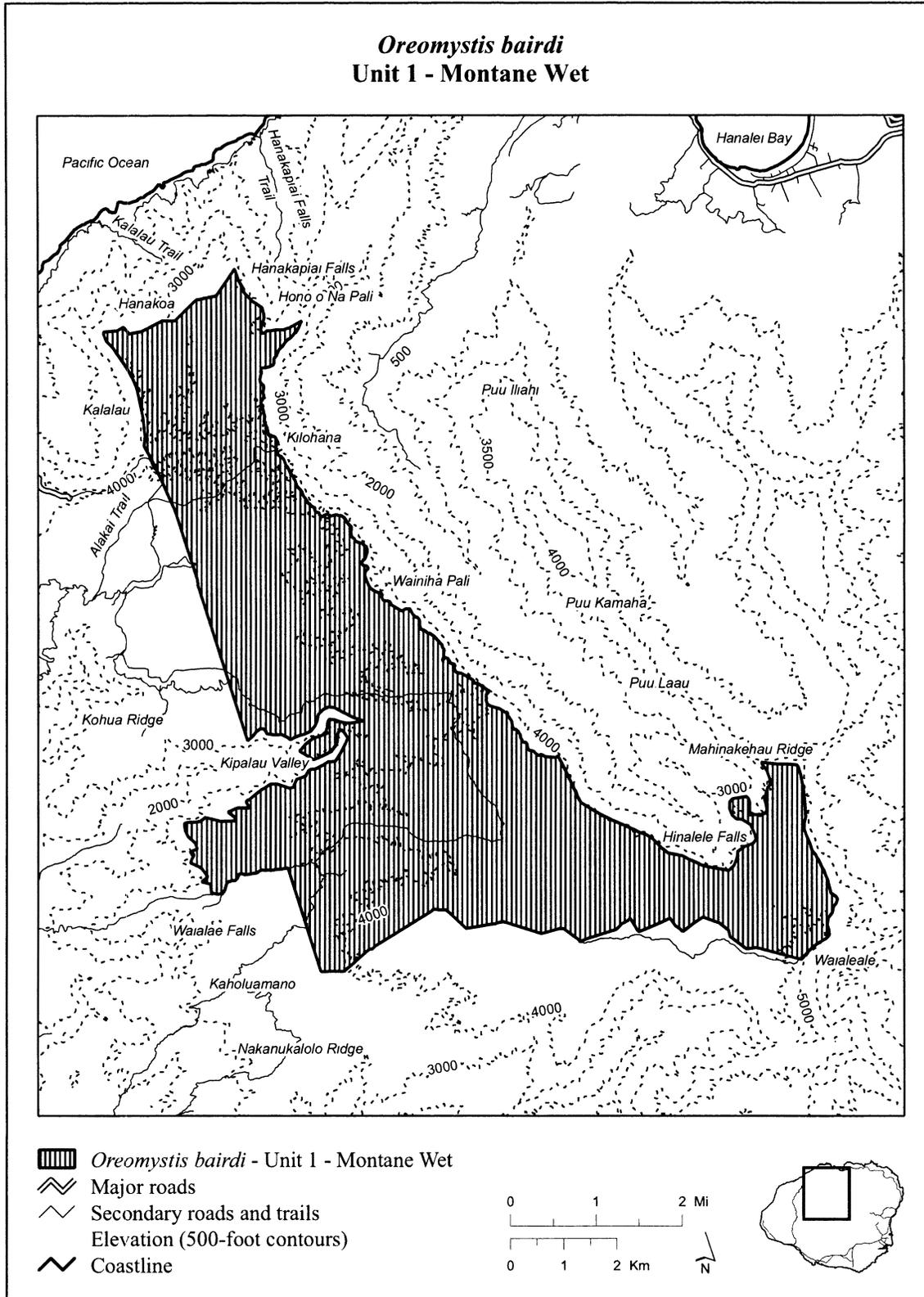
(4) Critical habitat maps. Maps were created in GIS, with coordinates in UTM Zone 4 with units in meters using North American datum of 1983 (NAD 83).

(5) Index map of critical habitat units for Akikiki (*Oreomystis bairdi*) follows:

**Map 1**  
***Oreomystis bairdi*—Index Map**



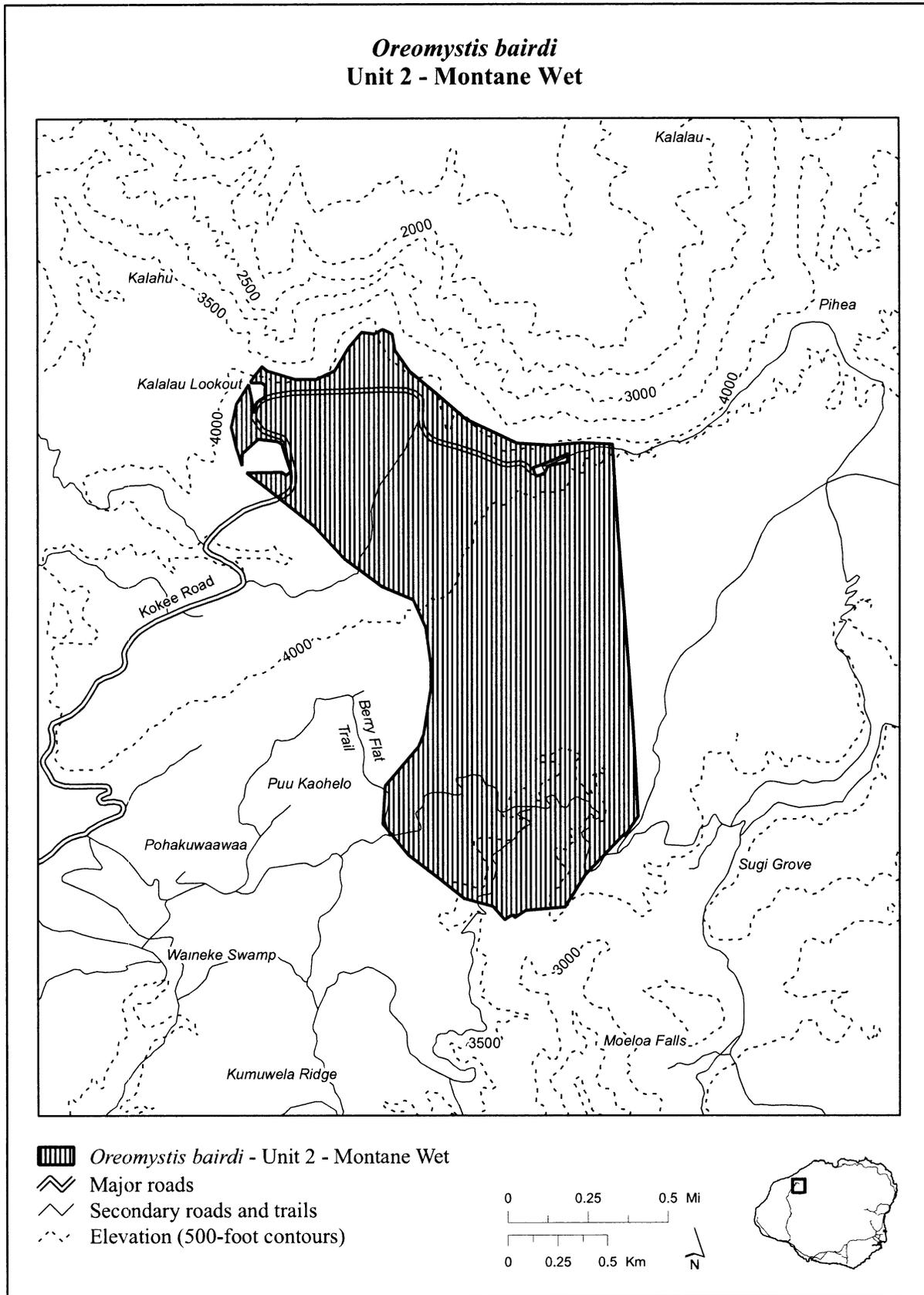
(6) Unit 1, Kauai County, Hawaii. (ii) Map of Unit 1 for Akikiki  
 (i) [Reserved for textual description of (Oreomystis bairdi) follows:  
 unit.]



(7) Unit 2, Kauai County, Hawaii.

(i) [Reserved for textual description of unit.]

(ii) Map of Unit 2 for Akikiki (*Oreomystis bairdi*) follows:



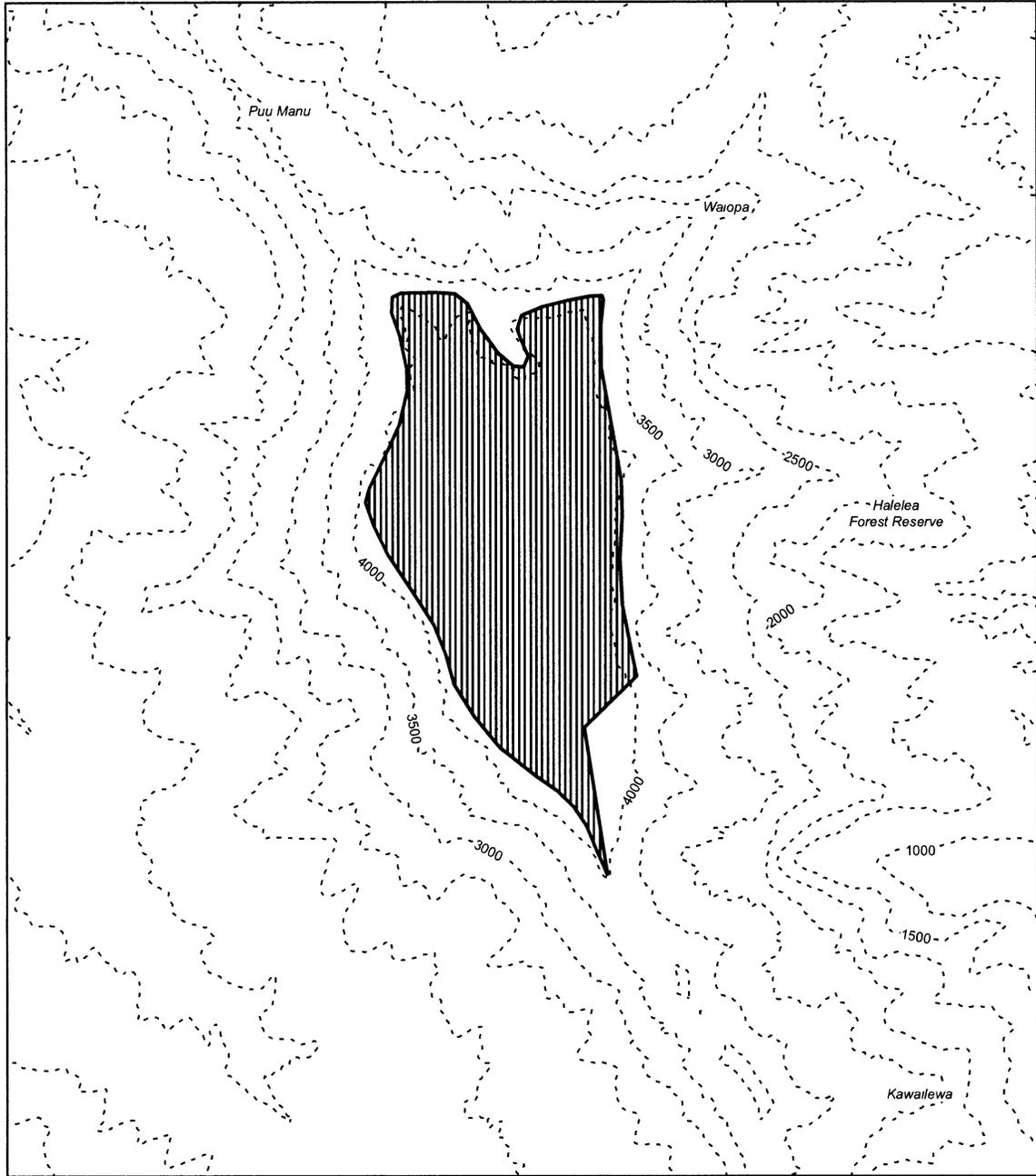
(8) Unit 3, Kauai County, Hawaii.

(ii) Map of Unit 3 for Akikiki

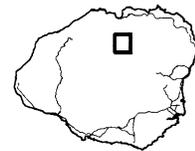
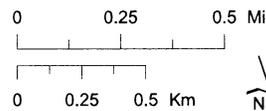
(i) [Reserved for textual description of unit.]

(*Oreomystis bairdi*) follows:

***Oreomystis bairdi***  
**Unit 3 - Montane Wet**



 *Oreomystis bairdi* - Unit 3 - Montane Wet  
 Elevation (500-foot contours)



\* \* \* \* \*

(i) *Insects.*

\* \* \* \* \*

Hawaiian picture-wing fly  
(*Drosophila attigua*)

(1) Critical habitat units are depicted for Kauai County, Hawaii, on the maps below.

(2) *Primary constituent elements.*

(i) In units 1, 2, and 3, the primary constituent elements of critical habitat for Hawaiian picture-wing fly (*Drosophila attigua*) are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(E) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(F) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

(G) Larval host plants (*Cheirodendron* sp.).

(ii) In units 4, 5, and 6, the primary constituent elements of critical habitat for Hawaiian picture-wing fly (*Drosophila attigua*) are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

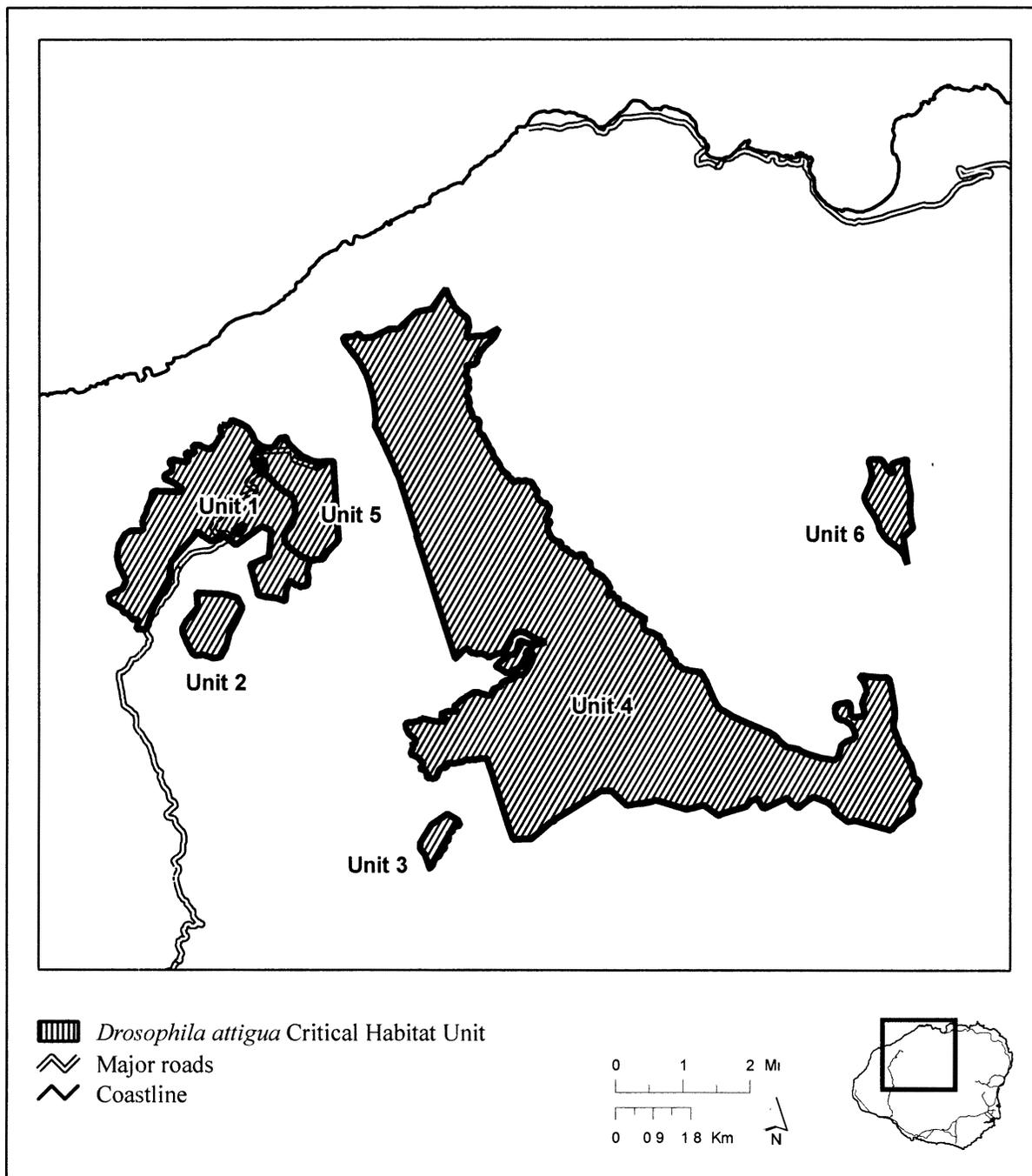
(G) Larval host plants (*Cheirodendron* sp.).

(3) Existing manmade features and structures, such as buildings, roads, railroads, airports, runways, other paved areas, lawns, and other urban landscaped areas, do not contain one or more of the primary constituent elements. Federal actions limited to those areas, therefore, would not trigger a consultation under section 7 of the Act unless they may affect the species or primary constituent elements in adjacent critical habitat.

(4) Critical habitat maps. Maps were created in GIS, with coordinates in UTM Zone 4 with units in meters using North American datum of 1983 (NAD 83).

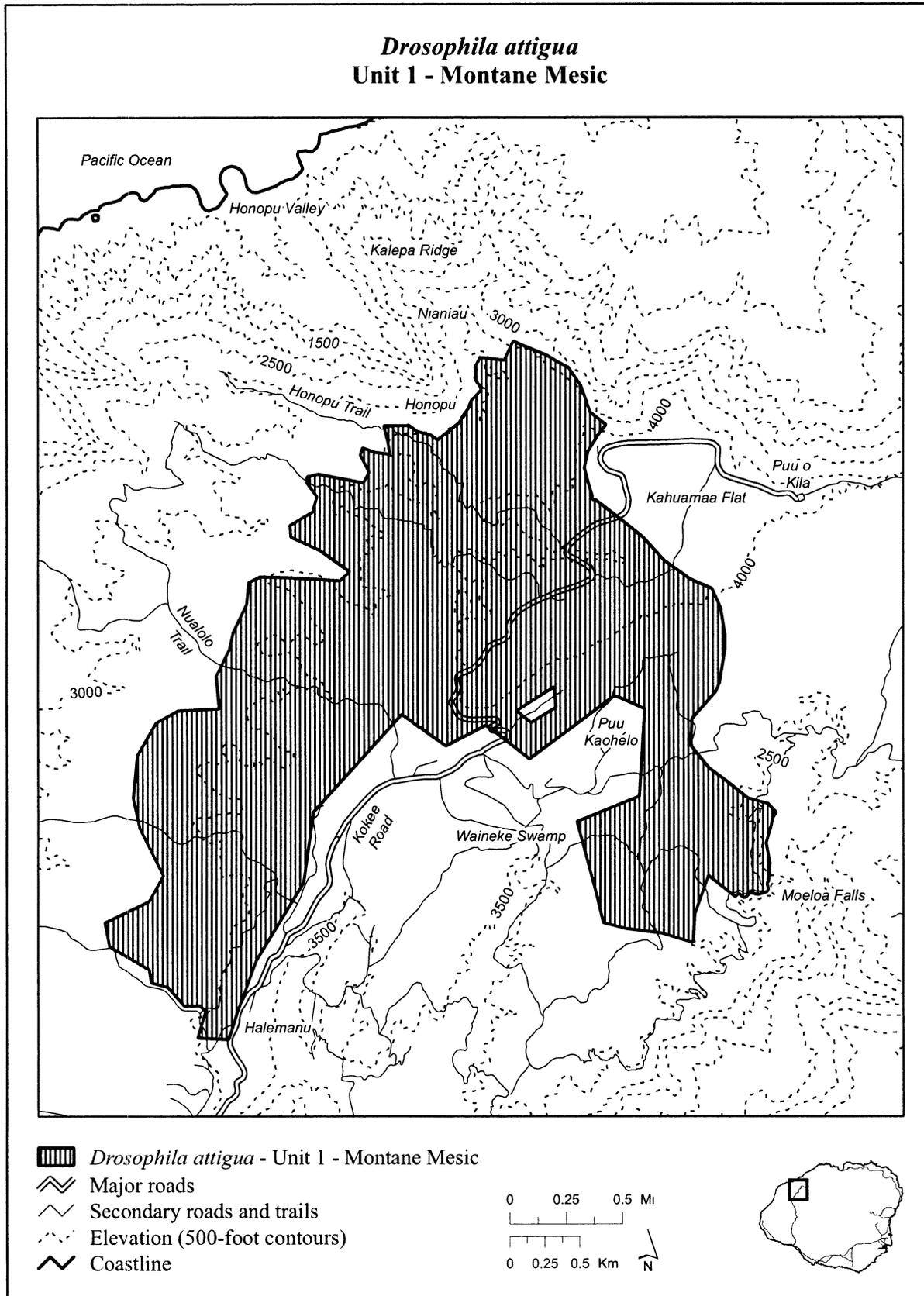
(5) Index map of critical habitat units for Hawaiian picture-wing fly (*Drosophila attigua*) follows:

### Map 1 *Drosophila attigua*—Index Map



(6) Unit 1, Kauai County, Hawaii.  
(i) [Reserved for textual description of unit.]

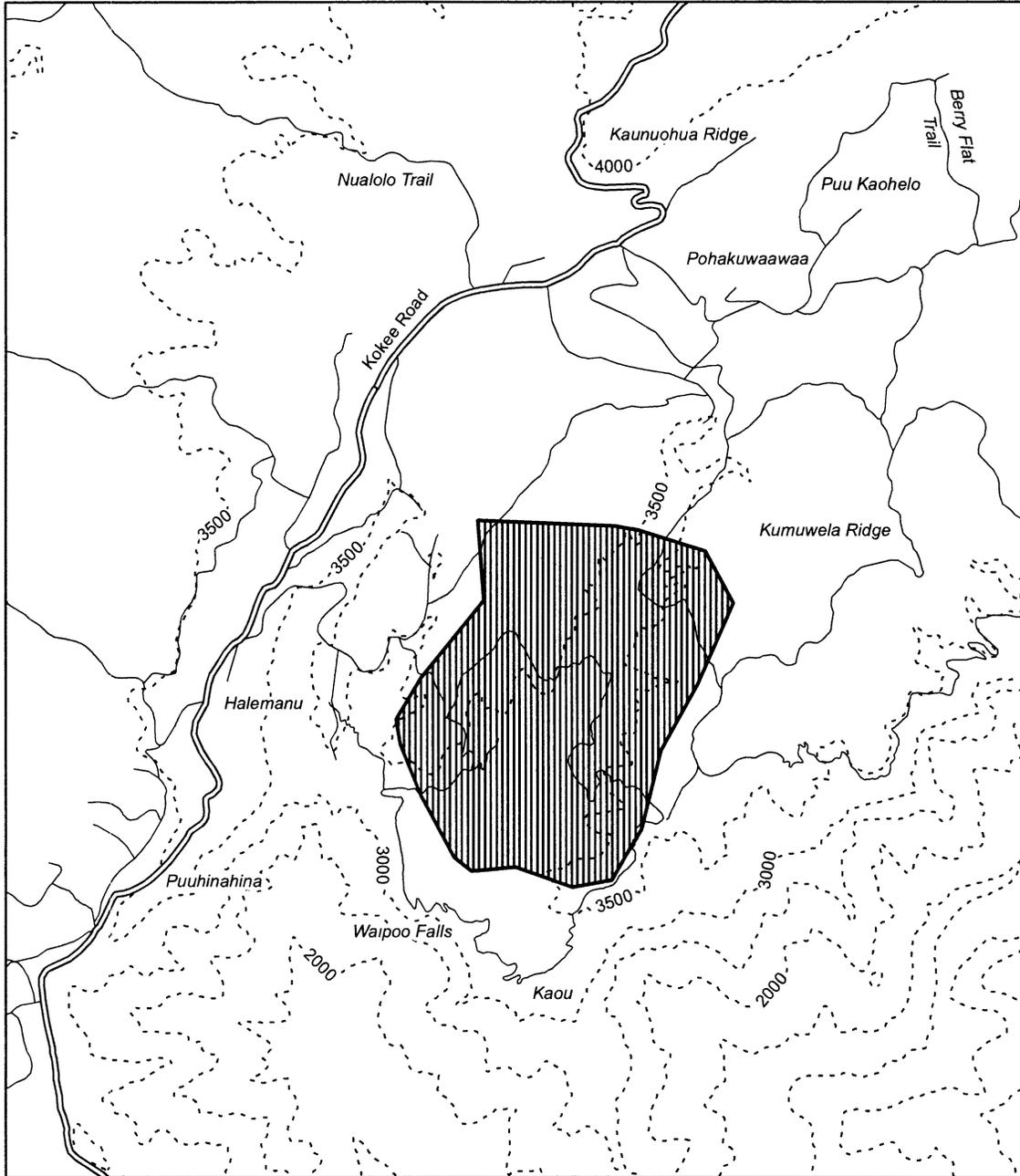
(ii) Map of Unit 1 for Hawaiian picture-wing fly (*Drosophila attigua*) follows:



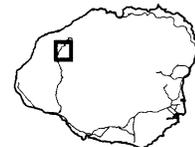
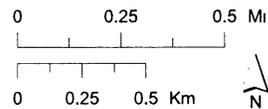
(7) Unit 2, Kauai County, Hawaii.  
(i) [Reserved for textual description of unit.]

(ii) Map of Unit 2 for Hawaiian picture-wing fly (*Drosophila attigua*) follows:

### *Drosophila attigua* Unit 2 - Montane Mesic

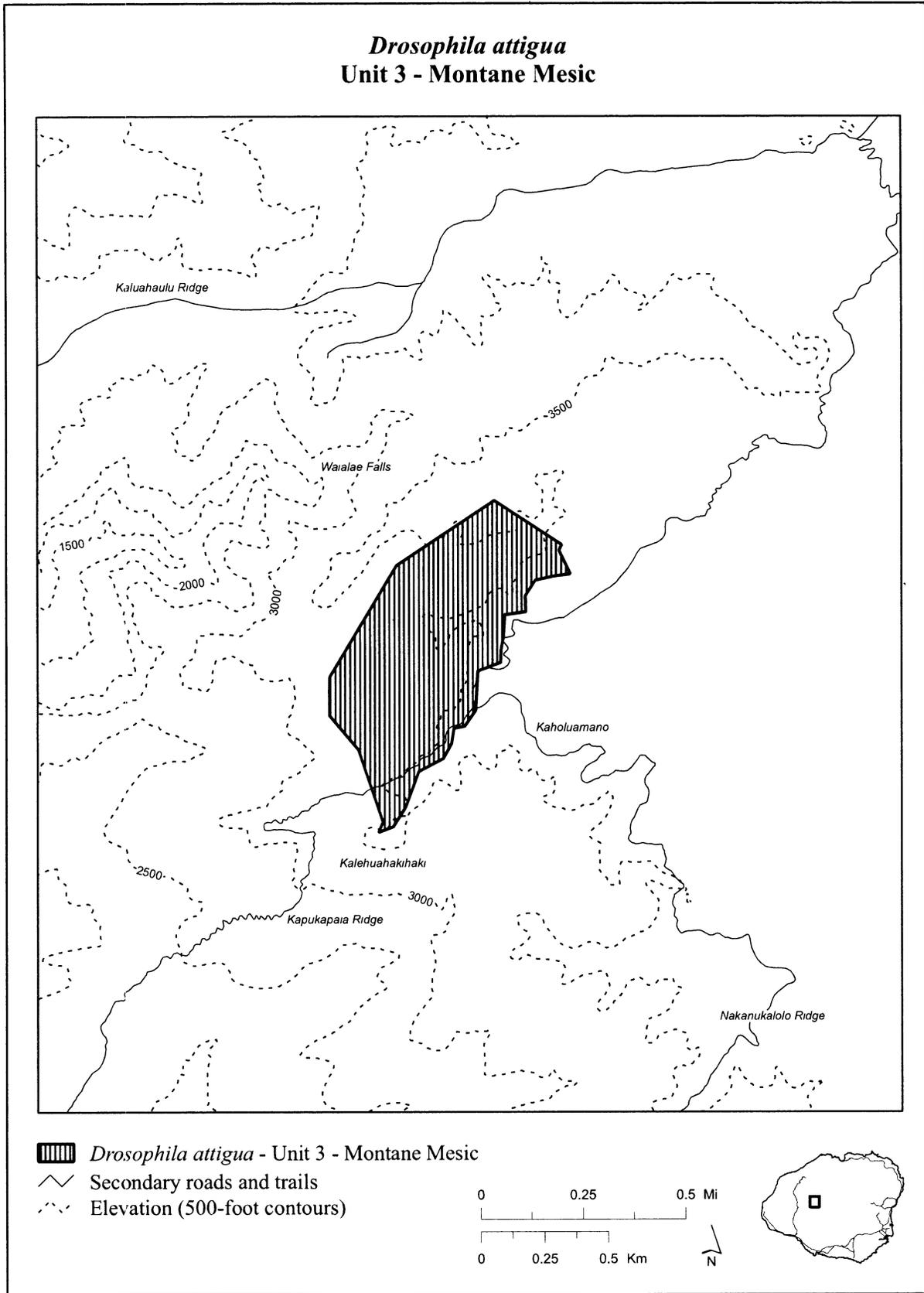


-  *Drosophila attigua* - Unit 2 - Montane Mesic
-  Major roads
-  Secondary roads and trails
-  Elevation (500-foot contours)



(8) Unit 3, Kauai County, Hawaii.  
 (i) [Reserved for textual description of unit.]

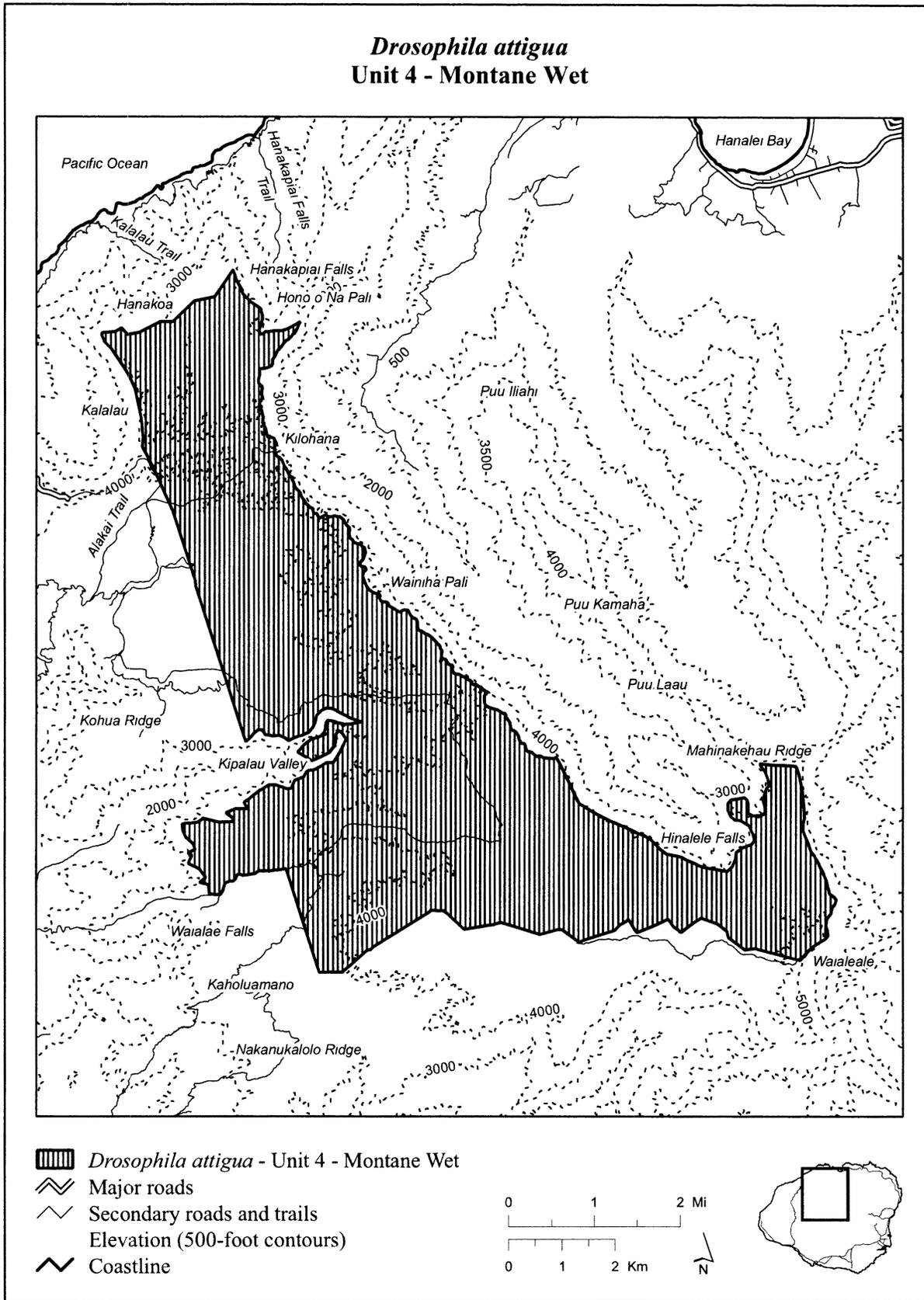
(ii) Map of Unit 3 for Hawaiian picture-wing fly (*Drosophila attigua*) follows:



(9) Unit 4, Kauai County, Hawaii.

(i) [Reserved for textual description of unit.]

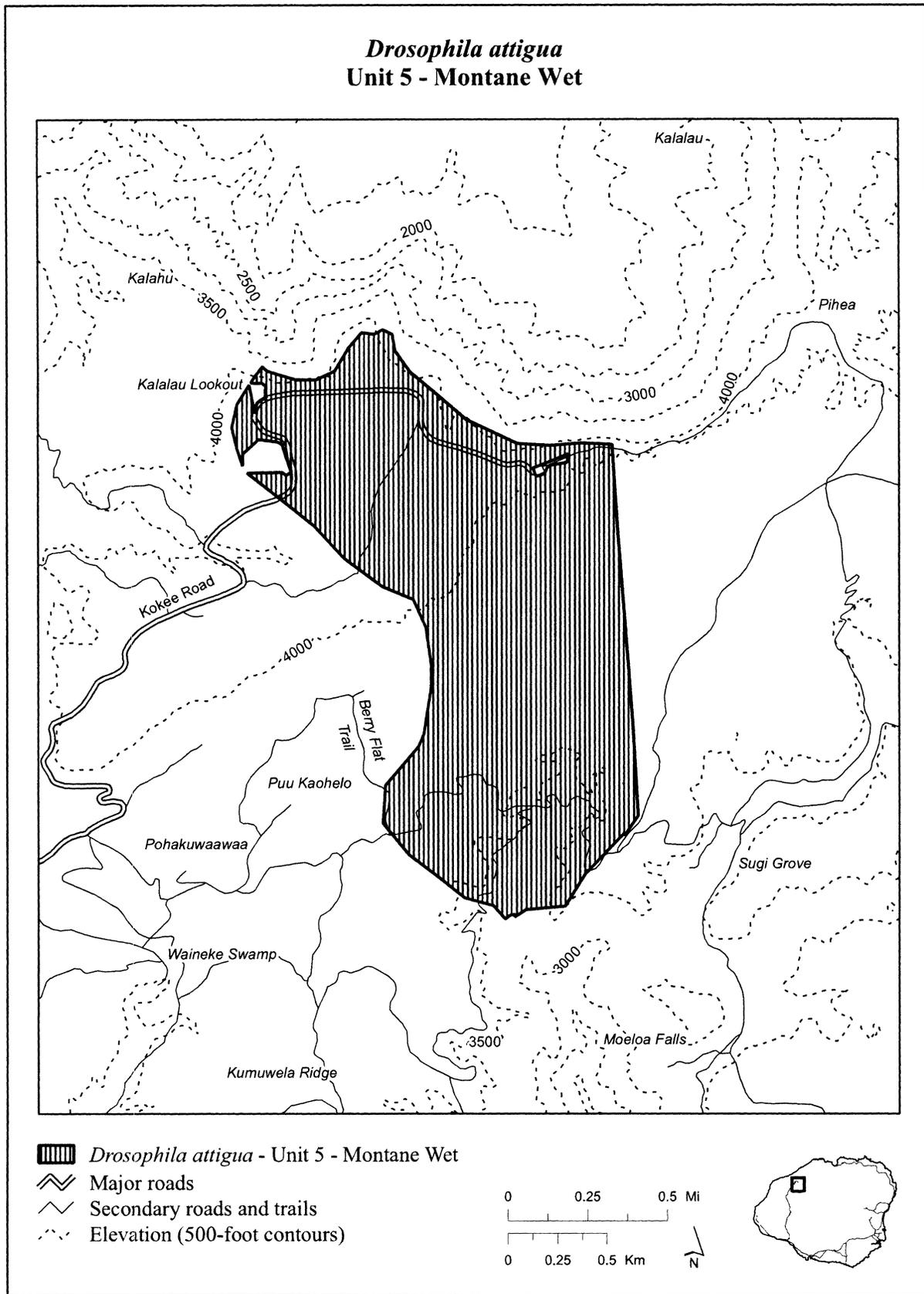
(ii) Map of Unit 4 for Hawaiian picture-wing fly (*Drosophila attigua*) follows:



(10) Unit 5, Kauai County, Hawaii.

(i) [Reserved for textual description of unit.]

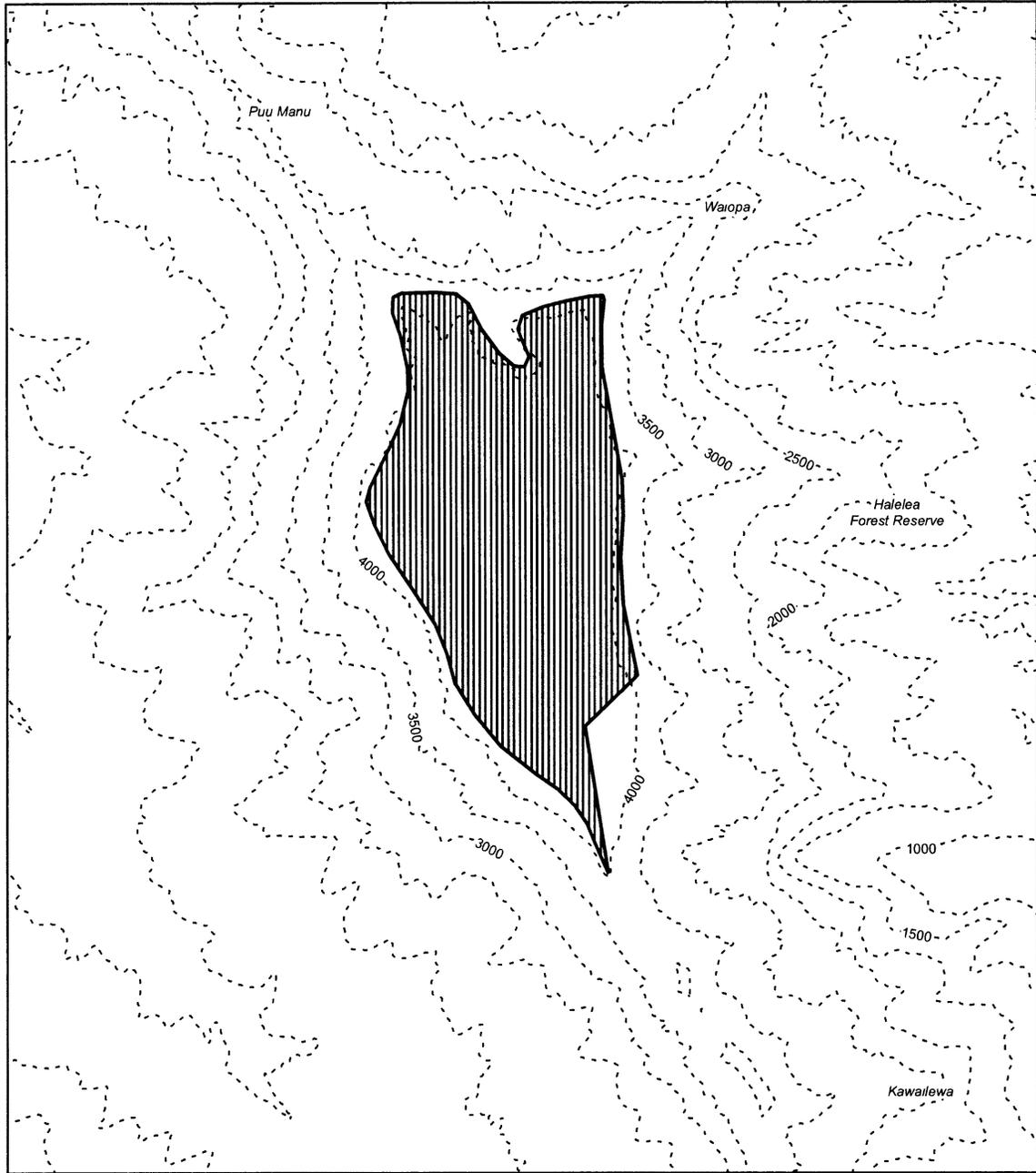
(ii) Map of Unit 5 for Hawaiian picture-wing fly (*Drosophila attigua*) follows:



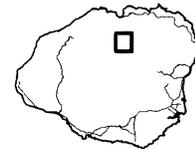
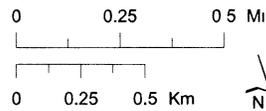
(11)Unit 6, Kauai County, Hawaii.  
(i) [Reserved for textual description of unit.]

(ii) Map of Unit 6 for Hawaiian picture-wing fly (*Drosophila attigua*) follows:

### *Drosophila attigua* Unit 6 - Montane Wet



 *Drosophila attigua* - Unit 6 - Montane Wet  
 Elevation (500-foot contours)



\* \* \* \* \*

5. Amend § 17.99 as follows:

a. By revising the introductory text of paragraph (a)(1) to read as set forth below;

b. By revising paragraph (a)(1)(i) as set forth below;

c. By redesignating paragraphs (a)(1)(vi) through (a)(1)(ccxviii) as paragraphs (a)(1)(viii) through (a)(1)(ccxx);

d. By adding new paragraphs (a)(1)(vi) and (a)(1)(vii) to read as set forth below;

e. By redesignating newly designated paragraphs (a)(1)(ix) through (a)(1)(ccxx) as paragraphs (a)(1)(x) through (a)(1)(ccxxi);

f. By adding new paragraph (a)(1)(ix) to read as set forth below;

g. By redesignating newly designated paragraphs (a)(1)(xvi) through (a)(1)(ccxxi) as paragraphs (a)(1)(xix) through (a)(1)(ccxxiv);

h. By adding new paragraphs (a)(1)(xvi), (a)(1)(xvii), and (a)(1)(xviii) to read as set forth below;

i. By redesignating newly designated paragraphs (a)(1)(xxv) through (a)(1)(ccxxiv) as paragraphs (a)(1)(xxviii) through (a)(1)(ccxxvii);

j. By adding new paragraphs (a)(1)(xxv), (a)(1)(xxvi), and (a)(1)(xxvii) to read as set forth below;

k. By redesignating newly designated paragraphs (a)(1)(xxix) through (a)(1)(ccxxvii) as paragraphs (a)(1)(xxx) through (a)(1)(ccxxviii);

l. By adding a new paragraph (a)(1)(xxix) to read as set forth below;

m. By redesignating newly designated paragraphs (a)(1)(xxxiv) through (a)(1)(ccxxviii) as paragraphs (a)(1)(xxxviii) through (a)(1)(ccxxxii);

n. By adding new paragraphs (a)(1)(xxxiv), (a)(1)(xxxv), (a)(1)(xxxvi), and (a)(1)(xxxvii) to read as set forth below;

o. By redesignating newly designated paragraphs (a)(1)(xxxix) through (a)(1)(ccxxxii) as paragraphs (a)(1)(xli) through (a)(1)(ccxxiv);

p. By adding new paragraphs (a)(1)(xxxix) and (a)(1)(xl) to read as set forth below;

q. By redesignating newly designated paragraphs (a)(1)(xlii) through (a)(1)(ccxxiv) as paragraphs (a)(1)(xliii) through (a)(1)(ccxxxv);

r. By adding a new paragraph (a)(1)(xlii) to read as set forth below;

s. By redesignating newly designated paragraphs (a)(1)(xlviii) through (a)(1)(ccxxxv) as paragraphs (a)(1)(li) through (a)(1)(ccxxviii);

t. By adding new paragraphs (a)(1)(xlviii), (a)(1)(xlix), and (a)(1)(l) to read as set forth below;

u. By redesignating newly designated paragraphs (a)(1)(liii) through

(a)(1)(ccxxxviii) as paragraphs (a)(1)(liv) through (a)(1)(ccxxxix);

v. By adding a new paragraph (a)(1)(liii) to read as set forth below;

w. By redesignating newly designated paragraphs (a)(1)(lvii) through (a)(1)(ccxxxix) as paragraphs (a)(1)(lviii) through (a)(1)(ccxl);

x. By adding a new paragraph (a)(1)(lvii) to read as set forth below;

y. By redesignating newly designated paragraphs (a)(1)(lix) through (a)(1)(ccxl) as paragraphs (a)(1)(lxv) through (a)(1)(ccxli);

z. By adding new paragraphs (a)(1)(lix), (a)(1)(lx), (a)(1)(lxi), (a)(1)(lxii), (a)(1)(lxiii), and (a)(1)(lxiv) to read as set forth below;

aa. By redesignating newly designated paragraphs (a)(1)(lxvi) through (a)(1)(ccxli) as paragraphs (a)(1)(lxx) through (a)(1)(ccl);

bb. By adding new paragraphs (a)(1)(lxvi), (a)(1)(lxvii), (a)(1)(lxviii), and (a)(1)(lxix) to read as set forth below;

cc. By redesignating newly designated paragraphs (a)(1)(lxxiii) through (a)(1)(ccl) as paragraphs (a)(1)(lxxix) through (a)(1)(cclvi);

dd. By adding new paragraphs (a)(1)(lxxiii), (a)(1)(lxxiv), (a)(1)(lxxv), (a)(1)(lxxvi), (a)(1)(lxxvii), and (a)(1)(lxxviii) to read as set forth below;

ee. By redesignating newly designated paragraphs (a)(1)(lxxx) through (a)(1)(cclvi) as paragraphs (a)(1)(lxxxii) through (a)(1)(cclviii);

ff. By adding new paragraphs (a)(1)(lxxx) and (a)(1)(lxxxii) to read as set forth below;

gg. By redesignating newly designated paragraphs (a)(1)(lxxxiii) through (a)(1)(cclviii) as paragraphs (a)(1)(lxxxiv) through (a)(1)(cclix);

hh. By adding a new paragraph (a)(1)(lxxxiii) to read as set forth below;

ii. By redesignating newly designated paragraphs (a)(1)(lxxxvi) through (a)(1)(cclix) as paragraphs (a)(1)(xc) through (a)(1)(cclxiii);

jj. By adding new paragraphs (a)(1)(lxxxvi), (a)(1)(lxxxvii), (a)(1)(lxxxviii), and (a)(1)(lxxxix) to read as set forth below;

kk. By redesignating newly designated paragraphs (a)(1)(xci) through (a)(1)(cclxiii) as paragraphs (a)(1)(xcii) through (a)(1)(cclxiv);

ll. By adding a new paragraph (a)(1)(xci) to read as set forth below;

mm. By redesignating newly designated paragraphs (a)(1)(xciii) through (a)(1)(cclxiv) as paragraphs (a)(1)(xciv) through (a)(1)(cclxv);

nn. By adding a new paragraph (a)(1)(xciii) to read as set forth below;

oo. By redesignating newly designated paragraphs (a)(1)(xcv) through

(a)(1)(cclxv) as paragraphs (a)(1)(cii) through (a)(1)(cclxxii);

pp. By adding new paragraphs (a)(1)(xcv), (a)(1)(xcvi), (a)(1)(xcvii), (a)(1)(xcviii), (a)(1)(xcix), (a)(1)(c), and (a)(1)(ci) to read as set forth below;

qq. By redesignating newly designated paragraphs (a)(1)(cii) through (a)(1)(cclxxii) as paragraphs (a)(1)(civ) through (a)(1)(cclxxiii);

rr. By adding a new paragraph (a)(1)(cii) to read as set forth below;

ss. By redesignating newly designated paragraphs (a)(1)(cv) through (a)(1)(cclxxiii) as paragraphs (a)(1)(cvii) through (a)(1)(cclxxv);

tt. By adding new paragraphs (a)(1)(cv) and (a)(1)(cvi) to read as set forth below;

uu. By redesignating newly designated paragraphs (a)(1)(cviii) through (a)(1)(cclxxv) as paragraphs (a)(1)(cxii) through (a)(1)(cclxxix);

vv. By adding new paragraphs (a)(1)(cviii), (a)(1)(cix), (a)(1)(cx), and (a)(1)(cxii) to read as set forth below;

ww. By redesignating newly designated paragraphs (a)(1)(cxiii) through (a)(1)(cclxxix) as paragraphs (a)(1)(cxvi) through (a)(1)(cclxxii);

xx. By adding new paragraphs (a)(1)(cxiii), (a)(1)(cxiv), and (a)(1)(cxv) to read as set forth below;

yy. By redesignating newly designated paragraphs (a)(1)(cxxx) through (a)(1)(cclxxxii) as paragraphs (a)(1)(cxxx) through (a)(1)(cclxxxiii);

zz. By adding a new paragraph (a)(1)(cxxxix) to read as set forth below;

aaa. By redesignating newly designated paragraphs (a)(1)(cxxxii) through (a)(1)(cclxxxiii) as paragraphs (a)(1)(cxxxiii) through (a)(1)(cclxxxiv);

bbb. By adding a new paragraph (a)(1)(cxxxii) to read as set forth below;

ccc. By redesignating newly designated paragraphs (a)(1)(cxxxiv) through (a)(1)(cclxxxiv) as paragraphs (a)(1)(cxxxvi) through (a)(1)(cclxxxvi);

ddd. By adding new paragraphs (a)(1)(cxxxiv) and (a)(1)(cxxxv) to read as set forth below;

eee. By redesignating newly designated paragraphs (a)(1)(cxxxix) through (a)(1)(cclxxxvi) as paragraphs (a)(1)(cxlviii) through (a)(1)(ccxcv);

fff. By adding new paragraphs (a)(1)(cxxxix), (a)(1)(cxli), (a)(1)(cxlii), (a)(1)(cxliii), (a)(1)(cxliv), (a)(1)(cxlv), (a)(1)(cxlvi), and (a)(1)(cxlvii) to read as set forth below;

ggg. By redesignating newly designated paragraphs (a)(1)(cxliv) through (a)(1)(ccxcv) as paragraphs (a)(1)(cli) through (a)(1)(ccxcix);

hhh. By adding new paragraphs (a)(1)(cxlix), (a)(1)(cl), (a)(1)(cli), and (a)(1)(clii) to read as set forth below;

iii. By redesignating newly designated paragraphs (a)(1)(clxii) through

(a)(1)(ccxcix) as paragraphs (a)(1)(clxv) through (a)(1)(cccii);

jjj. By adding new paragraphs (a)(1)(clxii), (a)(1)(clxiii), and (a)(1)(clxiv) to read as set forth below;

kkk. By redesignating newly designated paragraphs (a)(1)(clxxi) through (a)(1)(ccci) as paragraphs (a)(1)(clxxii) through (a)(1)(ccci);

lll. By adding a new paragraph (a)(1)(clxxi) to read as set forth below;

mmm. By redesignating newly designated paragraphs (a)(1)(clxxv) through (a)(1)(ccci) as paragraphs (a)(1)(clxxx) through (a)(1)(ccviii);

nnn. By adding new paragraphs (a)(1)(clxxv), (a)(1)(clxxvi), (a)(1)(clxxvii), (a)(1)(clxxviii), and (a)(1)(clxxix) to read as set forth below;

ooo. By redesignating newly designated paragraphs (a)(1)(clxxxiii) through (a)(1)(ccviii) as paragraphs (a)(1)(clxxxv) through (a)(1)(ccx);

ppp. By adding new paragraphs (a)(1)(clxxxiii) and (a)(1)(clxxxiv) to read as set forth below;

qqq. By redesignating newly designated paragraphs (a)(1)(cxcviii) through (a)(1)(ccx) as paragraphs (a)(1)(cxcix) through (a)(1)(ccxi);

rrr. By adding a new paragraph (a)(1)(cxcviii) to read as set forth below;

sss. By redesignating newly designated paragraphs (a)(1)(ccxv) through (a)(1)(ccxi) as paragraphs (a)(1)(ccxvii) through (a)(1)(ccxiii);

ttt. By adding new paragraphs (a)(1)(ccxv) and (a)(1)(ccxvi) to read as set forth below;

uuu. By redesignating newly designated paragraphs (a)(1)(ccxxi) through (a)(1)(ccxiii) as paragraphs (a)(1)(ccxxv) through (a)(1)(ccxvii);

vvv. By adding new paragraphs (a)(1)(ccxxi), (a)(1)(ccxxii), (a)(1)(ccxxiii), and (a)(1)(ccxxiv) to read as set forth below;

www. By redesignating newly designated paragraphs (a)(1)(ccxxviii) through (a)(1)(ccxvii) as paragraphs (a)(1)(ccxxix) through (a)(1)(ccxviii);

xxx. By adding a new paragraph (a)(1)(ccxxviii) to read as set forth below;

yyy. By redesignating newly designated paragraphs (a)(1)(ccxxiv) through (a)(1)(ccxviii) as paragraphs (a)(1)(ccxxix) through (a)(1)(ccxxiii);

zzz. By adding new paragraphs (a)(1)(ccxxiv), (a)(1)(ccxxv), (a)(1)(ccxxvi), (a)(1)(ccxxvii), and (a)(1)(ccxxviii) to read as set forth below;

aaaa. By redesignating newly designated paragraphs (a)(1)(ccxl) through (a)(1)(ccxxiii) as paragraphs (a)(1)(ccxli) through (a)(1)(ccxxiv);

bbbb. By adding a new paragraph (a)(1)(ccxl) to read as set forth below;

cccc. By redesignating newly designated paragraphs (a)(1)(ccxlvii) through (a)(1)(ccxxiv) as paragraphs (a)(1)(ccl) through (a)(1)(ccxxvii);

dddd. By adding new paragraphs (a)(1)(ccxlvii), (a)(1)(ccxlvi), and (a)(1)(ccxliv) to read as set forth below;

eeee. By redesignating newly designated paragraphs (a)(1)(cclii) through (a)(1)(ccxxvii) as paragraphs (a)(1)(ccliii) through (a)(1)(ccxxviii);

ffff. By adding a new paragraph (a)(1)(cclii) to read as set forth below;

gggg. By redesignating newly designated paragraphs (a)(1)(cclvii) through (a)(1)(ccxxviii) as paragraphs (a)(1)(cclix) through (a)(1)(ccxxx);

hhhh. By adding new paragraphs (a)(1)(cclvii) and (a)(1)(cclviii) to read as set forth below;

iiii. By redesignating newly designated paragraphs (a)(1)(cclxv) through (a)(1)(ccxxx) as paragraphs (a)(1)(cclxvii) through (a)(1)(ccxxxii);

jjjj. By adding new paragraphs (a)(1)(cclxv) and (a)(1)(cclxvi) to read as set forth below;

kkkk. By redesignating newly designated paragraphs (a)(1)(cclxxi) through (a)(1)(ccxxxii) as paragraphs (a)(1)(cclxxii) through (a)(1)(ccxxxiii);

llll. By adding a new paragraph (a)(1)(cclxxi) to read as set forth below;

mmmm. By redesignating newly designated paragraphs (a)(1)(cclxxvi) through (a)(1)(ccxxxiii) as paragraphs (a)(1)(cclxxxi) through (a)(1)(ccxxxviii);

nnnn. By adding new paragraphs (a)(1)(cclxxvi), (a)(1)(cclxxvii), (a)(1)(cclxxviii), (a)(1)(cclxxix), and (a)(1)(cclxxx) to read as set forth below;

oooo. By redesignating newly designated paragraphs (a)(1)(cclxxxix) through (a)(1)(ccxxxviii) as paragraphs (a)(1)(ccxcii) through (a)(1)(ccxli);

pppp. By adding new paragraphs (a)(1)(cclxxxix), (a)(1)(ccxc), and (a)(1)(ccxc) to read as set forth below;

qqqq. By redesignating newly designated paragraphs (a)(1)(ccviii) through (a)(1)(ccxli) as paragraphs (a)(1)(cccix) through (a)(1)(ccxlii);

rrrr. By adding a new paragraph (a)(1)(ccviii) to read as set forth below;

ssss. By redesignating newly designated paragraphs (a)(1)(ccxxviii) through (a)(1)(ccxlii) as paragraphs (a)(1)(ccxxv) through (a)(1)(ccxlix);

tttt. By adding new paragraphs (a)(1)(ccxxviii), (a)(1)(ccxxix), (a)(1)(ccxxx), (a)(1)(ccxxxi), (a)(1)(ccxxxii), (a)(1)(ccxxxiii), and (a)(1)(ccxxxiv) to read as set forth below;

uuuu. By redesignating newly designated paragraph (a)(1)(ccxlix) as paragraph (a)(1)(cdlvi);

vvvv. By adding new paragraphs (a)(1)(ccxlix), (a)(1)(ccl), (a)(1)(cclii),

(a)(1)(ccliii), (a)(1)(ccliv), (a)(1)(cclv), (a)(1)(cclvi),

(a)(1)(cclvii), (a)(1)(cclviii), (a)(1)(cclix), (a)(1)(cclx), (a)(1)(cclxi), (a)(1)(cclxii), (a)(1)(cclxiii),

(a)(1)(cclxiv), (a)(1)(cclxv), (a)(1)(cclxvi), (a)(1)(cclxvii), (a)(1)(cclxviii), (a)(1)(cclxix),

(a)(1)(cclxx), (a)(1)(cclxxi), (a)(1)(cclxxii), (a)(1)(cclxxiii), (a)(1)(cclxxiv), (a)(1)(cclxxv),

(a)(1)(cclxxvi), (a)(1)(cclxxvii), (a)(1)(cclxxviii), (a)(1)(cclxxix), (a)(1)(cclxxx), (a)(1)(cclxxxi),

(a)(1)(cclxxxii), (a)(1)(cclxxxiii), (a)(1)(cclxxxiv), (a)(1)(cclxxxv), (a)(1)(cclxxxvi), (a)(1)(cclxxxvii),

(a)(1)(cclxxxviii), (a)(1)(cclxxxix), (a)(1)(ccxc), (a)(1)(ccxcii), (a)(1)(ccxciii),

(a)(1)(ccxciv), (a)(1)(ccxcv), (a)(1)(ccxcvi), (a)(1)(ccxcvii), (a)(1)(ccxcviii), (a)(1)(ccxcix),

(a)(1)(cd), (a)(1)(cdi), (a)(1)(cdii), (a)(1)(cdiii), (a)(1)(cdiv), (a)(1)(cdv),

(a)(1)(cdvi), (a)(1)(cdvii), (a)(1)(cdviii), (a)(1)(cdix), (a)(1)(cdx), (a)(1)(cdxi),

(a)(1)(cdxii), (a)(1)(cdxiii), (a)(1)(cdxiv), (a)(1)(cdxv), (a)(1)(cdxvi), (a)(1)(cdxvii),

(a)(1)(cdxviii), (a)(1)(cdxix), (a)(1)(cdxx), (a)(1)(cdxxi), (a)(1)(cdxxii), (a)(1)(cdxxiii), (a)(1)(cdxxiv),

(a)(1)(cdxxv), (a)(1)(cdxxvi), (a)(1)(cdxxvii), (a)(1)(cdxxviii), (a)(1)(cdxxix), (a)(1)(cdxxx),

(a)(1)(cdxxxi), (a)(1)(cdxxxii), (a)(1)(cdxxxiii), (a)(1)(cdxxxiv), (a)(1)(cdxxxv), (a)(1)(cdxxxvi),

(a)(1)(cdxxxvii), (a)(1)(cdxxxviii), (a)(1)(cdxxxix), (a)(1)(cdxli), (a)(1)(cdxlii), (a)(1)(cdxliii),

(a)(1)(cdxliv), (a)(1)(cdxlv), (a)(1)(cdxlvi), (a)(1)(cdxlvii), (a)(1)(cdxlviii), (a)(1)(cdxlix), (a)(1)(cdli),

(a)(1)(cdlii), (a)(1)(cdliii), (a)(1)(cdliv), and (a)(1)(cdlv) to read as set forth below;

www. By amending the table at newly designated paragraph (a)(1)(cdlvi) by adding the following entries, first by unit number and then alphabetically by species name, in the same order as these units are presented in the preceding subparagraphs of this section, as set forth below:

*New entry:*  
Kauai 4—*Chamaesyce remyi* var. *kauaiensis*—a  
Kauai 4—*Chamaesyce remyi* var. *remyi*—a  
Kauai 4—*Cyanea dolichopoda*—a  
Kauai 4—*Cyrtandra oenobarba*—a  
Kauai 4—*Cyrtandra paliku*—a  
Kauai 4—*Dubautia plantaginea* ssp. *magnifolia*—a  
Kauai 4—*Lysimachia iniki*—a  
Kauai 4—*Lysimachia pendens*—a  
Kauai 4—*Lysimachia venosa*—a  
Kauai 4—*Platydesma rostrata*—a

- Kauai 7–*Canavalia napaliensis*–a  
 Kauai 7–*Chamaesyce eleanoriae*–a  
 Kauai 7–*Chamaesyce remyi* var.  
*remyi*–b  
 Kauai 7–*Charpentiera densiflora*–a  
 Kauai 7–*Doryopteris angelica*–a  
 Kauai 7–*Dubautia kenwoodii*–a  
 Kauai 7–*Labordia helleri*–a  
 Kauai 7–*Pittosporum napaliense*–a  
 Kauai 7–*Platydesma rostrata*–b  
 Kauai 7–*Psychotria hobdyi*–a  
 Kauai 7–*Tetraplasandra*  
*bisattenuata*–a  
 Kauai 10–*Astelia waialealae*–a  
 Kauai 10–*Chamaesyce remyi* var.  
*kauaiensis*–b  
 Kauai 10–*Chamaesyce remyi* var.  
*kauaiensis*–c  
 Kauai 10–*Chamaesyce remyi* var.  
*remyi*–c  
 Kauai 10–*Chamaesyce remyi* var.  
*remyi*–d  
 Kauai 10–*Chamaesyce remyi* var.  
*remyi*–e  
 Kauai 10–*Charpentiera densiflora*–b  
 Kauai 10–*Cyanea dolichopoda*–b  
 Kauai 10–*Cyanea eleeleensis*–a  
 Kauai 10–*Cyanea kolekoleensis*–a  
 Kauai 10–*Cyanea kuhihewa*–a  
 Kauai 10–*Cyrtandra oenobarba*–b  
 Kauai 10–*Cyrtandra oenobarba*–c  
 Kauai 10–*Cyrtandra paliku*–b  
 Kauai 10–*Dryopteris crinalis* var.  
*podosorus*–a  
 Kauai 10–*Dubautia imbricata* ssp.  
*imbricata*–a  
 Kauai 10–*Dubautia kalalauensis*–a  
 Kauai 10–*Dubautia plantaginea* ssp.  
*magnifolia*–b  
 Kauai 10–*Dubautia waialealae*–a  
 Kauai 10–*Geranium kauaiense*–a  
 Kauai 10–*Keysseria erici*–a  
 Kauai 10–*Keysseria helenae*–a  
 Kauai 10–*Labordia helleri*–b  
 Kauai 10–*Labordia helleri*–c  
 Kauai 10–*Labordia pumila*–a  
 Kauai 10–*Lysimachia daphnoides*–a  
 Kauai 10–*Lysimachia iniki*–b  
 Kauai 10–*Lysimachia pendens*–b  
 Kauai 10–*Lysimachia venosa*–b  
 Kauai 10–*Melicope degeneri*–a  
 Kauai 10–*Melicope paniculata*–a  
 Kauai 10–*Melicope puberula*–a  
 Kauai 10–*Melicope puberula*–b  
 Kauai 10–*Myrsine mezii*–a  
 Kauai 10–*Phyllostegia renovans*–a  
 Kauai 10–*Phyllostegia renovans*–b  
 Kauai 10–*Platydesma rostrata*–c  
 Kauai 10–*Platydesma rostrata*–d  
 Kauai 10–*Platydesma rostrata*–e  
 Kauai 10–*Psychotria grandiflora*–a  
 Kauai 10–*Stenogyne kealiae*–a  
 Kauai 10–*Tetraplasandra*  
*bisattenuata*–b  
 Kauai 10–*Tetraplasandra flynnii*–a  
 Kauai 11–*Astelia waialealae*–b  
 Kauai 11–*Canavalia napaliensis*–b  
 Kauai 11–*Chamaesyce eleanoriae*–b  
 Kauai 11–*Chamaesyce eleanoriae*–c  
 Kauai 11–*Chamaesyce remyi* var.  
*kauaiensis*–d  
 Kauai 11–*Chamaesyce remyi* var.  
*kauaiensis*–e  
 Kauai 11–*Chamaesyce remyi* var.  
*remyi*–f  
 Kauai 11–*Chamaesyce remyi* var.  
*remyi*–g  
 Kauai 11–*Chamaesyce remyi* var.  
*remyi*–h  
 Kauai 11–*Chamaesyce remyi* var.  
*remyi*–i  
 Kauai 11–*Chamaesyce remyi* var.  
*remyi*–j  
 Kauai 11–*Charpentiera densiflora*–c  
 Kauai 11–*Charpentiera densiflora*–d  
 Kauai 11–*Cyanea dolichopoda*–c  
 Kauai 11–*Cyanea eleeleensis*–b  
 Kauai 11–*Cyanea kolekoleensis*–b  
 Kauai 11–*Cyanea kuhihewa*–b  
 Kauai 11–*Cyrtandra oenobarba*–d  
 Kauai 11–*Cyrtandra oenobarba*–e  
 Kauai 11–*Cyrtandra paliku*–c  
 Kauai 11–*Diellia mannii*–a  
 Kauai 11–*Doryopteris angelica*–b  
 Kauai 11–*Dryopteris crinalis* var.  
*podosorus*–b  
 Kauai 11–*Dubautia imbricata* ssp.  
*imbricata*–b  
 Kauai 11–*Dubautia kalalauensis*–b  
 Kauai 11–*Dubautia kenwoodii*–b  
 Kauai 11–*Dubautia plantaginea* ssp.  
*magnifolia*–c  
 Kauai 11–*Dubautia waialealae*–b  
 Kauai 11–*Geranium kauaiense*–b  
 Kauai 11–*Keysseria erici*–b  
 Kauai 11–*Keysseria helenae*–b  
 Kauai 11–*Labordia helleri*–d  
 Kauai 11–*Labordia helleri*–e  
 Kauai 11–*Labordia helleri*–f  
 Kauai 11–*Labordia helleri*–g  
 Kauai 11–*Labordia pumila*–b  
 Kauai 11–*Lysimachia daphnoides*–b  
 Kauai 11–*Lysimachia iniki*–c  
 Kauai 11–*Lysimachia pendens*–c  
 Kauai 11–*Lysimachia scopulensis*–a  
 Kauai 11–*Lysimachia venosa*–c  
 Kauai 11–*Melicope degeneri*–b  
 Kauai 11–*Melicope paniculata*–b  
 Kauai 11–*Melicope puberula*–c  
 Kauai 11–*Melicope puberula*–d  
 Kauai 11–*Myrsine knudsenii*–a  
 Kauai 11–*Myrsine mezii*–b  
 Kauai 11–*Myrsine mezii*–c  
 Kauai 11–*Phyllostegia renovans*–c  
 Kauai 11–*Phyllostegia renovans*–d  
 Kauai 11–*Pittosporum napaliense*–b  
 Kauai 11–*Platydesma rostrata*–f  
 Kauai 11–*Platydesma rostrata*–g  
 Kauai 11–*Platydesma rostrata*–h  
 Kauai 11–*Platydesma rostrata*–i  
 Kauai 11–*Platydesma rostrata*–j  
 Kauai 11–*Psychotria grandiflora*–b  
 Kauai 11–*Psychotria grandiflora*–c  
 Kauai 11–*Psychotria hobdyi*–b  
 Kauai 11–*Schiedea attenuata*–a  
 Kauai 11–*Stenogyne kealiae*–b  
 Kauai 11–*Stenogyne kealiae*–c  
 Kauai 11–*Stenogyne kealiae*–d  
 Kauai 11–*Tetraplasandra*  
*bisattenuata*–c  
 Kauai 11–*Tetraplasandra flynnii*–b  
 Kauai 11–*Tetraplasandra flynnii*–c  
 Kauai 18–*Astelia waialealae*–c  
 Kauai 18–*Chamaesyce remyi* var.  
*remyi*–k  
 Kauai 18–*Dryopteris crinalis* var.  
*podosorus*–c  
 Kauai 18–*Dubautia kalalauensis*–c  
 Kauai 18–*Dubautia waialealae*–c  
 Kauai 18–*Geranium kauaiense*–c  
 Kauai 18–*Keysseria erici*–c  
 Kauai 18–*Keysseria helenae*–c  
 Kauai 18–*Labordia helleri*–h  
 Kauai 18–*Labordia pumila*–c  
 Kauai 18–*Lysimachia daphnoides*–c  
 Kauai 18–*Melicope degeneri*–c  
 Kauai 18–*Melicope puberula*–e  
 Kauai 18–*Myrsine mezii*–d  
 Kauai 18–*Phyllostegia renovans*–e  
 Kauai 18–*Platydesma rostrata*–k  
 Kauai 18–*Psychotria grandiflora*–d  
 Kauai 18–*Tetraplasandra flynnii*–d  
 Kauai 19–*Chamaesyce remyi* var.  
*kauaiensis*–f  
 Kauai 19–*Chamaesyce remyi* var.  
*remyi*–l  
 Kauai 19–*Cyanea dolichopoda*–d  
 Kauai 19–*Cyrtandra oenobarba*–f  
 Kauai 19–*Cyrtandra paliku*–d  
 Kauai 19–*Dubautia plantaginea* ssp.  
*magnifolia*–d  
 Kauai 19–*Lysimachia iniki*–d  
 Kauai 19–*Lysimachia pendens*–d  
 Kauai 19–*Lysimachia venosa*–d  
 Kauai 19–*Platydesma rostrata*–l  
 Kauai 20–*Chamaesyce remyi* var.  
*kauaiensis*–g  
 Kauai 20–*Chamaesyce remyi* var.  
*remyi*–m  
 Kauai 20–*Cyanea dolichopoda*–e  
 Kauai 20–*Cyrtandra oenobarba*–g  
 Kauai 20–*Cyrtandra paliku*–e  
 Kauai 20–*Dubautia plantaginea* ssp.  
*magnifolia*–e  
 Kauai 20–*Lysimachia iniki*–e  
 Kauai 20–*Lysimachia pendens*–e  
 Kauai 20–*Lysimachia venosa*–e  
 Kauai 20–*Platydesma rostrata*–m  
 Kauai 21–*Chamaesyce remyi* var.  
*kauaiensis*–h  
 Kauai 21–*Chamaesyce remyi* var.  
*remyi*–n  
 Kauai 21–*Charpentiera densiflora*–e  
 Kauai 21–*Cyanea eleeleensis*–c  
 Kauai 21–*Cyanea kolekoleensis*–c  
 Kauai 21–*Cyanea kuhihewa*–c  
 Kauai 21–*Cyrtandra oenobarba*–h  
 Kauai 21–*Dubautia imbricata* ssp.  
*imbricata*–c  
 Kauai 21–*Labordia helleri*–i  
 Kauai 21–*Melicope paniculata*–c  
 Kauai 21–*Melicope puberula*–f  
 Kauai 21–*Phyllostegia renovans*–f  
 Kauai 21–*Platydesma rostrata*–n  
 Kauai 21–*Stenogyne kealiae*–e

Kauai 21—*Tetraplasandra bisattenuata*—e  
 Kauai 22—*Chamaesyce remyi* var. *remyi*—o  
 Kauai 22—*Diellia mannii*—b  
 Kauai 22—*Labordia helleri*—j  
 Kauai 22—*Myrsine knudsenii*—b  
 Kauai 22—*Myrsine mezii*—e  
 Kauai 22—*Platydesma rostrata*—o  
 Kauai 22—*Psychotria grandiflora*—e  
 Kauai 22—*Stenogyne kealiae*—f  
 Kauai 22—*Tetraplasandra flynnii*—e  
 Kauai 23—*Chamaesyce remyi* var. *remyi*—p  
 Kauai 23—*Diellia mannii*—c  
 Kauai 23—*Labordia helleri*—k  
 Kauai 23—*Myrsine knudsenii*—c  
 Kauai 23—*Myrsine mezii*—f  
 Kauai 23—*Platydesma rostrata*—p  
 Kauai 23—*Psychotria grandiflora*—f  
 Kauai 23—*Stenogyne kealiae*—g  
 Kauai 23—*Tetraplasandra flynnii*—f  
 Kauai 24—*Astelia waialealae*—d  
 Kauai 24—*Chamaesyce remyi* var. *remyi*—q  
 Kauai 24—*Dryopteris crinalis* var. *podosorus*—d  
 Kauai 24—*Dubautia kalalauensis*—d  
 Kauai 24—*Dubautia waialealae*—d  
 Kauai 24—*Geranium kauaiense*—d  
 Kauai 24—*Keysseria erici*—d  
 Kauai 24—*Keysseria helenae*—d  
 Kauai 24—*Labordia helleri*—l  
 Kauai 24—*Labordia pumila*—d  
 Kauai 24—*Lysimachia daphnoides*—d  
 Kauai 24—*Melicope degeneri*—d  
 Kauai 24—*Melicope puberula*—g  
 Kauai 24—*Myrsine mezii*—g  
 Kauai 24—*Phyllostegia renovans*—g  
 Kauai 24—*Platydesma rostrata*—q  
 Kauai 24—*Psychotria grandiflora*—g  
 Kauai 24—*Tetraplasandra flynnii*—g  
 Kauai 25—*Astelia waialealae*—e  
 Kauai 25—*Chamaesyce remyi* var. *remyi*—r  
 Kauai 25—*Dryopteris crinalis* var. *podosorus*—e  
 Kauai 25—*Dubautia kalalauensis*—e  
 Kauai 25—*Dubautia waialealae*—e  
 Kauai 25—*Geranium kauaiense*—e  
 Kauai 25—*Keysseria erici*—e  
 Kauai 25—*Keysseria helenae*—e  
 Kauai 25—*Labordia helleri*—m  
 Kauai 25—*Labordia pumila*—e  
 Kauai 25—*Lysimachia daphnoides*—e  
 Kauai 25—*Melicope degeneri*—e  
 Kauai 25—*Melicope puberula*—h

Kauai 25—*Myrsine mezii*—h  
 Kauai 25—*Phyllostegia renovans*—h  
 Kauai 25—*Platydesma rostrata*—r  
 Kauai 25—*Psychotria grandiflora*—h  
 Kauai 25—*Tetraplasandra flynnii*—h  
 xxxx. By amending paragraph (b) as follows:  
 i. In paragraph (b)(1), by adding “Family Amaranthaceae”, “Family Asteliaceae”, “Family Geraniaceae”, and “Family Pittosporaceae” in alphabetical order to the list of family names;  
 ii. In paragraph (b)(1), by adding entries in alphabetical order by family name to read as set forth below:  
*New entry:*  
 Family Amaranthaceae: *Charpentiera densiflora*  
 Family Araliaceae: *Tetraplasandra bisattenuata*  
 Family Araliaceae: *Tetraplasandra flynnii*  
 Family Asteliaceae: *Astelia waialealae*  
 Family Asteraceae: *Dubautia imbricata* ssp. *imbricata*  
 Family Asteraceae: *Dubautia kalalauensis*  
 Family Asteraceae: *Dubautia kenwoodii*  
 Family Asteraceae: *Dubautia plantaginea* ssp. *magnifolia*  
 Family Asteraceae: *Dubautia waialealae*  
 Family Asteraceae: *Keysseria erici*  
 Family Asteraceae: *Keysseria helenae*  
 Family Campanulaceae: *Cyanea dolichopoda*  
 Family Campanulaceae: *Cyanea eleleensis*  
 Family Campanulaceae: *Cyanea kolekoleensis*  
 Family Campanulaceae: *Cyanea kuhihewa*  
 Family Caryophyllaceae: *Schiedea attenuate*  
 Family Euphorbiaceae: *Chamaesyce eleanoriae*  
 Family Euphorbiaceae: *Chamaesyce remyi* var. *kauaiensis*  
 Family Euphorbiaceae: *Chamaesyce remyi* var. *remyi*  
 Family Fabaceae: *Canavalia napaliensis*  
 Family Geraniaceae: *Geranium kauaiense*  
 Family Gesneriaceae: *Cyrtandra oenobarba*

Family Gesneriaceae: *Cyrtandra paliku*  
 Family Lamiaceae: *Phyllostegia renovans*  
 Family Lamiaceae: *Stenogyne kealiae*  
 Family Loganiaceae: *Labordia helleri*  
 Family Loganiaceae: *Labordia pumila*  
 Family Myrsinaceae: *Lysimachia daphnoides*  
 Family Myrsinaceae: *Lysimachia iniki*  
 Family Myrsinaceae: *Lysimachia pendens*  
 Family Myrsinaceae: *Lysimachia scopulensis*  
 Family Myrsinaceae: *Lysimachia venosa*  
 Family Myrsinaceae: *Myrsine knudsenii*  
 Family Myrsinaceae: *Myrsine mezii*  
 Family Pittosporaceae: *Pittosporum napaliense*  
 Family Rubiaceae: *Psychotria grandiflora*  
 Family Rubiaceae: *Psychotria hobbyi*  
 Family Rutaceae: *Melicope degeneri*  
 Family Rutaceae: *Melicope paniculata*  
 Family Rutaceae: *Melicope puberula*  
 Family Rutaceae: *Platydesma rostrata*  
 iii. In paragraph (b)(2), by adding “Family Dryopteridaceae” and “Family Pteridaceae” in alphabetical order to the list of family names; and  
 iv. In paragraph (b)(2), by adding entries in alphabetical order by family name to read as set forth below:  
*New entry:*  
 Family Aspleniaceae: *Diellia mannii*  
 Family Dryopteridaceae: *Dryopteris crinalis* var. *podosorus*  
 Family Pteridaceae: *Doryopteris angelica*

**§ 17.99 Critical habitat; plants on the islands of Kauai, Niihau, Molokai, Maui, Kahoolawe, Oahu, and Hawaii, HI, and on the Northwestern Hawaiian Islands.**

(a) \* \* \*

(1) *Kauai*. Critical habitat units are described below. Coordinates are in UTM Zone 4 with units in meters using North American Datum of 1983 (NAD83). The following map shows the general locations of the critical habitat units designated on the island of Kauai.

(i) *Note*: Map 1—Index map follows:

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### Map 1 Kauai and Niihau Critical Habitat–Island Index Map



\* \* \* \* \*

(vi) Kauai 4–*Chamaesyce remyi* var. *kauaiensis*–a (15.4 ha; 38 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 4–*Chamaesyce remyi* var. *remyi*–a, Kauai 4–*Cyanea dolichopoda*–a,

Kauai 4–*Cyrtandra oenobarba*–a, Kauai 4–*Cyrtandra paliku*–a, Kauai 4–*Dubautia plantaginea* ssp. *magnifolia*–a, Kauai 4–*Lysimachia iniki*–a, Kauai 4–*Lysimachia pendens*–a, Kauai 4–*Lysimachia venosa*–a, and Kauai 4–*Platydesma rostrata*–a (see paragraphs

(a)(1)(vii), (a)(1)(ix), (a)(1)(xvi), (a)(1)(xvii), (a)(1)(xviii), (a)(1)(xxv), (a)(1)(xxvi), (a)(1)(xxvii), and (a)(1)(xxix), respectively, of this section).

(B) Note: Map 5a follows:



(vii) Kauai 4—*Chamaesyce remyi* var. *remyi*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

\* \* \* \* \*

(ix) Kauai 4—*Cyanea dolichopoda*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

\* \* \* \* \*

(xvi) Kauai 4—*Cyrtandra oenobarba*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

(xvii) Kauai 4—*Cyrtandra paliku*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

(xviii) Kauai 4—*Dubautia plantaginea* ssp. *magnifolia*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

\* \* \* \* \*

(xxv) Kauai 4—*Lysimachia iniki*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

(xxvi) Kauai 4—*Lysimachia pendens*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

(xxvii) Kauai 4—*Lysimachia venosa*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

\* \* \* \* \*

(xxix) Kauai 4—*Platydesma rostrata*—a (15.4 ha; 38 ac)

(A) See paragraph (a)(1)(vi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(vi)(B) of this section for the map of this unit.

\* \* \* \* \*

(xxxiv) Kauai 7—*Canavalia napaliensis*—a (15 ha; 37 ac)

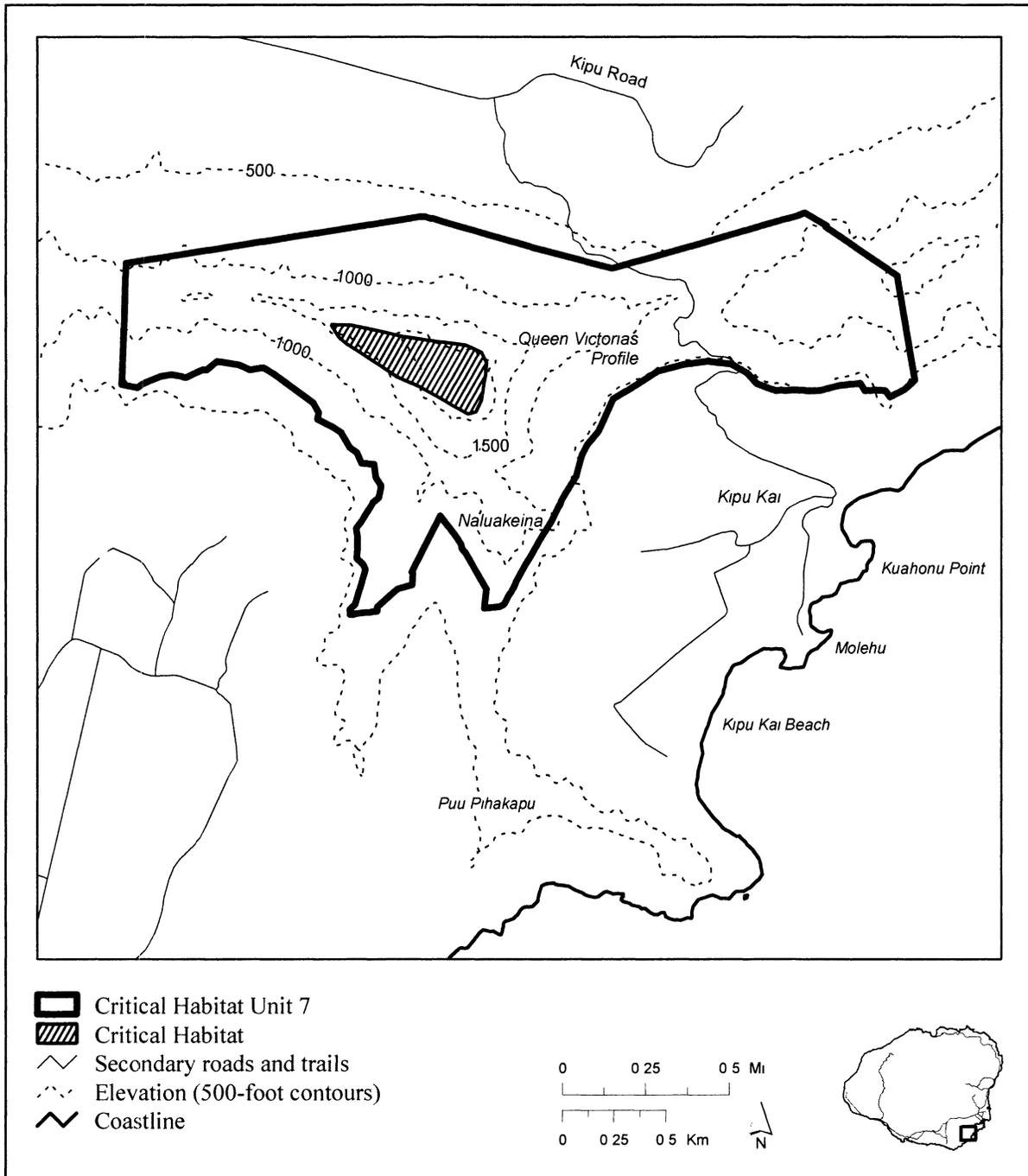
(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 7—*Chamaesyce eleanoriae*—a, Kauai 7—*Chamaesyce remyi* var. *remyi*—b, Kauai 7—*Charpentiera densiflora*—a, Kauai 7—*Doryopteris angelica*—a, Kauai 7—*Dubautia kenwoodii*—a, Kauai 7—*Labordia helleri*—a, Kauai 7—*Pittosporum napaliense*—a, Kauai 7—*Platydesma rostrata*—b, Kauai 7—*Psychotria hobdyi*—a, and Kauai 7—*Tetraplasandra bisattenuata*—a (see paragraphs (a)(1)(xxxv), (a)(1)(xxxvi), (a)(1)(xxxvii), (a)(1)(xxxix), (a)(1)(xl), (a)(1)(xlii), (a)(1)(xlviii), (a)(1)(xlix), (a)(1)(l), and (a)(1)(liii), respectively, of this section).

(B) Note: Map 23a follows:

### Map 23a

**Kauai 7—*Canavalia napaliensis*—a, Kauai 7—*Chamaesyce eleanoriae*—a, Kauai 7—*Chamaesyce remyi* var. *remyi*—b, Kauai 7—*Charpentiera densiflora*—a, Kauai 7—*Doryopteris angelica*—a, Kauai 7—*Dubautia kenwoodii*—a, Kauai 7—*Labordia helleri*—a, Kauai 7—*Pittosporum napaliense*—a, Kauai 7—*Platydesma rostrata*—b, Kauai 7—*Psychotria hobdyi*—a, Kauai 7—*Tetraplasandra bisattenuata*—a**

### Lowland Mesic



(xxxv) Kauai 7—*Chamaesyce eleanoriae*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

(xxxvi) Kauai 7—*Chamaesyce remyi* var. *remyi*—b (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

(xxxvii) Kauai 7—*Charpentiera densiflora*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

\* \* \* \* \*

(xxxix) Kauai 7—*Doryopteris angelica*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

(xl) Kauai 7—*Dubautia kenwoodii*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

\* \* \* \* \*

(xlii) Kauai 7—*Labordia helleri*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

\* \* \* \* \*

(xlviii) Kauai 7—*Pittosporum napaliense*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

(xlix) Kauai 7—*Platydesma rostrata*—b (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

(l) Kauai 7—*Psychotria hobdyi*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

\* \* \* \* \*

(liii) Kauai 7—*Tetraplasandra bisattenuata*—a (15 ha; 37 ac)

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

\* \* \* \* \*

(lvii) Kauai 10—*Astelia waialealae*—a (40 ha; 99 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 10—*Chamaesyce remyi* var. *remyi*—c, Kauai 10—*Dryopteris crinalis* var. *podosorus*—a, Kauai 10—*Dubautia kalalauensis*—a, Kauai 10—*Dubautia waialealae*—a, Kauai 10—*Geranium kauaiense*—a, Kauai 10—*Keysseria erici*—a, Kauai 10—*Keysseria helenae*—a, Kauai 10—*Labordia helleri*—b, Kauai 10—*Labordia pumila*—a, Kauai 10—*Lysimachia daphnoides*—a, Kauai 10—*Melicope degeneri*—a, Kauai 10—*Melicope puberula*—a, Kauai 10—*Myrsine mezii*—a, Kauai 10—*Phyllostegia renovans*—a, Kauai 10—*Platydesma rostrata*—c, Kauai 10—*Psychotria grandiflora*—a, and Kauai 10—*Tetraplasandra flynnii*—a (see paragraphs (a)(1)(lxi), (a)(1)(lxxvi), (a)(1)(lxxviii), (a)(1)(lxxx), (a)(1)(lxxxiii), (a)(1)(lxxxvi), (a)(1)(lxxxvii), (a)(1)(lxxxviii), (a)(1)(xc), (a)(1)(xciii), (a)(1)(xcviii), (a)(1)(c), (a)(1)(ciii), (a)(1)(cv), (a)(1)(cviii), (a)(1)(cxi), and (a)(1)(cxv), respectively, of this section).

(A) See paragraph (a)(1)(xxxiv)(A) of this section for the textual description of this unit.

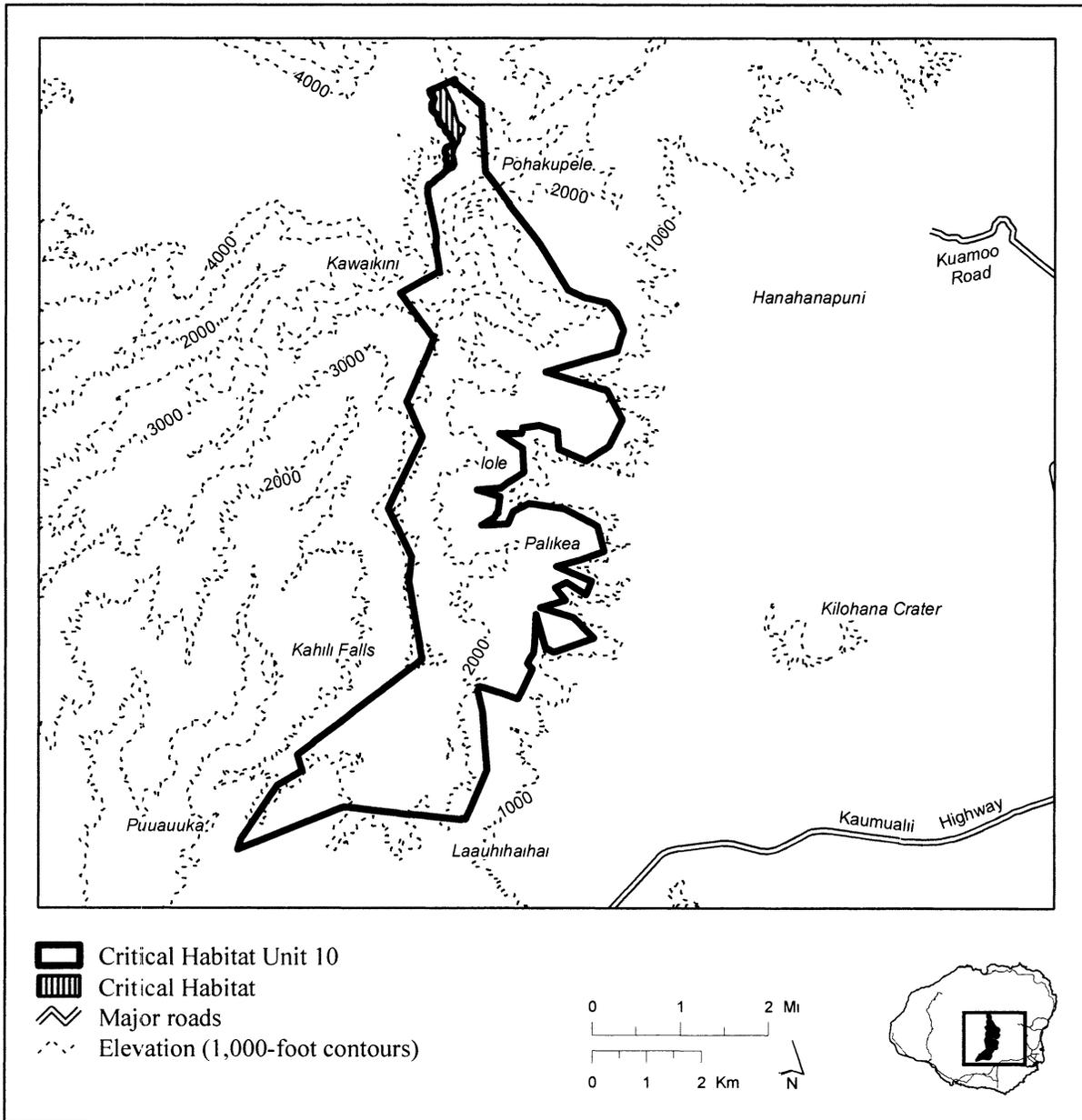
(B) See paragraph (a)(1)(xxxiv)(B) of this section for the map of this unit.

(B) Note: Map 35a follows:

### Map 35a

**Kauai 10–*Astelia waialealae*–a, Kauai 10–*Chamaesyce remyi* var. *remyi*–c,  
 Kauai 10–*Dryopteris crinalis* var. *podosorus*–a, Kauai 10–*Dubautia kalalauensis*–a,  
 Kauai 10–*Dubautia waialealae*–a, Kauai 10–*Geranium kauaiense*–a, Kauai 10–  
*Keysseria erici*–a, Kauai 10–*Keysseria helenae*–a, Kauai 10–*Labordia helleri*–b,  
 Kauai 10–*Labordia pumila*–a, Kauai 10–*Lysimachia daphnoides*–a, Kauai 10–  
*Melicope degeneri*–a, Kauai 10–*Melicope puberula*–a, Kauai 10–*Myrsine mezii*–a,  
 Kauai 10–*Phyllostegia renovans*–a, Kauai 10–*Platydesma rostrata*–c, Kauai 10–  
*Psychotria grandiflora*–a, Kauai 10–*Tetraplasandra flynnii*–a**

### Montane Wet



\* \* \* \* \*

(lix) Kauai 10—*Chamaesyce remyi* var. *kauaiensis*—b (943 ha; 2,330 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 10—*Chamaesyce remyi* var. *remyi*—d, Kauai 10—*Charpentiera densiflora*—b, Kauai 10—*Cyanea eleeleensis*—a, Kauai 10—*Cyanea kolekoleensis*—a, Kauai 10—

*Cyanea kuhihewa*—a, Kauai 10—*Cyrtandra oenobarba*—b, Kauai 10—*Dubautia imbricata* ssp. *imbricata*—a, Kauai 10—*Labordia helleri*—c, Kauai 10—*Melicope paniculata*—a, Kauai 10—*Melicope puberula*—b, Kauai 10—*Phyllostegia renovans*—b, Kauai 10—*Platydesma rostrata*—d, Kauai 10—*Stenogyne kealiae*—a, and Kauai 10—

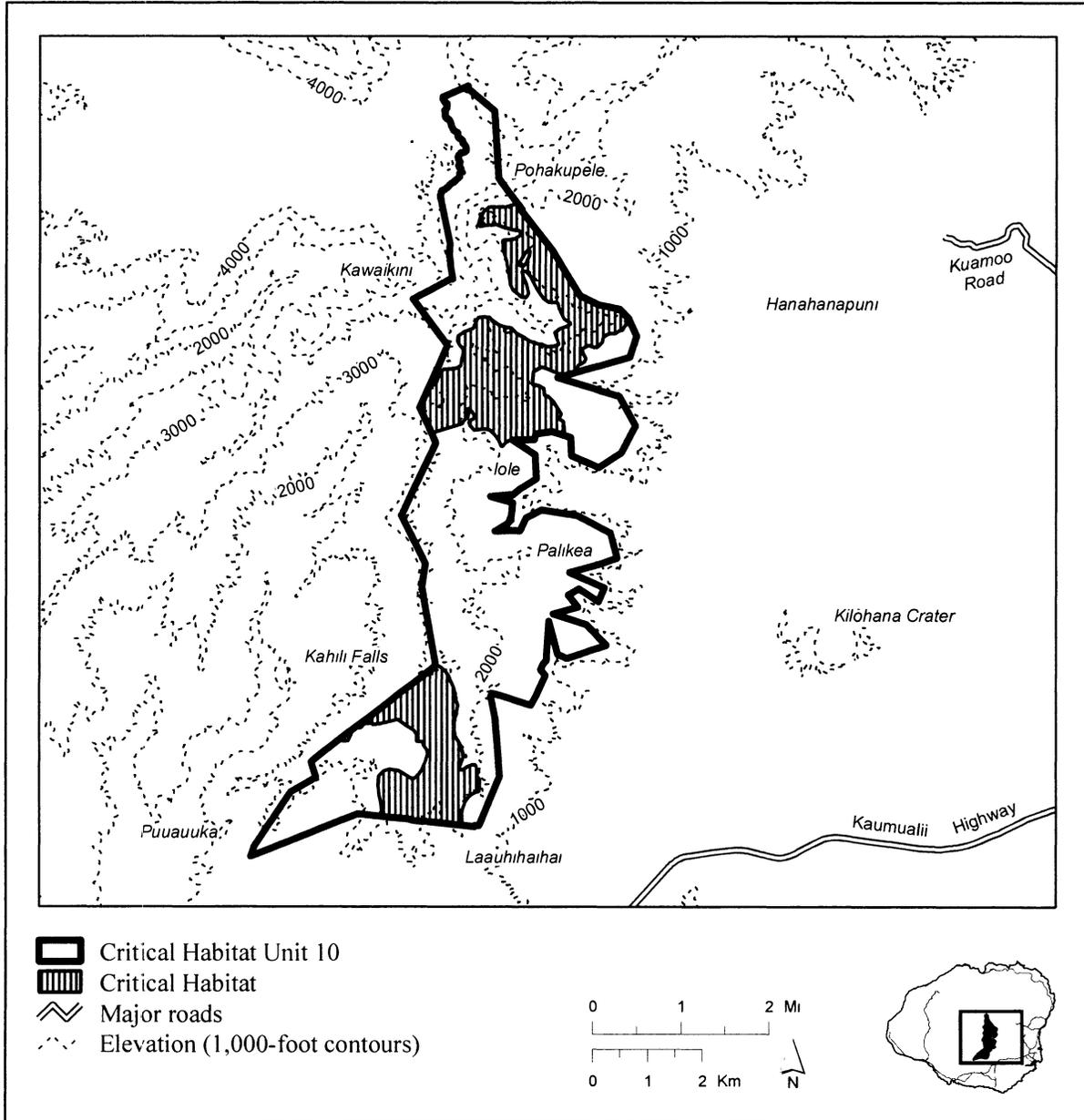
*Tetraplasandra bisattenuata*—b (see paragraphs (a)(1)(lxii), (a)(1)(lxiv), (a)(1)(lxvii), (a)(1)(lxviii), (a)(1)(lxix), (a)(1)(lxxiii), (a)(1)(lxxvii), (a)(1)(lxxxix), (a)(1)(xcix), (a)(1)(ci), (a)(1)(cvi), (a)(1)(cix), (a)(1)(cxiii), and (a)(1)(cxiv), respectively, of this section).

(B) Note: Map 36a follows:

Map 36a

**Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–b, Kauai 10–*Chamaesyce remyi* var. *remyi*–d, Kauai 10–*Charpentiera densiflora*–b, Kauai 10–*Cyanea eleeleensis*–a, Kauai 10–*Cyanea kolekoleensis*–a, Kauai 10–*Cyanea kuhihewa*–a, Kauai 10–*Cyrtandra oenobarba*–b, Kauai 10–*Dubautia imbricata* ssp. *imbricata*–a, Kauai 10–*Labordia helleri*–c, Kauai 10–*Melicope paniculata*–a, Kauai 10–*Melicope puberula*–b, Kauai 10–*Phyllostegia renovans*–b, Kauai 10–*Platydesma rostrata*–d, Kauai 10–*Stenogyne kealiae*–a, Kauai 10–*Tetraplasandra bisattenuata*–b**

Lowland Wet



(lx) Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–c (198 ha; 489 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for

Kauai 10–*Chamaesyce remyi* var. *remyi*–e, Kauai 10–*Cyanea dolichopoda*–b, Kauai 10–*Cyrtandra oenobarba*–c, Kauai 10–*Cyrtandra paliku*–b, Kauai 10–

*Dubautia plantaginea* ssp. *magnifolia*–b, Kauai 10–*Lysimachia iniki*–b, Kauai 10–*Lysimachia pendens*–b, Kauai 10–*Lysimachia venosa*–b, and Kauai 10–

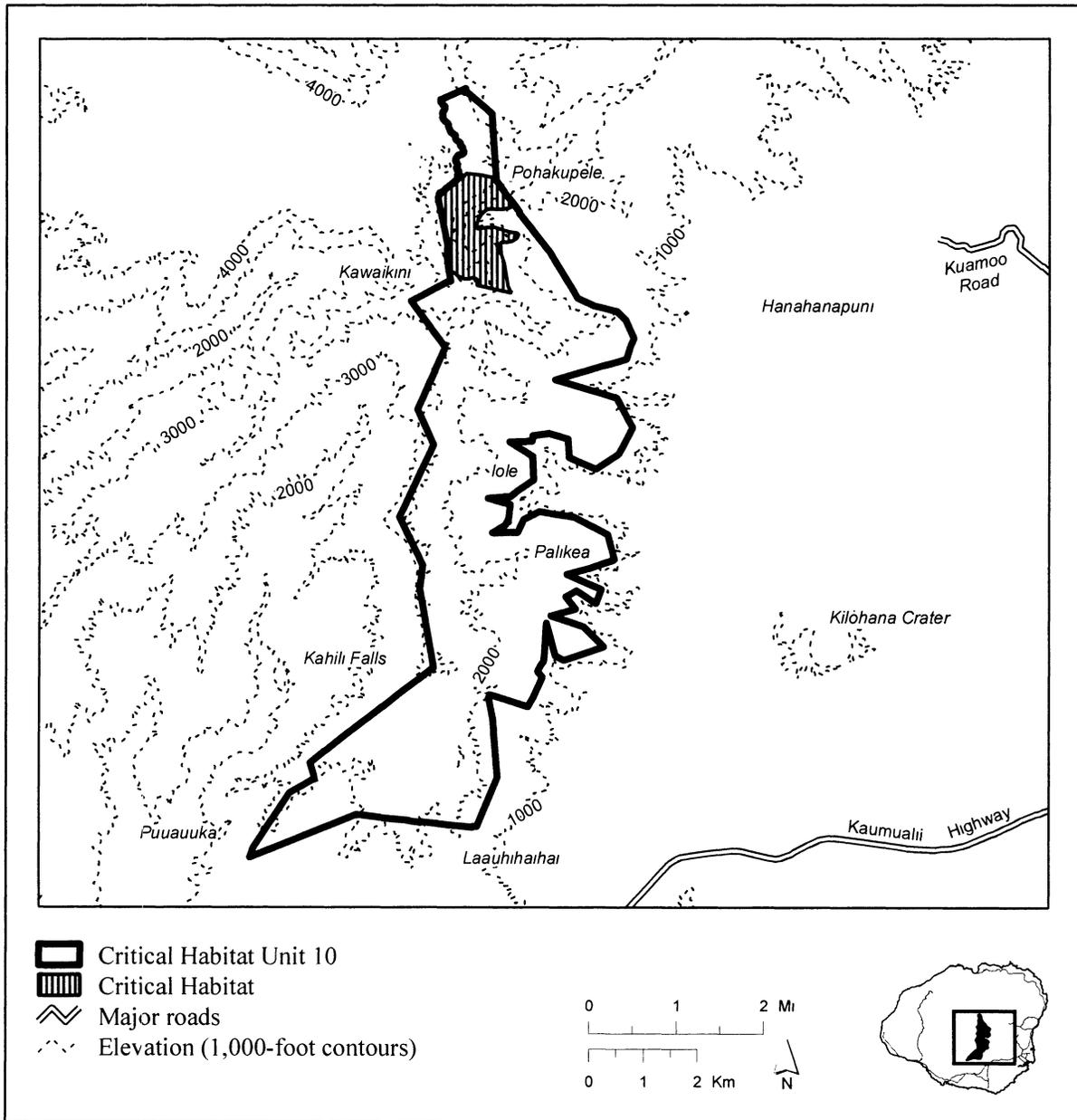
*Platydesma rostrata*—e (see paragraphs (a)(1)(lxiii), (a)(1)(lxvi), (a)(1)(lxxiv), (a)(1)(lxxv), (a)(1)(lxxx), (a)(1)(xcv),

(a)(1)(xcvi), (a)(1)(xcvii), and (a)(1)(cx), respectively, of this section).  
 (B) Note: Map 36b follows:

**Map 36b**

**Kauai 10—*Chamaesyce remyi* var. *kauaiensis*—c, Kauai 10—*Chamaesyce remyi* var. *remyi*—e, Kauai 10—*Cyanea dolichopoda*—b, Kauai 10—*Cyrtandra oenobarba*—c, Kauai 10—*Cyrtandra paliku*—b, Kauai 10—*Dubautia plantaginea* ssp. *magnifolia*—b, Kauai 10—*Lysimachia iniki*—b, Kauai 10—*Lysimachia pendens*—b, Kauai 10—*Lysimachia venosa*—b, Kauai 10—*Platydesma rostrata*—e**

**Wet Cliff**



(lxi) Kauai 10-*Chamaesyce remyi* var. *remyi*-c (40 ha; 99 ac)  
(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(lxii) Kauai 10-*Chamaesyce remyi* var. *remyi*-d (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(lxiii) Kauai 10-*Chamaesyce remyi* var. *remyi*-e (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(lxiv) Kauai 10-*Charpentiera densiflora*-b (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

\* \* \* \* \*

(lxvi) Kauai 10-*Cyanea dolichopoda*-b (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(lxvii) Kauai 10-*Cyanea eleeleensis*-a (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(lxviii) Kauai 10-*Cyanea kolekoleensis*-a (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(lxix) Kauai 10-*Cyanea kuhihewa*-a (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

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(lxxiii) Kauai 10-*Cyrtandra oenobarba*-b (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(lxxiv) Kauai 10-*Cyrtandra oenobarba*-c (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(lxxv) Kauai 10-*Cyrtandra paliku*-b (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(lxxvi) Kauai 10-*Dryopteris crinalis* var. *podosorus*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(lxxvii) Kauai 10-*Dubautia imbricata* ssp. *imbricata*-a (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(lxxviii) Kauai 10-*Dubautia kalalauensis*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

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(lxxx) Kauai 10-*Dubautia plantaginea* ssp. *magnifolia*-b (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(lxxxii) Kauai 10-*Dubautia waialealae*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

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(lxxxiii) Kauai 10-*Geranium kauaiense*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

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(lxxxvi) Kauai 10-*Keysseria erici*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(lxxxvii) Kauai 10-*Keysseria helenae*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(lxxxviii) Kauai 10-*Labordia helleri*-b (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(lxxxix) Kauai 10-*Labordia helleri*-c (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

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(xc) Kauai 10-*Labordia pumila*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

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(xciii) Kauai 10-*Lysimachia daphnoides*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

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(xcv) Kauai 10-*Lysimachia iniki*-b (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(xcvi) Kauai 10-*Lysimachia pendens*-b (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(xcvii) Kauai 10-*Lysimachia venosa*-b (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(xcviii) Kauai 10-*Melicope degeneri*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(xcix) Kauai 10-*Melicope paniculata*-a (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(c) Kauai 10-*Melicope puberula*-a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(ci) Kauai 10—*Melicope puberula*—b (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

\* \* \* \* \*

(ciii) Kauai 10—*Myrsine mezii*—a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

\* \* \* \* \*

(cv) Kauai 10—*Phyllostegia renovans*—a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(cvi) Kauai 10—*Phyllostegia renovans*—b (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

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(cviii) Kauai 10—*Platydesma rostrata*—c (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

(cix) Kauai 10—*Platydesma rostrata*—d (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(cx) Kauai 10—*Platydesma rostrata*—e (198 ha; 489 ac)

(A) See paragraph (a)(1)(lx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lx)(B) of this section for the map of this unit.

(cxi) Kauai 10—*Psychotria grandiflora*—a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

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(cxiii) Kauai 10—*Stenogyne kealiae*—a (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(cxiv) Kauai 10—*Tetraplasandra bisattenuata*—b (943 ha; 2,330 ac)

(A) See paragraph (a)(1)(lix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lix)(B) of this section for the map of this unit.

(cxv) Kauai 10—*Tetraplasandra flynnii*—a (40 ha; 99 ac)

(A) See paragraph (a)(1)(lvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(lvii)(B) of this section for the map of this unit.

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(cxxix) Kauai 11—*Astelia waialealae*—b (5,705 ha; 14,096 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 11—*Chamaesyce remyi* var. *remyi*—f, Kauai 11—*Dryopteris crinalis* var. *podosorus*—b, Kauai 11—*Dubautia kalalauensis*—b, Kauai 11—*Dubautia waialealae*—b, Kauai 11—*Geranium kauaiense*—b, Kauai 11—*Keysseria erici*—b, Kauai 11—*Keysseria helena*—b, Kauai 11—*Labordia helleri*—d, Kauai 11—*Labordia pumila*—b, Kauai 11—*Lysimachia daphnoides*—b, Kauai 11—*Melicope degeneri*—b, Kauai 11—*Melicope puberula*—c, Kauai 11—*Myrsine mezii*—b, Kauai 11—*Phyllostegia renovans*—c, Kauai 11—*Platydesma rostrata*—f, Kauai 11—*Psychotria grandiflora*—b, and Kauai 11—*Tetraplasandra flynnii*—b (see paragraphs (a)(1)(cxli), (a)(1)(clxxvi), (a)(1)(clxxviii), (a)(1)(clxxxiv), (a)(1)(cxcviii), (a)(1)(ccxv), (a)(1)(ccxvi), (a)(1)(ccxxi), (a)(1)(ccxxviii), (a)(1)(ccxxxiv), (a)(1)(ccxl), (a)(1)(ccxlviii), (a)(1)(cclvii), (a)(1)(cclxv), (a)(1)(cclxxvi), (a)(1)(cclxxxix), and (a)(1)(cccxxxiii), respectively, of this section).

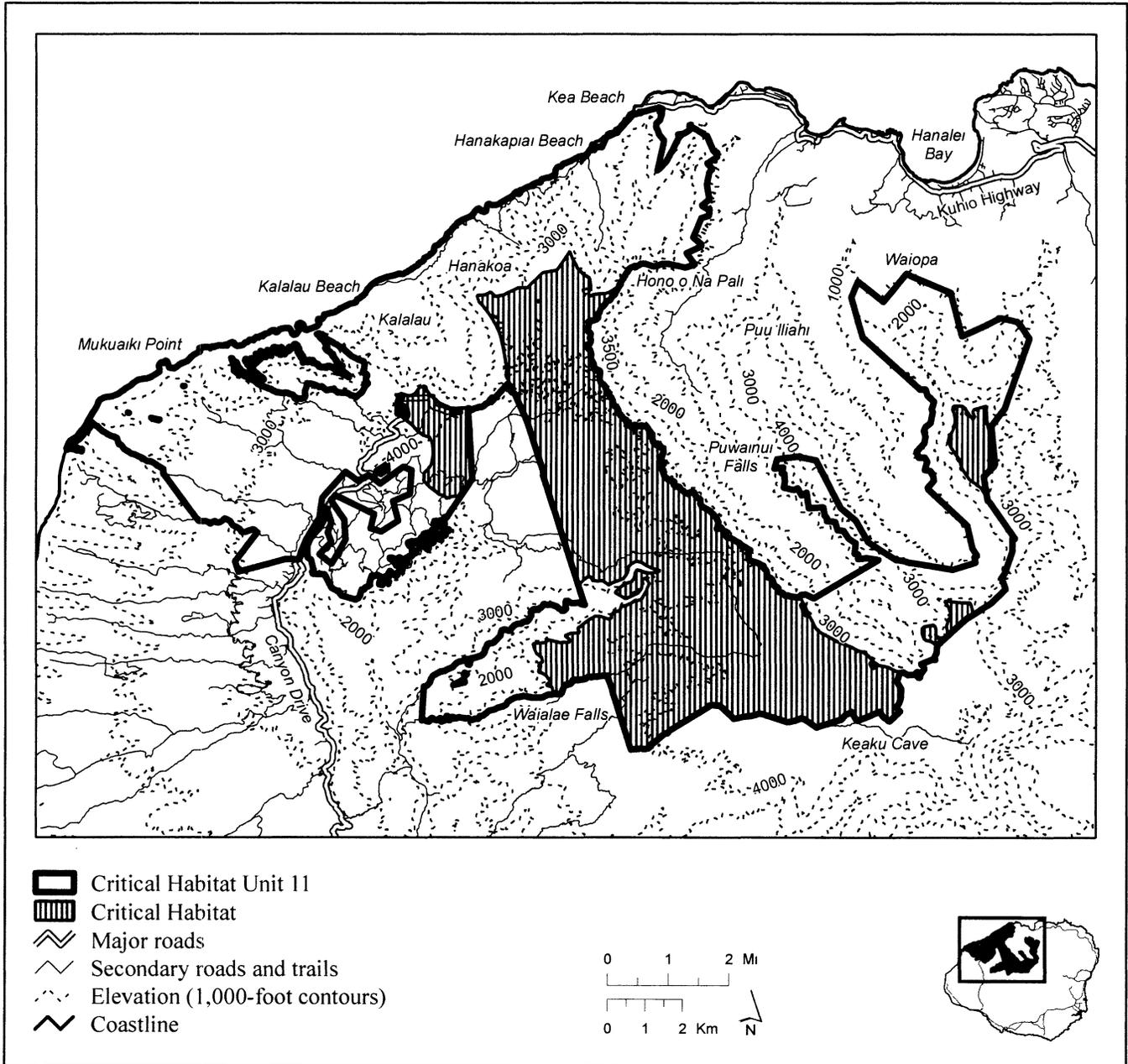
(B) Note: Map 64a follows:

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Map 64a

**Kauai 11—*Astelia waialealae*–b, Kauai 11—*Chamaesyce remyi* var. *remyi*–f, Kauai 11—*Dryopteris crinalis* var. *podosorus*–b, Kauai 11—*Dubautia kalalauensis*–b, Kauai 11—*Dubautia waialealae*–b, Kauai 11—*Geranium kauaiense*–b, Kauai 11—*Keysseria erici*–b, Kauai 11—*Keysseria helenae*–b, Kauai 11—*Labordia helleri*–d, Kauai 11—*Labordia pumila*–b, Kauai 11—*Lysimachia daphnoides*–b, Kauai 11—*Melicope degeneri*–b, Kauai 11—*Melicope puberula*–c, Kauai 11—*Myrsine mezii*–b, Kauai 11—*Phyllostegia renovans*–c, Kauai 11—*Platydesma rostrata*–f, Kauai 11—*Psychotria grandiflora*–b, Kauai 11—*Tetraplasandra flynnii*–b**

Montane Wet



\* \* \* \* \*  
 (cxxxii) Kauai 11—*Canavalia napaliensis*–b (1,048 ha; 2,591 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 11—*Chamaesyce eleanoriae*–b,

Kauai 11—*Chamaesyce remyi* var. *remyi*–g, Kauai 11—*Charpentiera densiflora*–c, Kauai 11—*Dryopteris angelica*–b, Kauai

11–*Dubautia kenwoodii*–b, Kauai 11–*Labordia helleri*–e, Kauai 11–*Pittosporum napaliense*–b, Kauai 11–*Platydesma rostrata*–g, Kauai 11–*Psychotria hobdyi*–b, and Kauai 11–

*Tetraplasandra bisattenuata*–c (see paragraphs (a)(1)(cxxxiv), (a)(1)(cxlvi), (a)(1)(clxxv), (a)(1)(clxxix), (a)(1)(cxxxii), (a)(1)(cclxxi), (a)(1)(cclxxvii), (a)(1)(ccxc), and

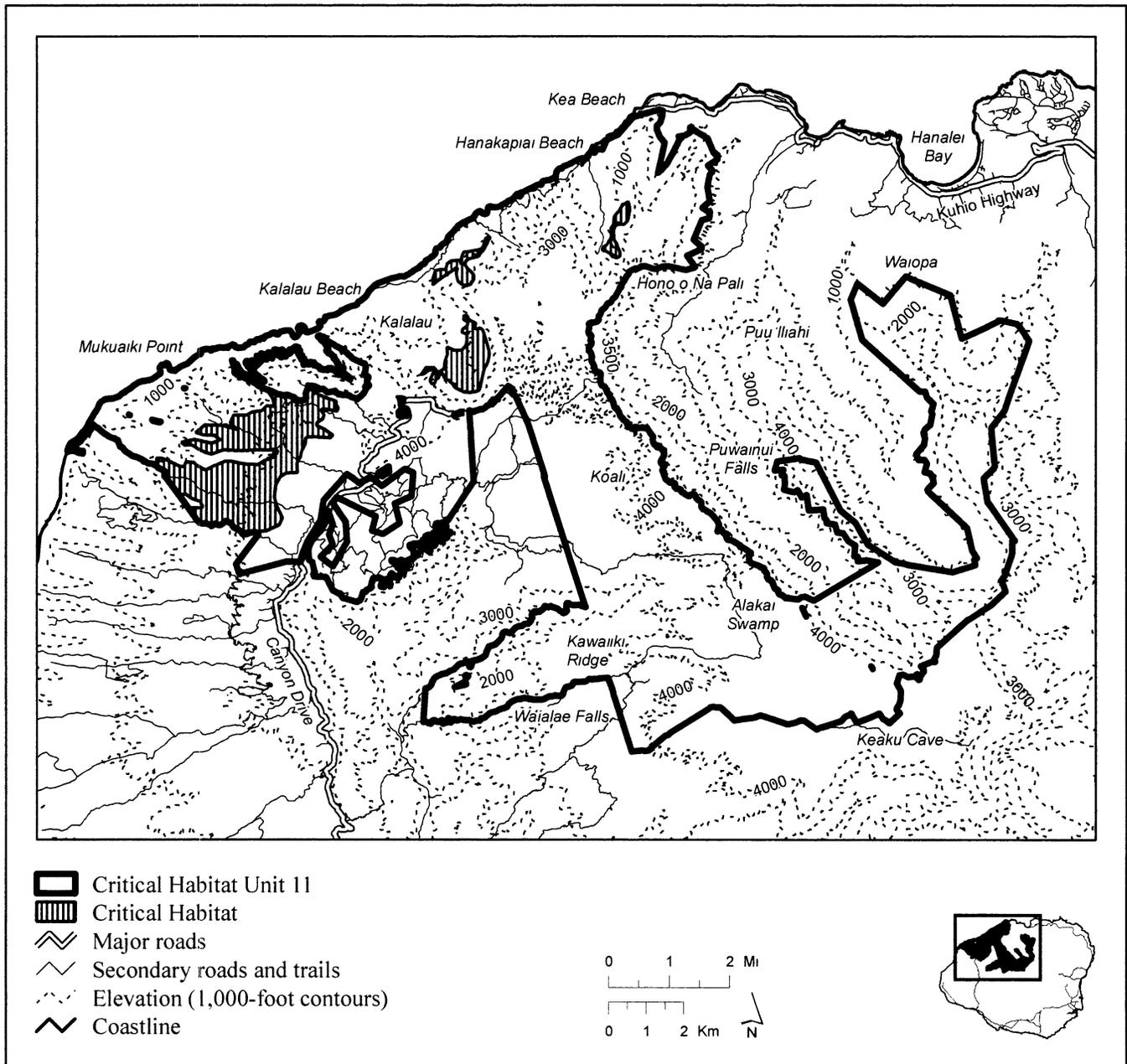
(a)(1)(cccxxxi), respectively, of this section).

(B) Note: Map 66a follows:

**Map 66a**

**Kauai 11–*Canavalia napaliensis*–b, Kauai 11–*Chamaesyce eleanoriae*–b, Kauai 11–*Chamaesyce remyi* var. *remyi*–g, Kauai 11–*Charpentiera densiflora*–c, Kauai 11–*Doryopteris angelica*–b, Kauai 11–*Dubautia kenwoodii*–b, Kauai 11–*Labordia helleri*–e, Kauai 11–*Pittosporum napaliense*–b, Kauai 11–*Platydesma rostrata*–g, Kauai 11–*Psychotria hobdyi*–b, Kauai 11–*Tetraplasandra bisattenuata*–c**

**Lowland Mesic**



\* \* \* \* \*

(cxxxiv) Kauai 11-*Chamaesyce eleanoriae*-b (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(cxxxv) Kauai 11-*Chamaesyce eleanoriae*-c (288 ha; 712 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 11-*Lysimachia scopulensis*-a,

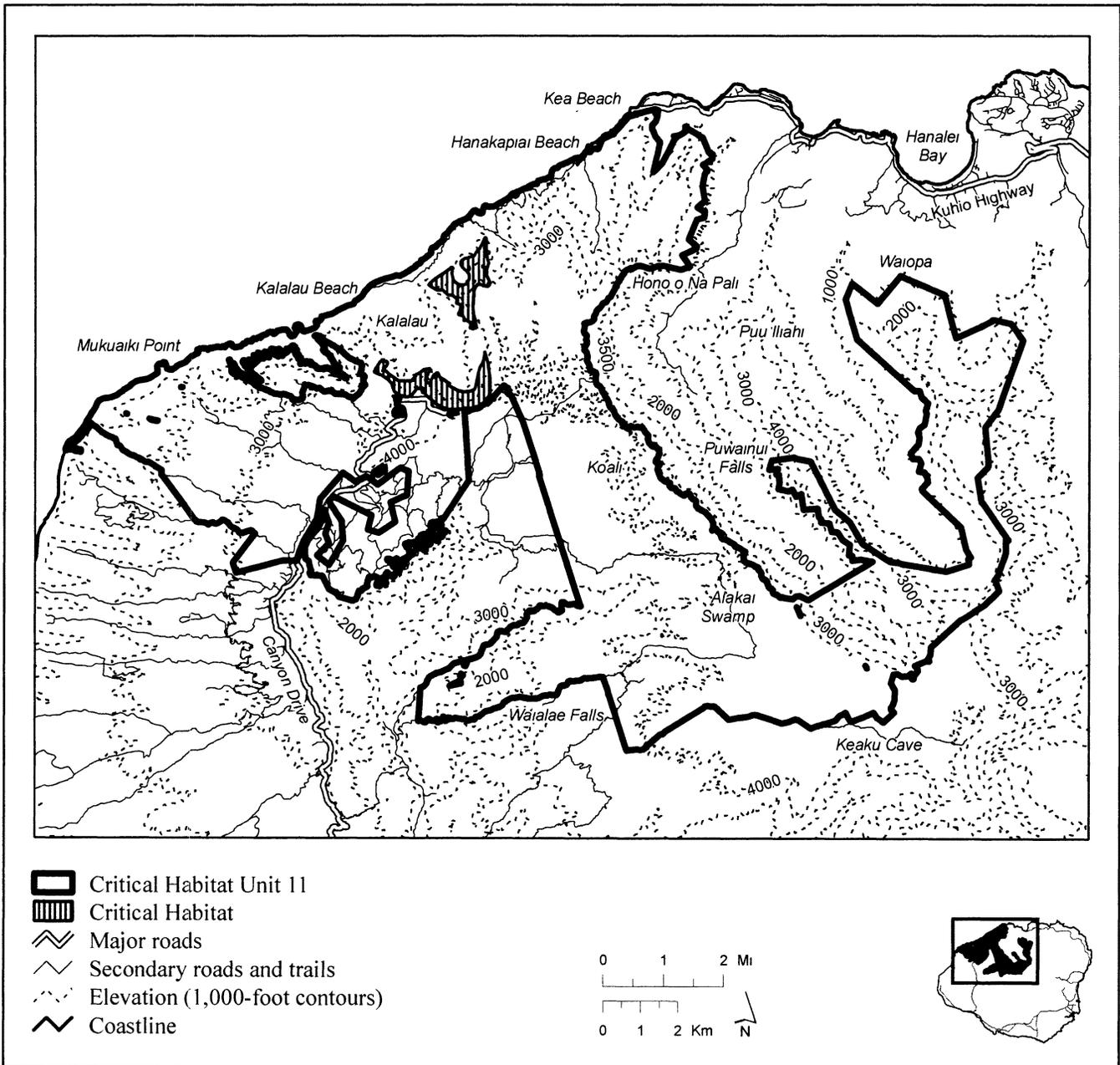
Kauai 11-*Schiedea attenuata*-a, and Kauai 11-*Stenogyne kealiae*-b (see paragraphs (a)(1)(ccxxxvii), (a)(1)(cccviii), and (a)(1)(cccxxviii), respectively, of this section).

(B) Note: Map 67a follows:

### Map 67a

## Kauai 11-*Chamaesyce eleanoriae*-c, Kauai 11-*Lysimachia scopulensis*-a, Kauai 11-*Schiedea attenuata*-a, Kauai 11-*Stenogyne kealiae*-b

### Dry Cliff



\* \* \* \* \*

(cxxxix) Kauai 11—*Chamaesyce remyi* var. *kauaiensis*—d (1,060 ha; 2,618 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 11—*Chamaesyce remyi* var. *remyi*—h, Kauai 11—*Charpentiera densiflora*—d, Kauai 11—*Cyanea eleeeensis*—b, Kauai 11—*Cyanea kolekoleensis*—b, Kauai 11—*Cyanea kuhihewa*—b, Kauai 11—

*Cyrtandra oenobarba*—d, Kauai 11—*Dubautia imbricata* ssp. *imbricata*—b, Kauai 11—*Labordia helleri*—f, Kauai 11—*Melicope paniculata*—b, Kauai 11—*Melicope puberula*—d, Kauai 11—*Phyllostegia renovans*—d, Kauai 11—*Platydesma rostrata*—h, Kauai 11—*Stenogyne kealiae*—c, and Kauai 11—*Tetraplasandra bisattenuata*—d (see

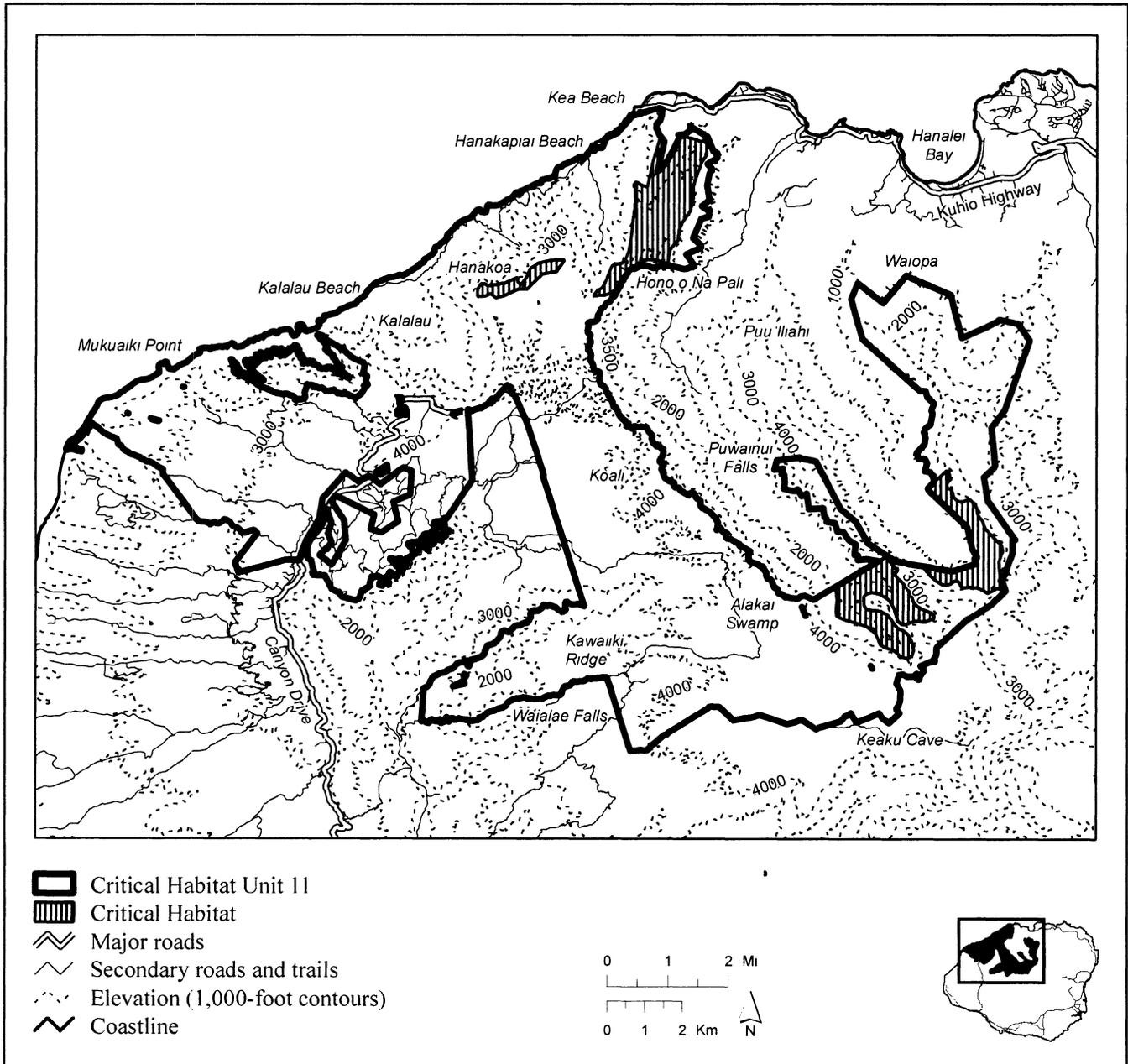
paragraphs (a)(1)(cxlili), (a)(1)(cxlvii), (a)(1)(cl), (a)(1)(cli), (a)(1)(clii), (a)(1)(clxii), (a)(1)(clxxvii), (a)(1)(ccxxiii), (a)(1)(ccxlvi), (a)(1)(ccxlix), (a)(1)(cclxvi), (a)(1)(cclxxviii), (a)(1)(cccxxix), and (a)(1)(cccxxxii), respectively, of this section).

(B) Note: Map 70a follows:

Map 70a

**Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–d, Kauai 11–*Chamaesyce remyi* var. *remyi*–h, Kauai 11–*Charpentiera densiflora*–d, Kauai 11–*Cyanea eleeleensis*–b, Kauai 11–*Cyanea kolekoleensis*–b, Kauai 11–*Cyanea kuhihewa*–b, Kauai 11–*Cyrtandra oenobarba*–d, Kauai 11–*Dubautia imbricata* ssp. *imbricata*–b, Kauai 11–*Labordia helleri*–f, Kauai 11–*Melicope paniculata*–b, Kauai 11–*Melicope puberula*–d, Kauai 11–*Phyllostegia renovans*–d, Kauai 11–*Platydesma rostrata*–h, Kauai 11–*Stenogyne kealiae*–c, Kauai 11–*Tetraplasandra bisattenuata*–d**

Lowland Wet



(cxl) Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–e (77 ha; 190 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 11–*Chamaesyce remyi* var. *remyi*–

i, Kauai 11–*Cyanea dolichopoda*–c, Kauai 11–*Cyrtandra oenobarba*–e, Kauai 11–*Cyrtandra paliku*–c, Kauai 11–

*Dubautia plantaginea* ssp. *magnifolia*-c,  
 Kauai 11-*Lysimachia iniki*-c, Kauai 11-  
*Lysimachia pendens*-c, Kauai 11-  
*Lysimachia venosa*-c, and Kauai 11-

*Platydesma rostrata*-i (see paragraphs  
 (a)(1)(cxliv), (a)(1)(cxlix), (a)(1)(clxiii),  
 (a)(1)(clxiv), (a)(1)(clxxxiii),  
 (a)(1)(ccxxv), (a)(1)(ccxxvi),

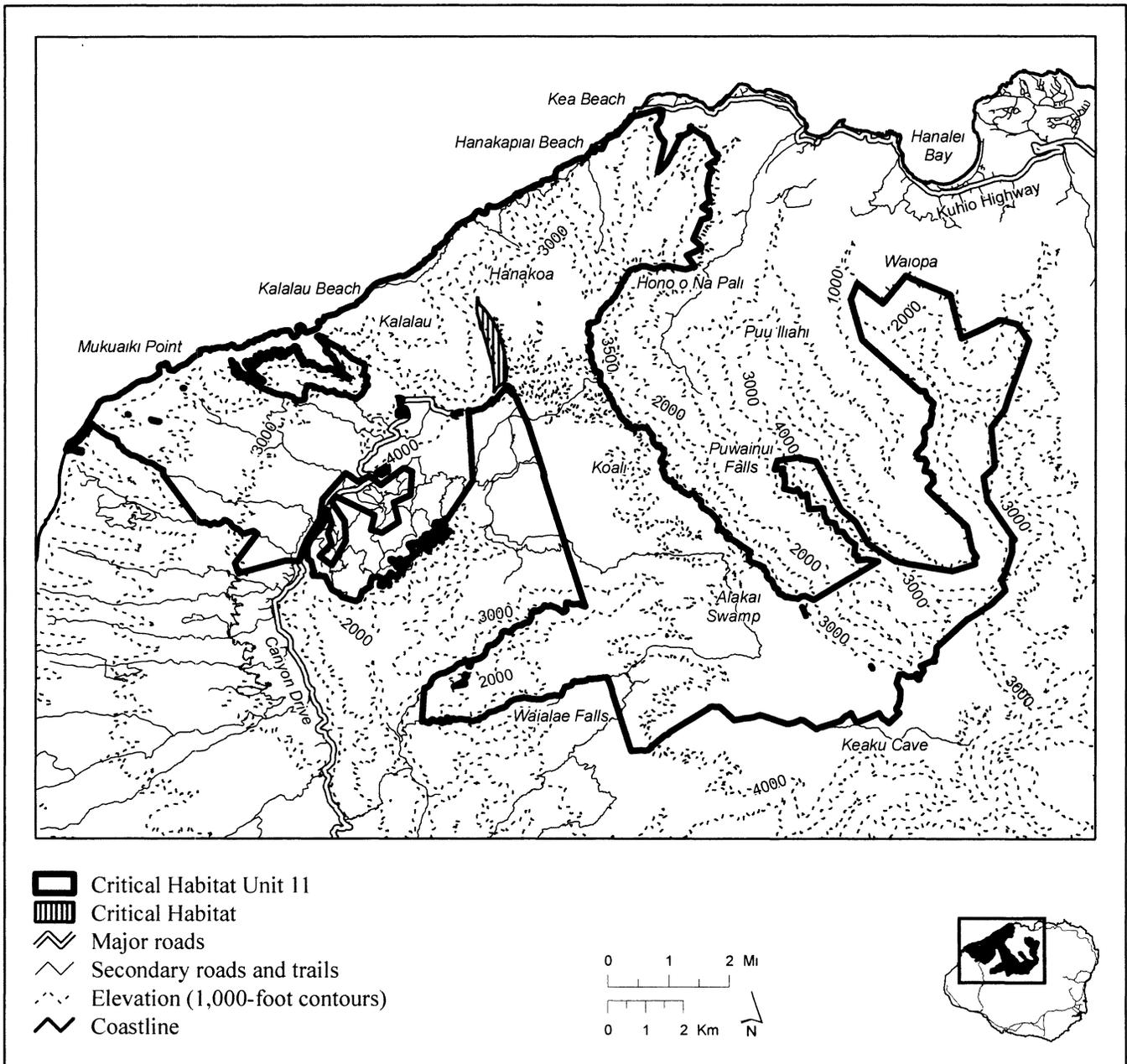
(a)(1)(ccxxviii), and (a)(1)(cclxxix),  
 respectively, of this section).

(B) Note: Map 70b follows:

**Map 70b**

**Kauai 11-*Chamaesyce remyi* var. *kauaiensis*-e, Kauai 11-*Chamaesyce remyi* var. *remyi*-i,  
 Kauai 11-*Cyanea dolichopoda*-c, Kauai 11-*Cyrtandra oenobarba*-e, Kauai 11-*Cyrtandra  
 paliku*-c, Kauai 11-*Dubautia plantaginea* ssp. *magnifolia*-c, Kauai 11-*Lysimachia iniki*-c,  
 Kauai 11-*Lysimachia pendens*-c, Kauai 11-*Lysimachia venosa*-c,  
 Kauai 11-*Platydesma rostrata*-i**

**Wet Cliff**



(cxli) Kauai 11–*Chamaesyce remyi* var. *remyi*–f (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cxlii) Kauai 11–*Chamaesyce remyi* var. *remyi*–g (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(cxliii) Kauai 11–*Chamaesyce remyi* var. *remyi*–h (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cxliv) Kauai 11–*Chamaesyce remyi* var. *remyi*–i (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(cxlv) Kauai 11–*Chamaesyce remyi* var. *remyi*–j (1,145 ha; 2,830 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for

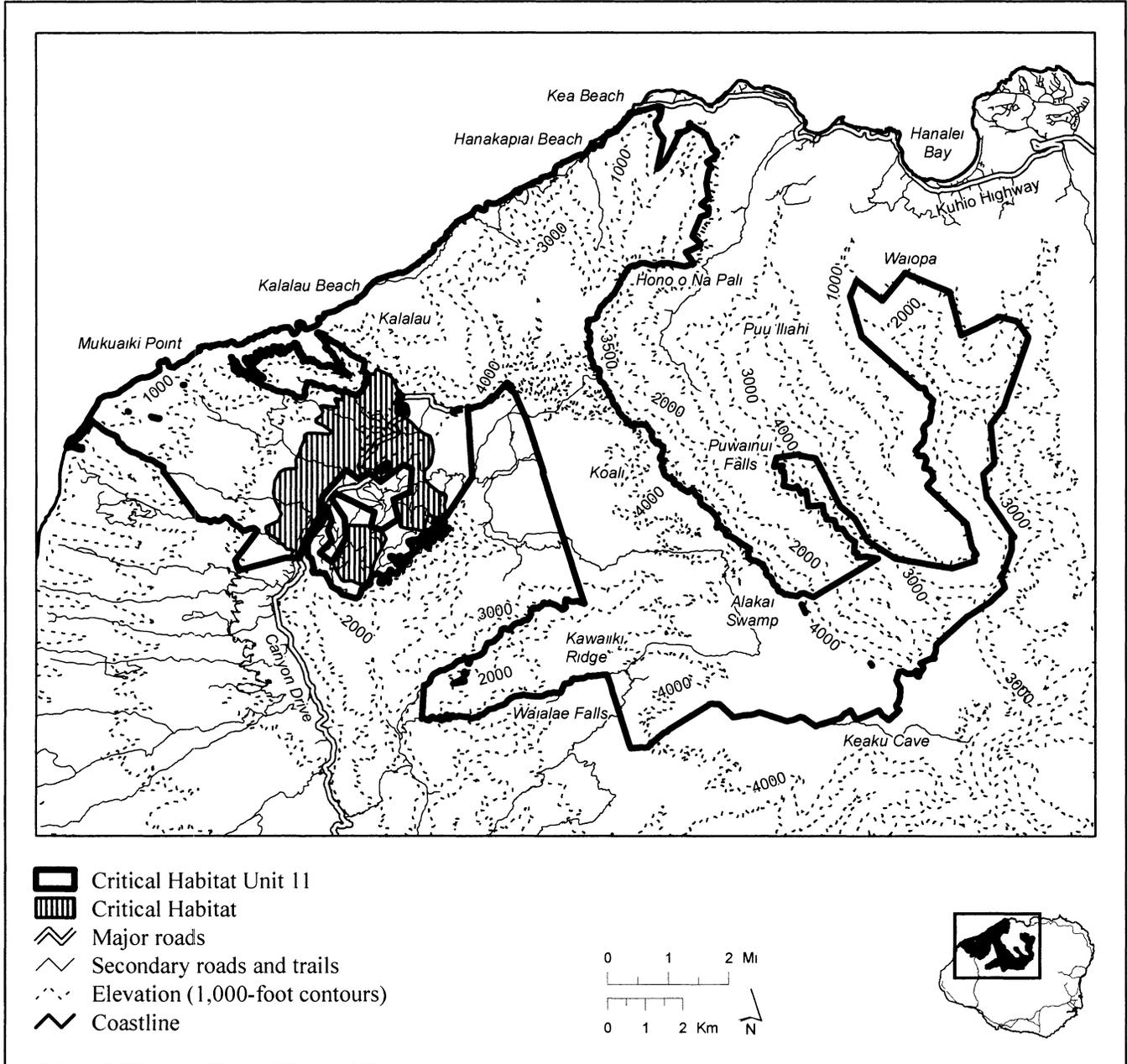
Kauai 11–*Diellia mannii*–a, Kauai 11–*Labordia helleri*–g, Kauai 11–*Myrsine knudsenii*–a, Kauai 11–*Myrsine mezii*–c, Kauai 11–*Platydesma rostrata*–j, Kauai 11–*Psychotria grandiflora*–c, Kauai 11–*Stenogyne kealiae*–d, and Kauai 11–*Tetraplasandra flynnii*–c (see paragraphs (a)(1)(clxxi), (a)(1)(ccxxiv), (a)(1)(ccli), (a)(1)(cclviii), (a)(1)(cclxxx), (a)(1)(ccxc), (a)(1)(cccxxx), and (a)(1)(cccxxxiv), respectively, of this section).

(B) Note: Map 70c follows:

Map 70c

**Kauai 11—*Chamaesyce remyi* var. *remyi*-j, Kauai 11—*Diellia mannii*-a, Kauai 11—*Labordia helleri*-g, Kauai 11—*Myrsine knudsenii*-a, Kauai 11—*Myrsine mezii*-c, Kauai 11—*Platydesma rostrata*-j, Kauai 11—*Psychotria grandiflora*-c, Kauai 11—*Stenogyne kealiae*-d, Kauai 11—*Tetraplasandra flynnii*-c**

Montane Mesic



(cxlvi) Kauai 11-Charpentiera densiflora-c (1,048 ha; 2,591 ac) (A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(cxlvii) Kauai 11-Charpentiera densiflora-d (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cxlix) Kauai 11-Cyanea dolichopoda-c (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(cl) Kauai 11-Cyanea eleeleensis-b (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cli) Kauai 11-Cyanea kolekoleensis-b (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(clii) Kauai 11-Cyanea kuhihewa-b (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(clxii) Kauai 11-Cyrtandra oenobarba-d (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(clxiii) Kauai 11-Cyrtandra oenobarba-e (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(clxiv) Kauai 11-Cyrtandra paliku-c (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(clxxi) Kauai 11-Diellia mannii-a (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(clxxv) Kauai 11-Doryopteris angelica-b (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(clxxvi) Kauai 11-Dryopteris crinalis var. podosorus-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(clxxvii) Kauai 11-Dubautia imbricata ssp. imbricata-b (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(clxxviii) Kauai 11-Dubautia kalalauensis-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(clxxix) Kauai 11-Dubautia kenwoodii-b (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(clxxxiii) Kauai 11-Dubautia plantaginea ssp. magnifolia-c (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(clxxxiv) Kauai 11-Dubautia waialealae-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cxcviii) Kauai 11-Geranium kauaiense-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cccxv) Kauai 11-Keyseria erici-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxxvi) Kauai 11-Keyseria helenae-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxxi) Kauai 11-Labordia helleri-d (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxxii) Kauai 11-Labordia helleri-e (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(ccxxiii) Kauai 11-Labordia helleri-f (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxxiv) Kauai 11-Labordia helleri-g (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(ccxxviii) Kauai 11-Labordia pumila-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxxxiv) Kauai 11-Lysimachia daphnoides-b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxxxv) Kauai 11-Lysimachia iniki-c (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(ccxxxvi) Kauai 11-Lysimachia pendens-c (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(ccxxxvii) Kauai 11–*Lysimachia scopulensis*–a (288 ha; 712 ac)

(A) See paragraph (a)(1)(cxxxv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxv)(B) of this section for the map of this unit.

(ccxxxviii) Kauai 11–*Lysimachia venosa*–c (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

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(ccxl) Kauai 11–*Melicope degeneri*–b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

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(ccxlvii) Kauai 11–*Melicope paniculata*–b (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxlviii) Kauai 11–*Melicope puberula*–c (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxlix) Kauai 11–*Melicope puberula*–d (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

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(ccli) Kauai 11–*Myrsine knudsenii*–a (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

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(cclvii) Kauai 11–*Myrsine mezii*–b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cclviii) Kauai 11–*Myrsine mezii*–c (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

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(cclxv) Kauai 11–*Phyllostegia renovans*–c (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cclxvi) Kauai 11–*Phyllostegia renovans*–d (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

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(cclxxi) Kauai 11–*Pittosporum napaliense*–b (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

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(cclxxvi) Kauai 11–*Platydesma rostrata*–f (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cclxxvii) Kauai 11–*Platydesma rostrata*–g (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(cclxxviii) Kauai 11–*Platydesma rostrata*–h (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cclxxix) Kauai 11–*Platydesma rostrata*–i (77 ha; 190 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(cclxxx) Kauai 11–*Platydesma rostrata*–j (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

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(cclxxxix) Kauai 11–*Psychotria grandiflora*–b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(ccxc) Kauai 11–*Psychotria grandiflora*–c (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(ccxci) Kauai 11–*Psychotria hobdyi*–b (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

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(cccviii) Kauai 11–*Schiedea attenuata*–a (288 ha; 712 ac)

(A) See paragraph (a)(1)(cxxxv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxv)(B) of this section for the map of this unit.

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(cccviii) Kauai 11–*Stenogyne kealiae*–b (288 ha; 712 ac)

(A) See paragraph (a)(1)(cxxxv)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxv)(B) of this section for the map of this unit.

(cccxix) Kauai 11–*Stenogyne kealiae*–c (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cccxix) Kauai 11–*Stenogyne kealiae*–d (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxl)(B) of this section for the map of this unit.

(cccxix) Kauai 11–*Tetraplasandra bisattenuata*–c (1,048 ha; 2,591 ac)

(A) See paragraph (a)(1)(cxxxii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxii)(B) of this section for the map of this unit.

(cccxix) Kauai 11–*Tetraplasandra bisattenuata*–d (1,060 ha; 2,618 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cccxix) Kauai 11–*Tetraplasandra flynnii*–b (5,705 ha; 14,096 ac)

(A) See paragraph (a)(1)(cxxxix)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxxxix)(B) of this section for the map of this unit.

(cccxix) Kauai 11–*Tetraplasandra flynnii*–c (1,145 ha; 2,830 ac)

(A) See paragraph (a)(1)(cxl)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cxlv)(B) of this section for the map of this unit.

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(cccclix) Kauai 18—*Astelia waialealae*—c (452 ha; 1,116ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 18—*Chamaesyce remyi* var. *remyi*—k, Kauai 18—*Dryopteris crinalis* var. *podosorus*—c, Kauai 18—*Dubautia kalalauensis*—c, Kauai 18—*Dubautia waialealae*—c, Kauai 18—*Geranium*

*kauaiense*—c, Kauai 18—*Keysseria erici*—c, Kauai 18—*Keysseria helenae*—c, Kauai 18—*Labordia helleri*—h, Kauai 18—*Labordia pumila*—c, Kauai 18—*Lysimachia daphnoides*—c, Kauai 18—*Melicope degeneri*—c, Kauai 18—*Melicope puberula*—e, Kauai 18—*Myrsine mezii*—d, Kauai 18—*Phyllostegia renovans*—e, Kauai 18—*Platydesma rostrata*—k, Kauai 18—*Psychotria grandiflora*—d, and Kauai 18—*Tetraplasandra flynnii*—d (see

paragraphs (a)(1)(cccl), (a)(1)(cccli), (a)(1)(ccclii), (a)(1)(cccliii), (a)(1)(cccliv), (a)(1)(ccclv), (a)(1)(ccclvi), (a)(1)(ccclvii), (a)(1)(ccclviii), (a)(1)(ccclix), (a)(1)(ccclx), (a)(1)(ccclxi), (a)(1)(ccclxii), (a)(1)(ccclxiii), (a)(1)(ccclxiv), (a)(1)(ccclxv), and (a)(1)(ccclxvi), respectively, of this section).

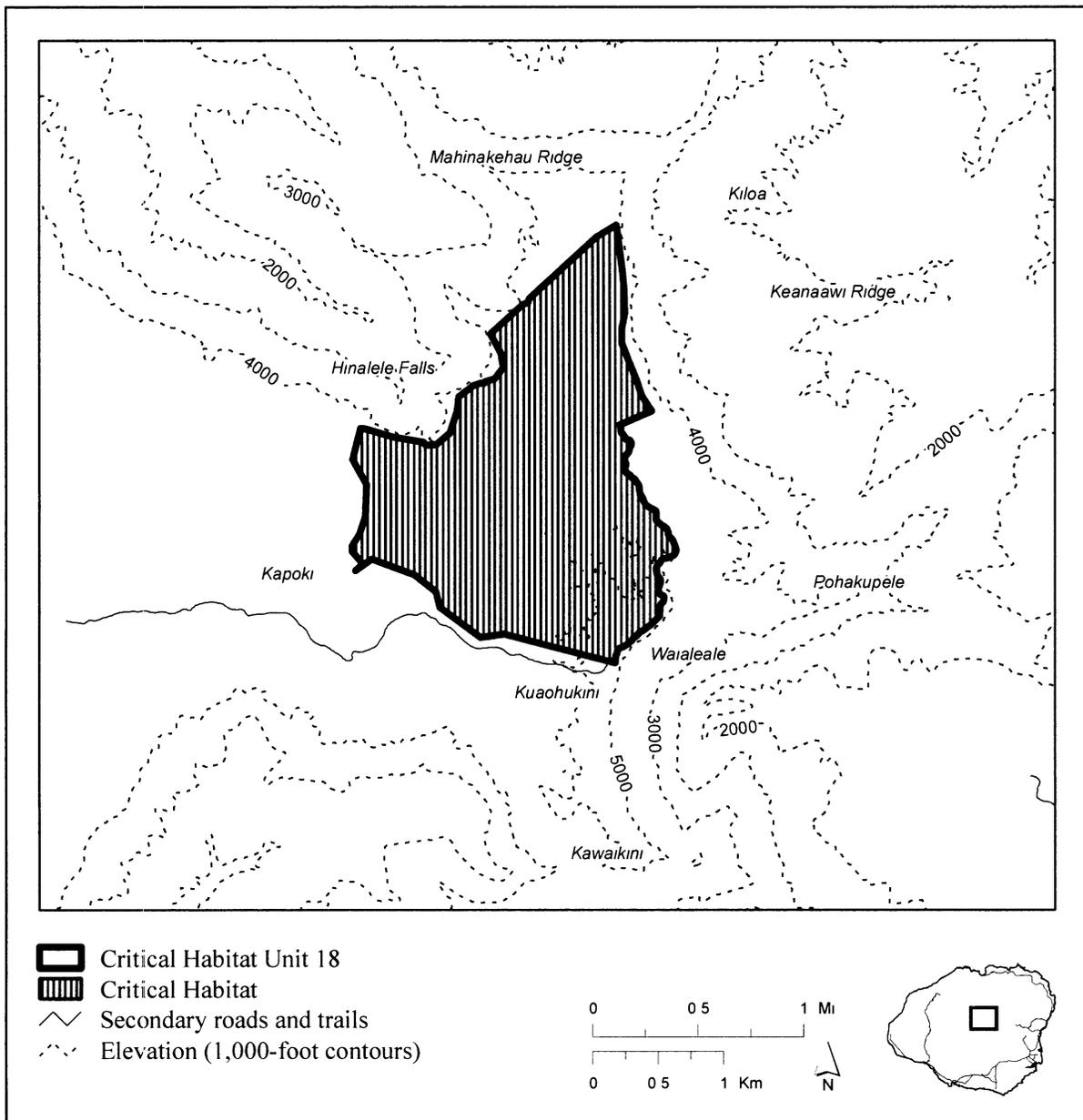
(B) Note: Map 217a follows:

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Map 217a

**Kauai 18—*Astelia waialealae*—c, Kauai 18—*Chamaesyce remyi* var. *remyi*—k, Kauai 18—*Dryopteris crinalis* var. *podosorus*—c, Kauai 18—*Dubautia kalalauensis*—c, Kauai 18—*Dubautia waialealae*—c, Kauai 18—*Geranium kauaiense*—c, Kauai 18—*Keysseria erici*—c, Kauai 18—*Keysseria helenae*—c, Kauai 18—*Labordia helleri*—h, Kauai 18—*Labordia pumila*—c, Kauai 18—*Lysimachia daphnoides*—c, Kauai 18—*Melicope degeneri*—c, Kauai 18—*Melicope puberula*—e, Kauai 18—*Myrsine mezii*—d, Kauai 18—*Phyllostegia renovans*—e, Kauai 18—*Platydesma rostrata*—k, Kauai 18—*Psychotria grandiflora*—d, Kauai 18—*Tetraplasandra flynnii*—d**

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(cccl) Kauai 18—*Chamaesyce remyi* var. *remyi*-k (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(cccli) Kauai 18—*Dryopteris crinalis* var. *podosorus*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclii) Kauai 18—*Dubautia kalalauensis*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(cccliii) Kauai 18—*Dubautia waialealae*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(cccliv) Kauai 18—*Geranium kauaiense*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclv) Kauai 18—*Keysseria erici*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclvi) Kauai 18—*Keysseria helenae*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclvii) Kauai 18—*Labordia helleri*-h (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclviii) Kauai 18—*Labordia pumila*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclix) Kauai 18—*Lysimachia daphnoides*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclx) Kauai 18—*Melicope degeneri*-c (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclxi) Kauai 18—*Melicope puberula*-e (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclxii) Kauai 18—*Myrsine mezii*-d (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclxiii) Kauai 18—*Phyllostegia renovans*-e (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclxiv) Kauai 18—*Platydesma rostrata*-k (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclxv) Kauai 18—*Psychotria grandiflora*-d (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclxvi) Kauai 18—*Tetraplasandra flynnii*-d (452 ha; 1,116 ac)

(A) See paragraph (a)(1)(cccxlx)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cccxlx)(B) of this section for the map of this unit.

(ccclxvii) Kauai 19—*Chamaesyce remyi* var. *kauaiensis*-f (120 ha; 296 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 19—*Chamaesyce remyi* var. *remyi*-l, Kauai 19—*Cyanea dolichopoda*-d, Kauai 19—*Cyrtandra oenobarba*-f, Kauai 19—*Cyrtandra paliku*-d, Kauai 19—*Dubautia plantaginea* ssp. *magnifolia*-d, Kauai 19—*Lysimachia iniki*-d, Kauai 19—*Lysimachia pendens*-d, Kauai 19—*Lysimachia venosa*-d, and Kauai 19—*Platydesma rostrata*-l (see paragraphs (a)(1)(ccclxviii), (a)(1)(ccclxix), (a)(1)(ccclxx), (a)(1)(ccclxxi), (a)(1)(ccclxxii), (a)(1)(ccclxxiii), (a)(1)(ccclxxiv), (a)(1)(ccclxxv), and (a)(1)(ccclxxvi), respectively, of this section).

(B) Note: Map 217b follows:

(a)(1)(ccclxxviii), (a)(1)(ccclxix), (a)(1)(ccclxx), (a)(1)(ccclxxi), (a)(1)(ccclxxii), (a)(1)(ccclxxiii), (a)(1)(ccclxxiv), (a)(1)(ccclxxv), and (a)(1)(ccclxxvi), respectively, of this section).

(a)(1)(ccclxxviii), (a)(1)(ccclxix), (a)(1)(ccclxx), (a)(1)(ccclxxi), (a)(1)(ccclxxii), (a)(1)(ccclxxiii), (a)(1)(ccclxxiv), (a)(1)(ccclxxv), and (a)(1)(ccclxxvi), respectively, of this section).

(a)(1)(ccclxxviii), (a)(1)(ccclxix), (a)(1)(ccclxx), (a)(1)(ccclxxi), (a)(1)(ccclxxii), (a)(1)(ccclxxiii), (a)(1)(ccclxxiv), (a)(1)(ccclxxv), and (a)(1)(ccclxxvi), respectively, of this section).

(a)(1)(ccclxxviii), (a)(1)(ccclxix), (a)(1)(ccclxx), (a)(1)(ccclxxi), (a)(1)(ccclxxii), (a)(1)(ccclxxiii), (a)(1)(ccclxxiv), (a)(1)(ccclxxv), and (a)(1)(ccclxxvi), respectively, of this section).

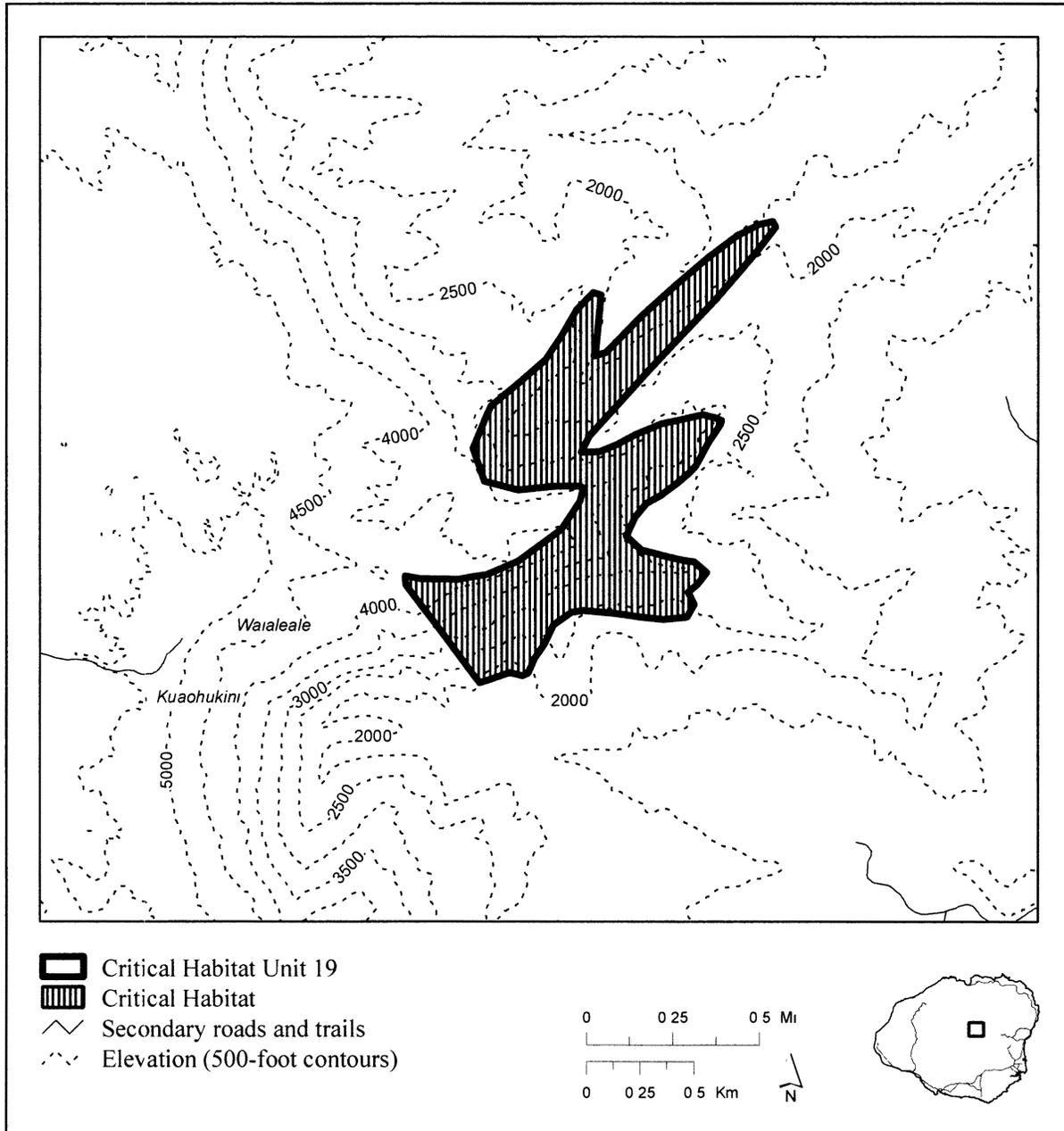
(B) Note: Map 217b follows:

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Map 217b

**Kauai 19—*Chamaesyce remyi* var. *kauaiensis*—f, Kauai 19—*Chamaesyce remyi* var. *remyi*—l, Kauai 19—*Cyanea dolichopoda*—d, Kauai 19—*Cyrtandra oenobarba*—f, Kauai 19—*Cyrtandra paliku*—d, Kauai 19—*Dubautia plantaginea* ssp. *magnifolia*—d, Kauai 19—*Lysimachia iniki*—d, Kauai 19—*Lysimachia pendens*—d, Kauai 19—*Lysimachia venosa*—d, Kauai 19—*Platydesma rostrata*—l**

Wet Cliff



(ccclxviii) Kauai 19—*Chamaesyce remyi* var. *remyi*-l (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxix) Kauai 19—*Cyanea dolichopoda*-d (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxx) Kauai 19—*Cyrtandra oenobarba*-f (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxxi) Kauai 19—*Cyrtandra paliku*-d (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxxii) Kauai 19—*Dubautia plantaginea* ssp. *magnifolia*-d (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxxiii) Kauai 19—*Lysimachia iniki*-d (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxxiv) Kauai 19—*Lysimachia pendens*-d (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxxv) Kauai 19—*Lysimachia venosa*-d (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxxvi) Kauai 19—*Platydesma rostrata*-l (120 ha; 296 ac)

(A) See paragraph (a)(1)(ccclxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxvii)(B) of this section for the map of this unit.

(ccclxxvii) Kauai 20—*Chamaesyce remyi* var. *kauaiensis*-g (9 ha; 23 ac)

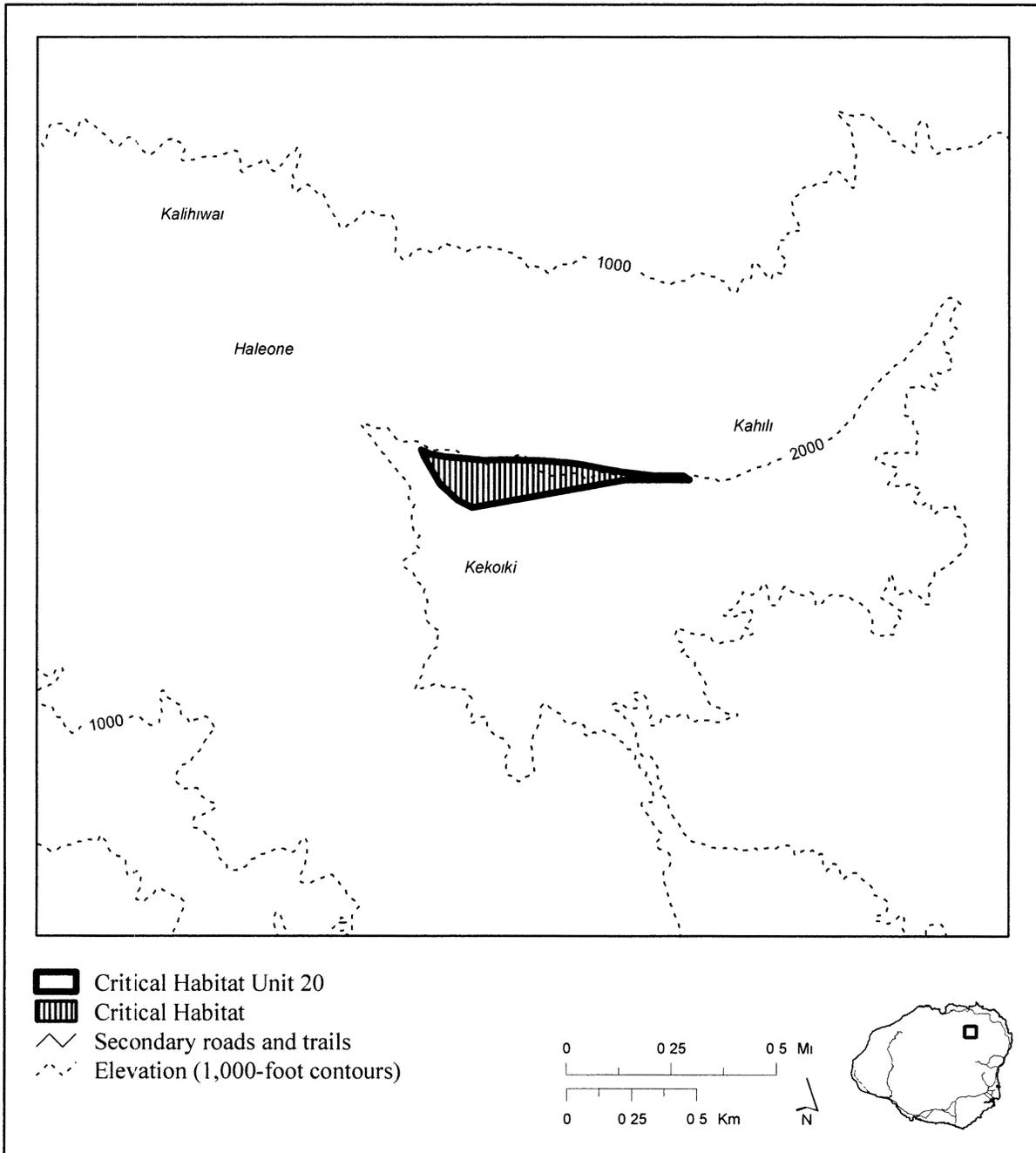
(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 20—*Chamaesyce remyi* var. *remyi*-m, Kauai 20—*Cyanea dolichopoda*-e, Kauai 20—*Cyrtandra oenobarba*-g, Kauai 20—*Cyrtandra paliku*-e, Kauai 20—*Dubautia plantaginea* ssp. *magnifolia*-e, Kauai 20—*Lysimachia iniki*-e, Kauai 20—*Lysimachia pendens*-e, Kauai 20—*Lysimachia venosa*-e, and Kauai 20—*Platydesma rostrata*-m (see paragraphs (a)(1)(ccclxxviii), (a)(1)(ccclxxix), (a)(1)(ccclxxx), (a)(1)(ccclxxxii), (a)(1)(ccclxxxiii), (a)(1)(ccclxxxiv), (a)(1)(ccclxxxv), and (a)(1)(ccclxxxvi), respectively, of this section).

(B) Note: Map 217c follows:

Map 217c

**Kauai 20—*Chamaesyce remyi* var. *kauaiensis*—g, Kauai 20—*Chamaesyce remyi* var. *remyi*—m, Kauai 20—*Cyanea dolichopoda*—e, Kauai 20—*Cyrtandra oenobarba*—g, Kauai 20—*Cyrtandra paliku*—e, Kauai 20—*Dubautia plantaginea* ssp. *magnifolia*—e, Kauai 20—*Lysimachia iniki*—e, Kauai 20—*Lysimachia pendens*—e, Kauai 20—*Lysimachia venosa*—e, Kauai 20—*Platydesma rostrata*—m**

Wet Cliff



(ccclxxviii) Kauai 20—*Chamaesyce remyi* var. *remyi*—m (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxix) Kauai 20—*Cyanea dolichopoda*—e (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxx) Kauai 20—*Cyrtandra oenobarba*—g (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxxi) Kauai 20—*Cyrtandra paliku*—e (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxxii) Kauai 20—*Dubautia plantaginea* ssp. *magnifolia*—e (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxxiii) Kauai 20—*Lysimachia iniki*—e (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxxiv) Kauai 20—*Lysimachia pendens*—e (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxxv) Kauai 20—*Lysimachia venosa*—e (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxxvi) Kauai 20—*Platydesma rostrata*—m (9 ha; 23 ac)

(A) See paragraph (a)(1)(ccclxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxvii)(B) of this section for the map of this unit.

(ccclxxxvii) Kauai 21—*Chamaesyce remyi* var. *kauaiensis*—h (26 ha; 65 ac)

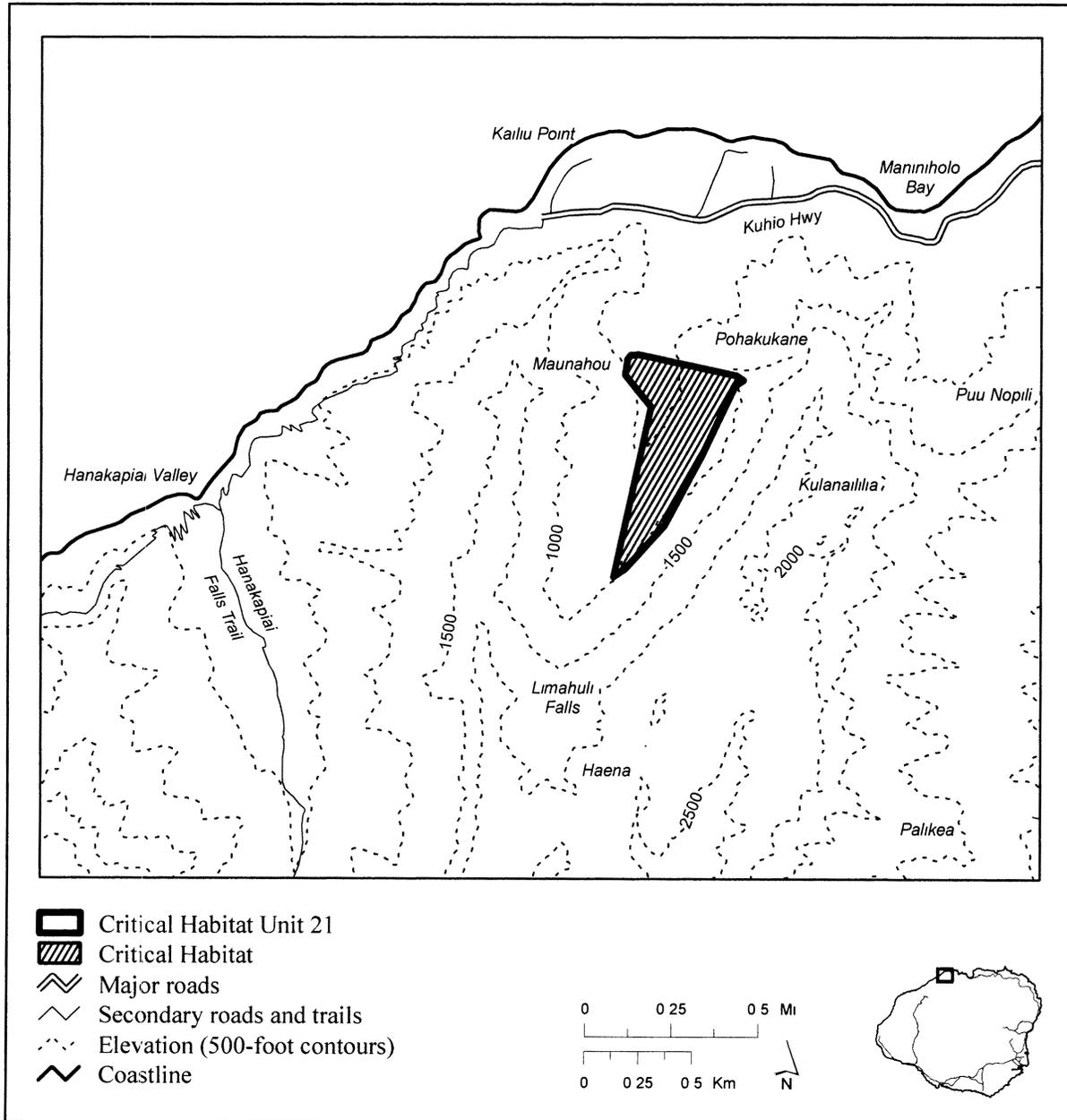
(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 21—*Chamaesyce remyi* var. *remyi*—n, Kauai 21—*Charpentiera densiflora*—e, Kauai 21—*Cyanea eleeleensis*—c, Kauai 21—*Cyanea kolekoleensis*—c, Kauai 21—*Cyanea kuhihewa*—c, Kauai 21—*Cyrtandra oenobarba*—h, Kauai 21—*Dubautia imbricata* ssp. *imbricata*—c, Kauai 21—*Labordia helleri*—i, Kauai 21—*Melicope paniculata*—c, Kauai 21—*Melicope puberula*—f, Kauai 21—*Phyllostegia renovans*—f, Kauai 21—*Platydesma rostrata*—n, Kauai 21—*Stenogyne kealiae*—e, and Kauai 21—*Tetraplasandra bisattenuata*—e (see paragraphs (a)(1)(ccclxxxviii), (a)(1)(ccclxxxix), (a)(1)(cccxc), (a)(1)(cccxcii), (a)(1)(cccxciii), (a)(1)(cccxciv), (a)(1)(cccxcv), (a)(1)(cccxcvi), (a)(1)(cccxcvii), (a)(1)(cccxcviii), (a)(1)(cccxcix), (a)(1)(cd), and (a)(1)(cdi), respectively, of this section).

(B) Note: Map 217d follows:

Map 217d

**Kauai 21—*Chamaesyce remyi* var. *kauaiensis*—h, Kauai 21—*Chamaesyce remyi* var. *remyi*—n, Kauai 21—*Charpentiera densiflora*—e, Kauai 21—*Cyanea eleeleensis*—c, Kauai 21—*Cyanea kolekoleensis*—c, Kauai 21—*Cyanea kuhihewa*—c, Kauai 21—*yrtandra oenobarba*—h, Kauai 21—*Dubautia imbricata* ssp. *imbricata*—c, Kauai 21—*Labordia helleri*—i, Kauai 21—*Melicope paniculata*—c, Kauai 21—*Melicope puberula*—f, Kauai 21—*Phyllostegia renovans*—f, Kauai 21—*Platydesma rostrata*—n, Kauai 21—*Stenogyne kealiae*—e, Kauai 21—*Tetraplasandra bisattenuata*—e**

Lowland Wet



(ccclxxxviii) Kauai 21—*Chamaesyce remyi* var. *remyi*-n (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(ccclxxxix) Kauai 21—*Charpentiera densiflora*-e (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxc) Kauai 21—*Cyanea eleleensis*-c (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxcii) Kauai 21—*Cyanea kolekoleensis*-c (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxciii) Kauai 21—*Cyanea kuhihewa*-c (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxciii) Kauai 21—*Cyrtandra oenobarba*-h (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxciv) Kauai 21—*Dubautia*

*imbricata* ssp. *imbricata*-c (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxcv) Kauai 21—*Labordia helleri*-i (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxcvi) Kauai 21—*Melicope paniculata*-c (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxcvii) Kauai 21—*Melicope puberula*-f (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxcviii) Kauai 21—*Phyllostegia renovans*-f (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cccxcix) Kauai 21—*Platydesma rostrata*-n (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cd) Kauai 21—*Stenogyne kealiae*-e (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cdi) Kauai 21—*Tetraplasandra bisattenuata*-e (26 ha; 65 ac)

(A) See paragraph

(a)(1)(ccclxxxvii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(ccclxxxvii)(B) of this section for the map of this unit.

(cdii) Kauai 22—*Chamaesyce remyi* var. *remyi*-o (3 ha; 8 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 22—*Diellia mannii*-b, Kauai 22—*Labordia helleri*-j, Kauai 22—*Myrsine knudsenii*-b, Kauai 22—*Myrsine mezii*-e, Kauai 22—*Platydesma rostrata*-o, Kauai 22—*Psychotria grandiflora*-e, Kauai 22—*Stenogyne kealiae*-f, and Kauai 22—*Tetraplasandra flynnii*-e (see paragraphs (a)(1)(cdiii), (a)(1)(cdiv), (a)(1)(cdv), (a)(1)(cdvi), (a)(1)(cdvii), (a)(1)(cdviii), (a)(1)(cdix), and (a)(1)(cdx), respectively, of this section).

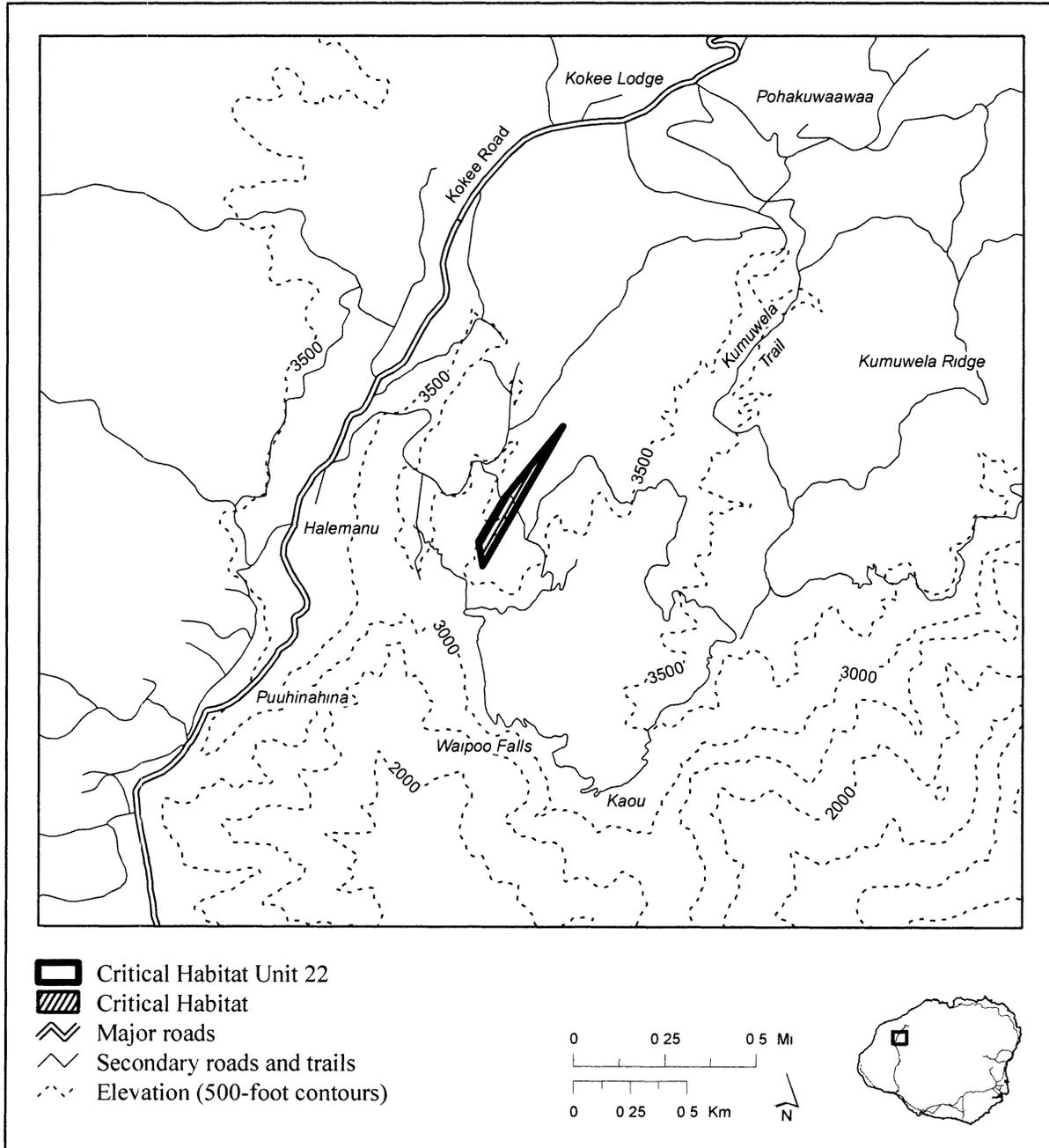
(B) Note: Map 217e follows:

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Map 217e

**Kauai 22—*Chamaesyce remyi* var. *remyi*—o, Kauai 22—*Diellia mannii*—b, Kauai 22—*Labordia helleri*—j, Kauai 22—*Myrsine knudsenii*—b, Kauai 22—*Myrsine mezii*—e, Kauai 22—*Platydesma rostrata*—o, Kauai 22—*Psychotria grandiflora*—e, Kauai 22—*Stenogyne kealiae*—f, Kauai 22—*Tetraplasandra flynnii*—e**

Montane Mesic



(cdiii) Kauai 22–*Diellia mannii*–b (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdiv) Kauai 22–*Labordia helleri*–j (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdv) Kauai 22–*Myrsine knudsenii*–b (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdvi) Kauai 22–*Myrsine mezii*–e (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdvii) Kauai 22–*Platydesma rostrata*–o (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdviii) Kauai 22–*Psychotria grandiflora*–e (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdix) Kauai 22–*Stenogyne kealiae*–f (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdx) Kauai 22–*Tetraplasandra flynnii*–e (3 ha; 8 ac)

(A) See paragraph (a)(1)(cdii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdii)(B) of this section for the map of this unit.

(cdxi) Kauai 23–*Chamaesyce remyi* var. *remyi*–p (56 ha; 138 ac)

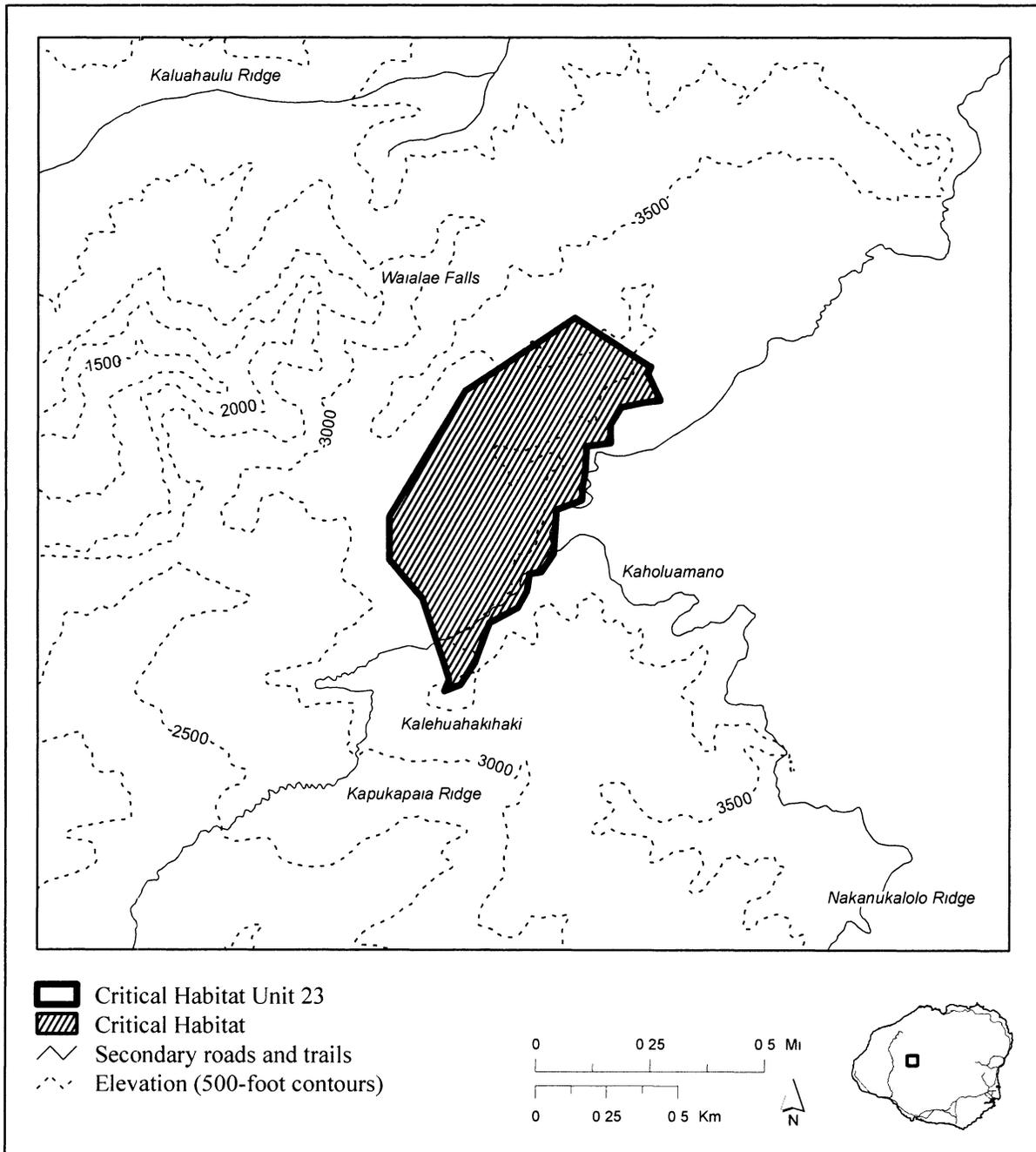
(A) [Reserve for textual description of unit.] This unit is also critical habitat for Kauai 23–*Diellia mannii*–c, Kauai 23–*Labordia helleri*–k, Kauai 23–*Myrsine knudsenii*–c, Kauai 23–*Myrsine mezii*–f, Kauai 23–*Platydesma rostrata*–p, Kauai 23–*Psychotria grandiflora*–f, Kauai 23–*Stenogyne kealiae*–g, and Kauai 23–*Tetraplasandra flynnii*–f (see paragraphs (a)(1)(cdxii), (a)(1)(cdxiii), (a)(1)(cdxiv), (a)(1)(cdxv), (a)(1)(cdxvi), (a)(1)(cdxvii), (a)(1)(cdxviii), and (a)(1)(cdxix), respectively, of this section).

(B) Note: Map 217f follows:

**Map 217f**

**Kauai 23—*Chamaesyce remyi* var. *remyi*—p, Kauai 23—*Diellia mannii*—c, Kauai 23—*Labordia helleri*—k, Kauai 23—*Myrsine knudsenii*—c, Kauai 23—*Myrsine mezii*—f, Kauai 23—*Platydesma rostrata*—p, Kauai 23—*Psychotria grandiflora*—f, Kauai 23—*Stenogyne kealiae*—g, Kauai 23—*Tetraplasandra flynnii*—f**

**Montane Mesic**



(cdxii) Kauai 23—*Diellia mannii*—c (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxiii) Kauai 23—*Labordia helleri*—k (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxiv) Kauai 23—*Myrsine knudsenii*—c (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxv) Kauai 23—*Myrsine mezii*—f (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxvi) Kauai 23—*Platydesma rostrata*—p (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxvii) Kauai 23—*Psychotria grandiflora*—f (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxviii) Kauai 23—*Stenogyne kealiae*—g (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxix) Kauai 23—*Tetraplasandra flynnii*—f (56 ha; 138 ac)

(A) See paragraph (a)(1)(cdxi)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxi)(B) of this section for the map of this unit.

(cdxx) Kauai 24—*Astelia waialealae*—d (0.2 ha; 0.4 ac)

(A) [Reserve for textual description of unit.] This unit is also critical habitat for

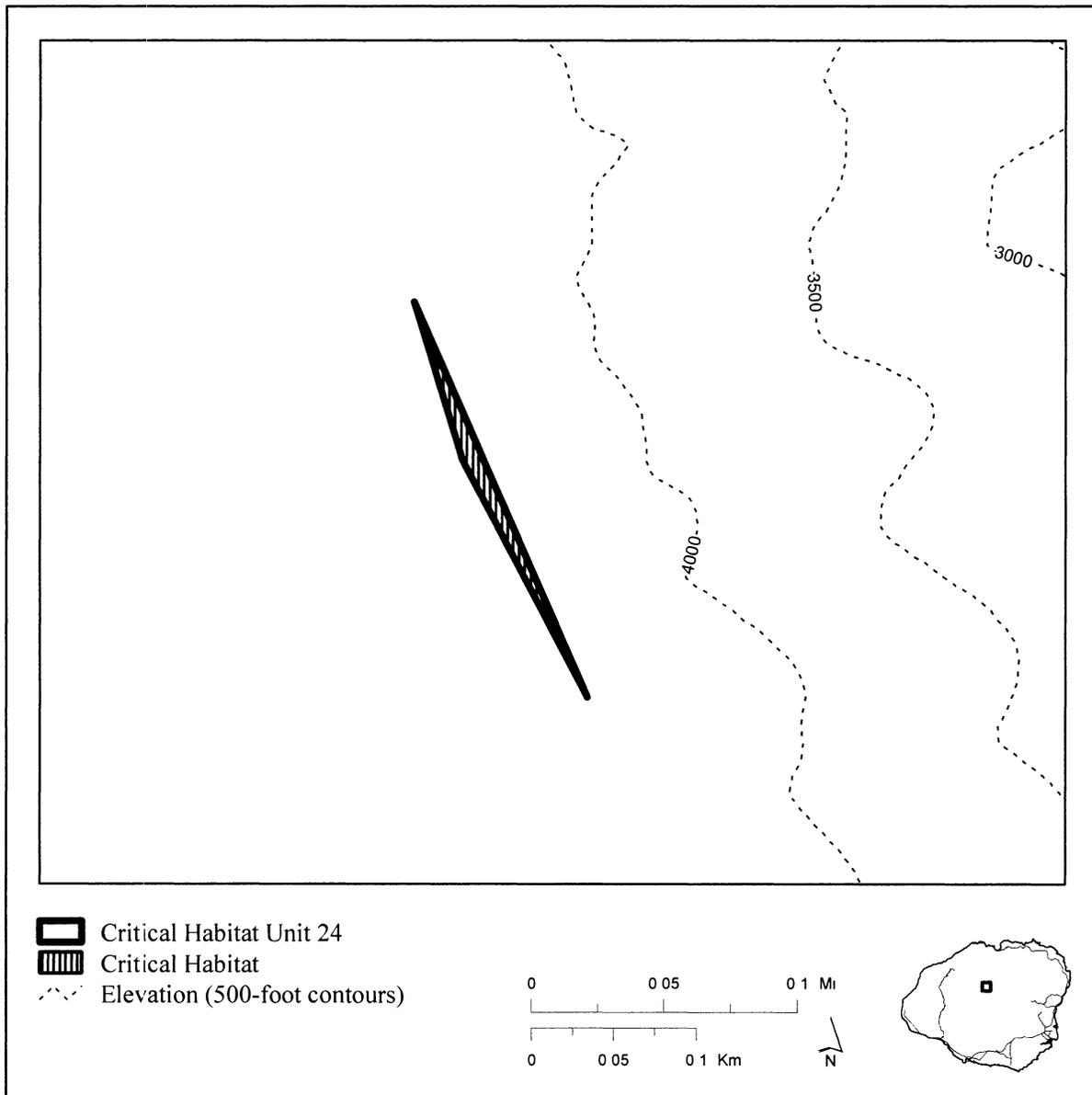
Kauai 24—*Chamaesyce remyi* var. *remyi*—q, Kauai 24—*Dryopteris crinalis* var. *podosorus*—d, Kauai 24—*Dubautia kalalauensis*—d, Kauai 24—*Dubautia waialealae*—d, Kauai 24—*Geranium kauaiense*—d, Kauai 24—*Keysseria erici*—d, Kauai 24—*Keysseria helenae*—d, Kauai 24—*Labordia helleri*—l, Kauai 24—*Labordia pumila*—d, Kauai 24—*Lysimachia daphnoides*—d, Kauai 24—*Melicope degeneri*—d, Kauai 24—*Melicope puberula*—g, Kauai 24—*Myrsine mezii*—g, Kauai 24—*Phyllostegia renovans*—g, Kauai 24—*Platydesma rostrata*—q, Kauai 24—*Psychotria grandiflora*—g, and Kauai 24—*Tetraplasandra flynnii*—g (see paragraphs (a)(1)(cdxxi), (a)(1)(cdxxii), (a)(1)(cdxxiii), (a)(1)(cdxxiv), (a)(1)(cdxxv), (a)(1)(cdxxvi), (a)(1)(cdxxvii), (a)(1)(cdxxviii), (a)(1)(cdxxix), (a)(1)(cdxxx), (a)(1)(cdxxxii), (a)(1)(cdxxxiii), (a)(1)(cdxxxiv), (a)(1)(cdxxxv), (a)(1)(cdxxxvi), and (a)(1)(cdxxxvii), respectively, of this section).

(B) Note: Map 217g follows:

## Map 217g

Kauai 24—*Astelia waialealae*—d, Kauai 24—*Chamaesyce remyi* var. *remyi*—q,  
 Kauai 24—*Dryopteris crinalis* var. *podosorus*—d, Kauai 24—*Dubautia*  
*kalalauensis*—d, Kauai 24—*Dubautia waialealae*—d, Kauai 24—*Geranium*  
*kuauaiense*—d, Kauai 24—*Keysseria erici*—d, Kauai 24—*Keysseria helenae*—d,  
 Kauai 24—*Labordia helleri*—l, Kauai 24—*Labordia pumila*—d, Kauai 24—*Lysimachia*  
*daphnoides*—d, Kauai 24—*Melicope degeneri*—d, Kauai 24—*Melicope*  
*puberula*—g, Kauai 24—*Myrsine mezii*—g, Kauai 24—*Phyllostegia renovans*—g,  
 Kauai 24—*Platydesma rostrata*—q, Kauai 24—*Psychotria grandiflora*—g,  
 Kauai 24—*Tetraplasandra flynnii*—g

## Montane Wet

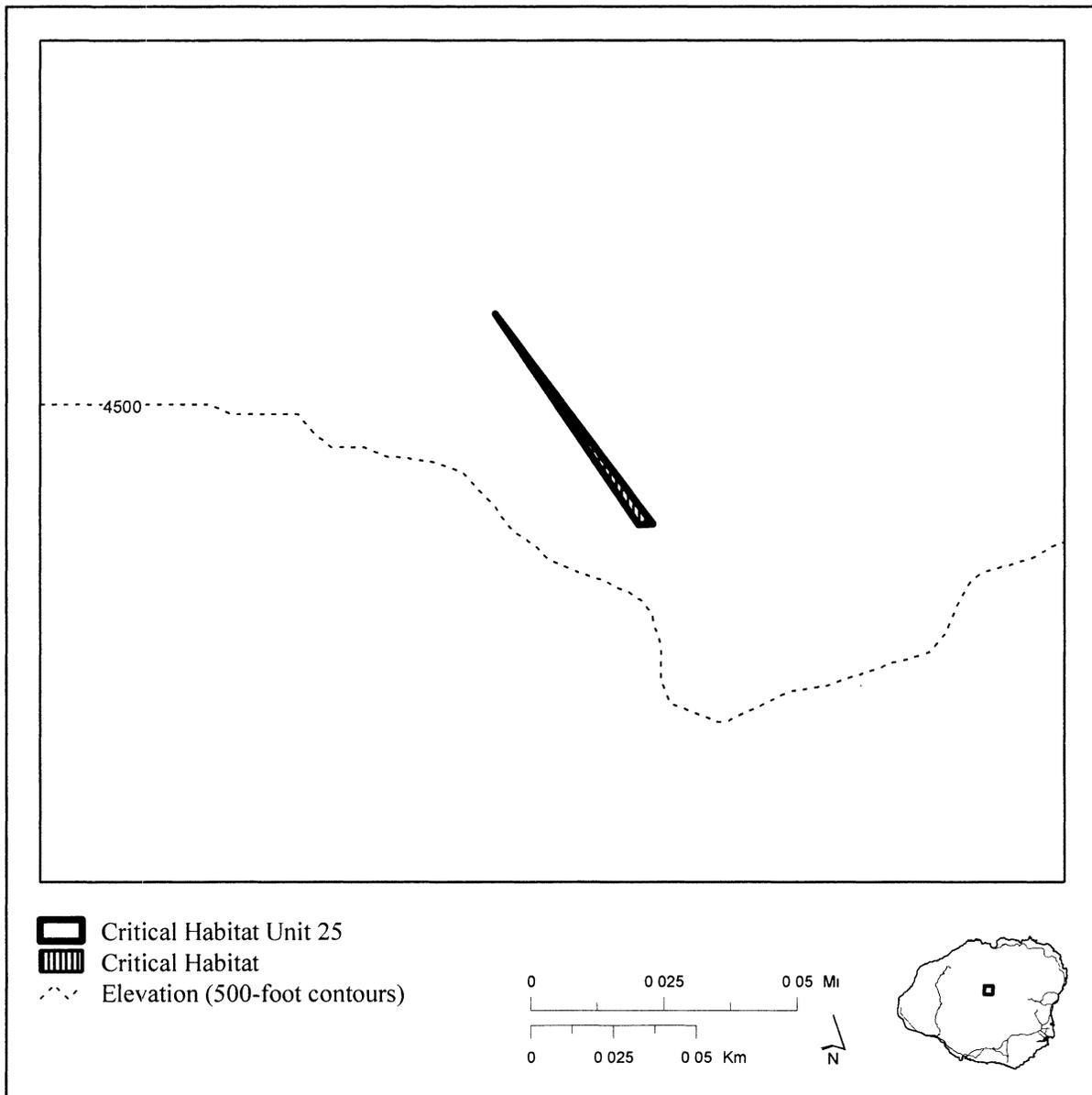




Map 217h

**Kauai 25—*Astelia waialealae*—e, Kauai 25—*Chamaesyce remyi* var. *remyi*—r,  
 Kauai 25—*Dryopteris crinalis* var. *podosorus*—e, Kauai 25—*Dubautia kalalauensis*—e,  
 Kauai 25—*Dubautia waialealae*—e, Kauai 25—*Geranium kuauaiense*—e, Kauai 25—  
*Keysseria erici*—e, Kauai 25—*Keysseria helenae*—e, Kauai 25—*Labordia helleri*—m,  
 Kauai 25—*Labordia pumila*—e, Kauai 25—*Lysimachia daphnoides*—e, Kauai 25—  
*Melicope degeneri*—e, Kauai 25—*Melicope puberula*—h, Kauai 25—*Myrsine mezii*—h,  
 Kauai 25—*Phyllostegia renovans*—h, Kauai 25—*Platydesma rostrata*—r,  
 Kauai 25—*Psychotria grandiflora*—h, Kauai 25—*Tetraplasandra flynnii*—h**

Montane Wet



(cdxxxix) Kauai 25–*Chamaesyce remyi* var. *remyi*–r (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxl) Kauai 25–*Dryopteris crinalis* var. *podosorus*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxli) Kauai 25–*Dubautia kalalauensis*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxlii) Kauai 25–*Dubautia waialealae*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxliii) Kauai 25–*Geranium kauaiense*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxliv) Kauai 25–*Keysseria erici*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.

(B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxlv) Kauai 25–*Keysseria helenae*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxlvi) Kauai 25–*Labordia helleri*–m (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxlvii) Kauai 25–*Labordia pumila*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxlviii) Kauai 25–*Lysimachia daphnoides*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdxlix) Kauai 25–*Melicope degeneri*–e (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdl) Kauai 25–*Melicope puberula*–h (0.01 ha; 0.04 ac)

(A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdli) Kauai 25–*Myrsine mezii*–h (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdlii) Kauai 25–*Phyllostegia renovans*–h (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdliii) Kauai 25–*Platydesma rostrata*–r (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdliv) Kauai 25–*Psychotria grandiflora*–h (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.  
 (cdlv) Kauai 25–*Tetraplasandra flynnii*–h (0.01 ha; 0.04 ac)  
 (A) See paragraph (a)(1)(cdxxxviii)(A) of this section for the textual description of this unit.  
 (B) See paragraph (a)(1)(cdxxxviii)(B) of this section for the map of this unit.

(CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI

Unit name	Species occupied	Species unoccupied
*****		
Kauai 4– <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> –a	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 4– <i>Chamaesyce remyi</i> var. <i>remyi</i> –a	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
*****		
Kauai 4– <i>Cyanea dolichopoda</i> –a	<i>Cyanea dolichopoda</i>	<i>Cyanea dolichopoda</i>
*****		
Kauai 4– <i>Cyrtandra oenobarba</i> –a	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 4– <i>Cyrtandra paliku</i> –a	<i>Cyrtandra paliku</i>	<i>Cyrtandra paliku</i>
Kauai 4– <i>Dubautia plantaginea</i> ssp. <i>magnifolia</i> –a	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>
*****		
Kauai 4– <i>Lysimachia iniki</i> –a	<i>Lysimachia iniki</i>	<i>Lysimachia iniki</i>
Kauai 4– <i>Lysimachia pendens</i> –a	<i>Lysimachia pendens</i>	<i>Lysimachia pendens</i>
Kauai 4– <i>Lysimachia venosa</i> –a		<i>Lysimachia venosa</i>

## (CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
*****		
Kauai 4— <i>Platydesma rostrata</i> —a	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
*****		
Kauai 7— <i>Canavalia napaliensis</i> —a	<i>Canavalia napaliensis</i>	<i>Canavalia napaliensis</i>
Kauai 7— <i>Chamaesyce eleanoriae</i> —a	<i>Chamaesyce eleanoriae</i>	<i>Chamaesyce eleanoriae</i>
Kauai 7— <i>Chamaesyce remyi</i> var. <i>remyi</i> —b	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 7— <i>Charpentiera densiflora</i> —a	<i>Charpentiera densiflora</i>	<i>Charpentiera densiflora</i>
*****		
Kauai 7— <i>Doryopteris angelica</i> —a	<i>Doryopteris angelica</i>	<i>Doryopteris angelica</i>
Kauai 7— <i>Dubautia kenwoodii</i> —a	<i>Dubautia kenwoodii</i>	<i>Dubautia kenwoodii</i>
*****		
Kauai 7— <i>Labordia helleri</i> —a	<i>Labordia helleri</i>	<i>Labordia helleri</i>
*****		
Kauai 7— <i>Pittosporum napaliense</i> —a	<i>Pittosporum napaliense</i>	<i>Pittosporum napaliense</i>
Kauai 7— <i>Platydesma rostrata</i> —b	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 7— <i>Psychotria hobdyi</i> —a	<i>Psychotria hobdyi</i>	<i>Psychotria hobdyi</i>
*****		
Kauai 7— <i>Tetraplasandra bisattenuata</i> —a	<i>Tetraplasandra bisattenuata</i>	<i>Tetraplasandra bisattenuata</i>
*****		
Kauai 10— <i>Astelia waialealae</i> —a	<i>Astelia waialealae</i>	<i>Astelia waialealae</i>
*****		
Kauai 10— <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> —b	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 10— <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> —c	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 10— <i>Chamaesyce remyi</i> var. <i>remyi</i> —c	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 10— <i>Chamaesyce remyi</i> var. <i>remyi</i> —d	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 10— <i>Chamaesyce remyi</i> var. <i>remyi</i> —e	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 10— <i>Charpentiera densiflora</i> —b	<i>Charpentiera densiflora</i>	<i>Charpentiera densiflora</i>
*****		
Kauai 10— <i>Cyanea dolichopoda</i> —b	<i>Cyanea dolichopoda</i>	<i>Cyanea dolichopoda</i>
Kauai 10— <i>Cyanea eleeleensis</i> —a		<i>Cyanea eleeleensis</i>
Kauai 10— <i>Cyanea kolekoleensis</i> —a		<i>Cyanea kolekoleensis</i>
Kauai 10— <i>Cyanea kuhihewa</i> —a		<i>Cyanea kuhihewa</i>
*****		
Kauai 10— <i>Cyrtandra oenobarba</i> —b	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 10— <i>Cyrtandra oenobarba</i> —c	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 10— <i>Cyrtandra paliku</i> —b	<i>Cyrtandra paliku</i>	<i>Cyrtandra paliku</i>

## (CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
Kauai 10— <i>Dryopteris crinalis</i> var. <i>podosorus</i> —a	<i>Dryopteris crinalis</i> var. <i>podosorus</i>	<i>Dryopteris crinalis</i> var. <i>podosorus</i>
Kauai 10— <i>Dubautia imbricata</i> ssp. <i>imbricata</i> —a	<i>Dubautia imbricata</i> ssp. <i>imbricata</i>	<i>Dubautia imbricata</i> ssp. <i>imbricata</i>
Kauai 10— <i>Dubautia kalalauensis</i> —a	<i>Dubautia kalalauensis</i>	<i>Dubautia kalalauensis</i>
*****		
Kauai 10— <i>Dubautia plantaginea</i> ssp. <i>magnifolia</i> —b	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>
Kauai 10— <i>Dubautia waialealae</i> —a	<i>Dubautia waialealae</i>	<i>Dubautia waialealae</i>
*****		
Kauai 10— <i>Geranium kauaiense</i> —a	<i>Geranium kauaiense</i>	<i>Geranium kauaiense</i>
*****		
Kauai 10— <i>Keysseria erici</i> —a	<i>Keysseria erici</i>	<i>Keysseria erici</i>
Kauai 10— <i>Keysseria helenae</i> —a	<i>Keysseria helenae</i>	<i>Keysseria helenae</i>
Kauai 10— <i>Labordia helleri</i> —b	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 10— <i>Labordia helleri</i> —c	<i>Labordia helleri</i>	<i>Labordia helleri</i>
*****		
Kauai 10— <i>Labordia pumila</i> —a	<i>Labordia pumila</i>	<i>Labordia pumila</i>
*****		
Kauai 10— <i>Lysimachia daphnoides</i> —a	<i>Lysimachia daphnoides</i>	<i>Lysimachia daphnoides</i>
*****		
Kauai 10— <i>Lysimachia iniki</i> —b	<i>Lysimachia iniki</i>	<i>Lysimachia iniki</i>
Kauai 10— <i>Lysimachia pendens</i> —b	<i>Lysimachia pendens</i>	<i>Lysimachia pendens</i>
Kauai 10— <i>Lysimachia venosa</i> —b		<i>Lysimachia venosa</i>
Kauai 10— <i>Melicope degeneri</i> —a	<i>Melicope paniculata</i>	<i>Melicope paniculata</i>
Kauai 10— <i>Melicope paniculata</i> —a	<i>Melicope paniculata</i>	<i>Melicope paniculata</i>
Kauai 10— <i>Melicope puberula</i> —a	<i>Melicope puberula</i>	<i>Melicope puberula</i>
Kauai 10— <i>Melicope puberula</i> —b	<i>Melicope puberula</i>	<i>Melicope puberula</i>
*****		
Kauai 10— <i>Myrsine mezii</i> —a	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>
*****		
Kauai 10— <i>Phyllostegia renovans</i> —a	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>
Kauai 10— <i>Phyllostegia renovans</i> —b	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>
*****		
Kauai 10— <i>Platydesma rostrata</i> —c	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 10— <i>Platydesma rostrata</i> —d	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 10— <i>Platydesma rostrata</i> —e	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 10— <i>Psychotria grandiflora</i> —a	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
*****		

## (CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
Kauai 10— <i>Stenogyne kealiae</i> —a	<i>Stenogyne kealiae</i>	<i>Stenogyne kealiae</i>
Kauai 10— <i>Tetraplasandra bisattenuata</i> —b	<i>Tetraplasandra bisattenuata</i>	<i>Tetraplasandra bisattenuata</i>
Kauai 10— <i>Tetraplasandra flynnii</i> —a	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>
*****		
Kauai 11— <i>Astelia waialealae</i> —b	<i>Astelia waialealae</i>	<i>Astelia waialealae</i>
*****		
Kauai 11— <i>Canavalia napaliensis</i> —b	<i>Canavalia napaliensis</i>	<i>Canavalia napaliensis</i>
*****		
Kauai 11— <i>Chamaesyce eleanoriae</i> —b	<i>Chamaesyce eleanoriae</i>	<i>Chamaesyce eleanoriae</i>
Kauai 11— <i>Chamaesyce eleanoriae</i> —c	<i>Chamaesyce eleanoriae</i>	<i>Chamaesyce eleanoriae</i>
*****		
Kauai 11— <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> —d	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 11— <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> —e	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 11— <i>Chamaesyce remyi</i> var. <i>remyi</i> —f	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 11— <i>Chamaesyce remyi</i> var. <i>remyi</i> —g	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 11— <i>Chamaesyce remyi</i> var. <i>remyi</i> —h	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 11— <i>Chamaesyce remyi</i> var. <i>remyi</i> —i	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 11— <i>Chamaesyce remyi</i> var. <i>remyi</i> —j	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 11— <i>Charpentiera densiflora</i> —c	<i>Charpentiera densiflora</i>	<i>Charpentiera densiflora</i>
Kauai 11— <i>Charpentiera densiflora</i> —d	<i>Charpentiera densiflora</i>	<i>Charpentiera densiflora</i>
*****		
Kauai 11— <i>Cyanea dolichopoda</i> —c	<i>Cyanea dolichopoda</i>	<i>Cyanea dolichopoda</i>
Kauai 11— <i>Cyanea eleeleensis</i> —b		<i>Cyanea eleeleensis</i>
Kauai 11— <i>Cyanea kolekoleensis</i> —b		<i>Cyanea kolekoleensis</i>
Kauai 11— <i>Cyanea kuhihewa</i> —b		<i>Cyanea kuhihewa</i>
*****		
Kauai 11— <i>Cyrtandra oenobarba</i> —d	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 11— <i>Cyrtandra oenobarba</i> —e	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 11— <i>Cyrtandra paliku</i> —c	<i>Cyrtandra paliku</i>	<i>Cyrtandra paliku</i>
*****		
Kauai 11— <i>Diellia mannii</i> —a	<i>Diellia mannii</i>	<i>Diellia mannii</i>
*****		
Kauai 11— <i>Doryopteris angelica</i> —b	<i>Doryopteris angelica</i>	<i>Doryopteris angelica</i>
Kauai 11— <i>Dryopteris crinalis</i> var. <i>podosorus</i> —b	<i>Dryopteris crinalis</i> var. <i>podosorus</i>	<i>Dryopteris crinalis</i> var. <i>podosorus</i>
Kauai 11— <i>Dubautia imbricata</i> ssp. <i>imbricata</i> —b	<i>Dubautia imbricata</i> ssp. <i>imbricata</i>	<i>Dubautia imbricata</i> ssp. <i>imbricata</i>
Kauai 11— <i>Dubautia kalalauensis</i> —b	<i>Dubautia kalalauensis</i>	<i>Dubautia kalalauensis</i>

## (CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
Kauai 11— <i>Dubautia kenwoodii</i> –b	<i>Dubautia kenwoodii</i>	<i>Dubautia kenwoodii</i>
*****		
Kauai 11— <i>Dubautia plantaginea</i> ssp. <i>magnifolia</i> –c	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>
Kauai 11— <i>Dubautia waialealae</i> –b	<i>Dubautia waialealae</i>	<i>Dubautia waialealae</i>
*****		
Kauai 11— <i>Geranium kauaiense</i> –b	<i>Geranium kauaiense</i>	<i>Geranium kauaiense</i>
*****		
Kauai 11— <i>Keysseria erici</i> –b	<i>Keysseria erici</i>	<i>Keysseria erici</i>
Kauai 11— <i>Keysseria helenae</i> –b	<i>Keysseria helenae</i>	<i>Keysseria helenae</i>
*****		
Kauai 11— <i>Labordia helleri</i> –d	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 11— <i>Labordia helleri</i> –e	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 11— <i>Labordia helleri</i> –f	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 11— <i>Labordia helleri</i> –g	<i>Labordia helleri</i>	<i>Labordia helleri</i>
*****		
Kauai 11— <i>Labordia pumila</i> –b	<i>Labordia pumila</i>	<i>Labordia pumila</i>
*****		
Kauai 11— <i>Lysimachia daphnoides</i> –b	<i>Lysimachia daphnoides</i>	<i>Lysimachia daphnoides</i>
Kauai 11— <i>Lysimachia iniki</i> –c	<i>Lysimachia iniki</i>	<i>Lysimachia iniki</i>
Kauai 11— <i>Lysimachia pendens</i> –c	<i>Lysimachia pendens</i>	<i>Lysimachia pendens</i>
Kauai 11— <i>Lysimachia scopulensis</i> –a	<i>Lysimachia scopulensis</i>	<i>Lysimachia scopulensis</i>
Kauai 11— <i>Lysimachia venosa</i> –c		<i>Lysimachia venosa</i>
*****		
Kauai 11— <i>Melicope degeneri</i> –b	<i>Melicope degeneri</i>	<i>Melicope degeneri</i>
*****		
Kauai 11— <i>Melicope paniculata</i> –b	<i>Melicope paniculata</i>	<i>Melicope paniculata</i>
Kauai 11— <i>Melicope puberula</i> –c	<i>Melicope puberula</i>	<i>Melicope puberula</i>
Kauai 11— <i>Melicope puberula</i> –d	<i>Melicope puberula</i>	<i>Melicope puberula</i>
*****		
Kauai 11— <i>Myrsine knudsenii</i> –a	<i>Myrsine knudsenii</i>	<i>Myrsine knudsenii</i>
*****		
Kauai 11— <i>Myrsine mezii</i> –b	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>
Kauai 11— <i>Myrsine mezii</i> –c	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>
*****		
Kauai 11— <i>Phyllostegia renovans</i> –c	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>
Kauai 11— <i>Phyllostegia renovans</i> –d	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>

## (CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
*****		
Kauai 11— <i>Pittosporum napaliense</i> -b	<i>Pittosporum napaliense</i>	<i>Pittosporum napaliense</i>
*****		
Kauai 11— <i>Platydesma rostrata</i> -f	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 11— <i>Platydesma rostrata</i> -g	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 11— <i>Platydesma rostrata</i> -h	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 11— <i>Platydesma rostrata</i> -i	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 11— <i>Platydesma rostrata</i> -j	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
*****		
Kauai 11— <i>Psychotria grandiflora</i> -b	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
Kauai 11— <i>Psychotria grandiflora</i> -c	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
Kauai 11— <i>Psychotria hobdyi</i> -b	<i>Psychotria hobdyi</i>	<i>Psychotria hobdyi</i>
*****		
Kauai 11— <i>Schiedea attenuata</i> -a	<i>Schiedea attenuata</i>	<i>Schiedea attenuata</i>
*****		
Kauai 11— <i>Stenogyne kealiae</i> -b	<i>Stenogyne kealiae</i>	<i>Stenogyne kealiae</i>
Kauai 11— <i>Stenogyne kealiae</i> -c	<i>Stenogyne kealiae</i>	<i>Stenogyne kealiae</i>
Kauai 11— <i>Stenogyne kealiae</i> -d	<i>Stenogyne kealiae</i>	<i>Stenogyne kealiae</i>
Kauai 11— <i>Tetraplasandra bisattenuata</i> -c	<i>Tetraplasandra bisattenuata</i>	<i>Tetraplasandra bisattenuata</i>
Kauai 11— <i>Tetraplasandra bisattenuata</i> -d	<i>Tetraplasandra bisattenuata</i>	<i>Tetraplasandra bisattenuata</i>
Kauai 11— <i>Tetraplasandra flynnii</i> -b	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>
Kauai 11— <i>Tetraplasandra flynnii</i> -c	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>
*****		
Kauai 18— <i>Astelia waialealae</i> -c	<i>Astelia waialealae</i>	<i>Astelia waialealae</i>
Kauai 18— <i>Chamaesyce remyi</i> var. <i>remyi</i> -k	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 18— <i>Dryopteris crinalis</i> var. <i>podosorus</i> -c	<i>Dryopteris crinalis</i> var. <i>podosorus</i>	<i>Dryopteris crinalis</i> var. <i>podosorus</i>
Kauai 18— <i>Dubautia kalalauensis</i> -c	<i>Dubautia kalalauensis</i>	<i>Dubautia kalalauensis</i>
Kauai 18— <i>Dubautia waialealae</i> -c	<i>Dubautia waialealae</i>	<i>Dubautia waialealae</i>
Kauai 18— <i>Geranium kauaiense</i> -c	<i>Geranium kauaiense</i>	<i>Geranium kauaiense</i>
Kauai 18— <i>Keysseria erici</i> -c	<i>Keysseria erici</i>	<i>Keysseria erici</i>
Kauai 18— <i>Keysseria helenae</i> -c	<i>Keysseria helenae</i>	<i>Keysseria helenae</i>
Kauai 18— <i>Labordia helleri</i> -h	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 18— <i>Labordia pumila</i> -c	<i>Labordia pumila</i>	<i>Labordia pumila</i>
Kauai 18— <i>Lysimachia daphnoides</i> -c	<i>Lysimachia daphnoides</i>	<i>Lysimachia daphnoides</i>
Kauai 18— <i>Melicope degeneri</i> -c	<i>Melicope degeneri</i>	<i>Melicope degeneri</i>
Kauai 18— <i>Melicope puberula</i> -e	<i>Melicope puberula</i>	<i>Melicope puberula</i>
Kauai 18— <i>Myrsine mezii</i> -d	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>

## (CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
Kauai 18— <i>Phyllostegia renovans</i> —e	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>
Kauai 18— <i>Platydesma rostrata</i> —k	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 18— <i>Psychotria grandiflora</i> —d	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
Kauai 18— <i>Tetraplasandra flynnii</i> —d	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>
Kauai 19— <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> —f	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 19— <i>Chamaesyce remyi</i> var. <i>remyi</i> —l	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 19— <i>Cyanea dolichopoda</i> —d	<i>Cyanea dolichopoda</i>	<i>Cyanea dolichopoda</i>
Kauai 19— <i>Cyrtandra oenobarba</i> —f	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 19— <i>Cyrtandra paliku</i> —d	<i>Cyrtandra paliku</i>	<i>Cyrtandra paliku</i>
Kauai 19— <i>Dubautia plantaginea</i> ssp. <i>magnifolia</i> —d	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>
Kauai 19— <i>Lysimachia iniki</i> —d	<i>Lysimachia iniki</i>	<i>Lysimachia iniki</i>
Kauai 19— <i>Lysimachia pendens</i> —d	<i>Lysimachia pendens</i>	<i>Lysimachia pendens</i>
Kauai 19— <i>Lysimachia venosa</i> —d		<i>Lysimachia venosa</i>
Kauai 19— <i>Platydesma rostrata</i> —l	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 20— <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> —g	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 20— <i>Chamaesyce remyi</i> var. <i>remyi</i> —m	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 20— <i>Cyanea dolichopoda</i> —e	<i>Cyanea dolichopoda</i>	<i>Cyanea dolichopoda</i>
Kauai 20— <i>Cyrtandra oenobarba</i> —g	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 20— <i>Cyrtandra paliku</i> —e	<i>Cyrtandra paliku</i>	<i>Cyrtandra paliku</i>
Kauai 20— <i>Dubautia plantaginea</i> ssp. <i>magnifolia</i> —e	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>	<i>Dubautia plantaginea</i> ssp. <i>magnifolia</i>
Kauai 20— <i>Lysimachia iniki</i> —e	<i>Lysimachia iniki</i>	<i>Lysimachia iniki</i>
Kauai 20— <i>Lysimachia pendens</i> —e	<i>Lysimachia pendens</i>	<i>Lysimachia pendens</i>
Kauai 20— <i>Lysimachia venosa</i> —e		<i>Lysimachia venosa</i>
Kauai 20— <i>Platydesma rostrata</i> —m	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 21— <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> —h	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>	<i>Chamaesyce remyi</i> var. <i>kauaiensis</i>
Kauai 21— <i>Chamaesyce remyi</i> var. <i>remyi</i> —n	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 21— <i>Charpentiera densiflora</i> —e	<i>Charpentiera densiflora</i>	<i>Charpentiera densiflora</i>
Kauai 21— <i>Cyanea eleeleensis</i> —c		<i>Cyanea eleeleensis</i>
Kauai 21— <i>Cyanea kolekoleensis</i> —c		<i>Cyanea kolekoleensis</i>
Kauai 21— <i>Cyanea kuhihewa</i> —c		<i>Cyanea kuhihewa</i>
Kauai 21— <i>Cyrtandra oenobarba</i> —h	<i>Cyrtandra oenobarba</i>	<i>Cyrtandra oenobarba</i>
Kauai 21— <i>Dubautia imbricata</i> ssp. <i>imbricata</i> —c	<i>Dubautia imbricata</i> ssp. <i>imbricata</i>	<i>Dubautia imbricata</i> ssp. <i>imbricata</i>
Kauai 21— <i>Labordia helleri</i> —i	<i>Labordia heller</i>	<i>Labordia heller</i>
Kauai 21— <i>Melicope paniculata</i> —c	<i>Melicope paniculata</i>	<i>Melicope paniculata</i>

(CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
Kauai 21— <i>Melicope puberula</i> –f	<i>Melicope puberula</i>	<i>Melicope puberula</i>
Kauai 21— <i>Phyllostegia renovans</i> –f	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>
Kauai 21— <i>Platydesma rostrata</i> –n	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 21— <i>Stenogyne kealiae</i> –e	<i>Stenogyne kealiae</i>	<i>Stenogyne kealiae</i>
Kauai 21— <i>Tetraplasandra bisattenuata</i> –e	<i>Tetraplasandra bisattenuata</i>	<i>Tetraplasandra bisattenuata</i>
Kauai 22— <i>Chamaesyce remyi</i> var. <i>remyi</i> –o	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 22— <i>Diellia mannii</i> –b	<i>Diellia mannii</i>	<i>Diellia mannii</i>
Kauai 22— <i>Labordia helleri</i> –j	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 22— <i>Myrsine knudsenii</i> –b	<i>Myrsine knudsenii</i>	<i>Myrsine knudsenii</i>
Kauai 22— <i>Myrsine mezii</i> –e	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>
Kauai 22— <i>Platydesma rostrata</i> –o	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 22— <i>Psychotria grandiflora</i> –e	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
Kauai 22— <i>Stenogyne kealiae</i> –f	<i>Stenogyne kealiae</i>	<i>Stenogyne kealiae</i>
Kauai 22— <i>Tetraplasandra flynnii</i> –e	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>
Kauai 23— <i>Chamaesyce remyi</i> var. <i>remyi</i> –p	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 23— <i>Diellia mannii</i> –c	<i>Diellia mannii</i>	<i>Diellia mannii</i>
Kauai 23— <i>Labordia helleri</i> –k	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 23— <i>Myrsine knudsenii</i> –c	<i>Myrsine knudsenii</i>	<i>Myrsine knudsenii</i>
Kauai 23— <i>Myrsine mezii</i> –f	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>
Kauai 23— <i>Platydesma rostrata</i> –p	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 23— <i>Psychotria grandiflora</i> –f	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
Kauai 23— <i>Stenogyne kealiae</i> –g	<i>Stenogyne kealiae</i>	<i>Stenogyne kealiae</i>
Kauai 23— <i>Tetraplasandra flynnii</i> –f	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>
Kauai 24— <i>Astelia waialealae</i> –d	<i>Astelia waialealae</i>	<i>Astelia waialealae</i>
Kauai 24— <i>Chamaesyce remyi</i> var. <i>remyi</i> –q	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 24— <i>Dryopteris crinalis</i> var. <i>podosorus</i> –d	<i>Dryopteris crinalis</i> var. <i>podosorus</i>	<i>Dryopteris crinalis</i> var. <i>podosorus</i>
Kauai 24— <i>Dubautia kalalauensis</i> –d	<i>Dubautia kalalauensis</i>	<i>Dubautia kalalauensis</i>
Kauai 24— <i>Dubautia waialealae</i> –d	<i>Dubautia waialealae</i>	<i>Dubautia waialealae</i>
Kauai 24— <i>Geranium kauaiense</i> –d	<i>Geranium kauaiense</i>	<i>Geranium kauaiense</i>
Kauai 24— <i>Keysseria erici</i> –d	<i>Keysseria erici</i>	<i>Keysseria erici</i>
Kauai 24— <i>Keysseria helenae</i> –d	<i>Keysseria helenae</i>	<i>Keysseria helenae</i>
Kauai 24— <i>Labordia helleri</i> –l	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 24— <i>Labordia pumila</i> –d	<i>Labordia pumila</i>	<i>Labordia pumila</i>
Kauai 24— <i>Lysimachia daphnoides</i> –d	<i>Lysimachia daphnoides</i>	<i>Lysimachia daphnoides</i>
Kauai 24— <i>Melicope degeneri</i> –d	<i>Melicope degeneri</i>	<i>Melicope degeneri</i>
Kauai 24— <i>Melicope puberula</i> –g	<i>Melicope puberula</i>	<i>Melicope puberula</i>
Kauai 24— <i>Myrsine mezii</i> –g	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>

(CDLVI) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
Kauai 24— <i>Phyllostegia renovans</i> –g	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>
Kauai 24— <i>Platydesma rostrata</i> –q	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 24— <i>Psychotria grandiflora</i> –g	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
Kauai 24— <i>Tetraplasandra flynnii</i> –g	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>
Kauai 25— <i>Astelia waialealae</i> –e	<i>Astelia waialealae</i>	<i>Astelia waialealae</i>
Kauai 25— <i>Chamaesyce remyi</i> var. <i>remyi</i> –r	<i>Chamaesyce remyi</i> var. <i>remyi</i>	<i>Chamaesyce remyi</i> var. <i>remyi</i>
Kauai 25— <i>Dryopteris crinalis</i> var. <i>podosorus</i> –e	<i>Dryopteris crinalis</i> var. <i>podosorus</i>	<i>Dryopteris crinalis</i> var. <i>podosorus</i>
Kauai 25— <i>Dubautia kalalauensis</i> –e	<i>Dubautia kalalauensis</i>	<i>Dubautia kalalauensis</i>
Kauai 25— <i>Dubautia waialealae</i> –e	<i>Dubautia waialealae</i>	<i>Dubautia waialealae</i>
Kauai 25— <i>Geranium kauaiense</i> –e	<i>Geranium kauaiense</i>	<i>Geranium kauaiense</i>
Kauai 25— <i>Keysseria erici</i> –e	<i>Keysseria erici</i>	<i>Keysseria erici</i>
Kauai 25— <i>Keysseria helenae</i> –e	<i>Keysseria helenae</i>	<i>Keysseria helenae</i>
Kauai 25— <i>Labordia helleri</i> –m	<i>Labordia helleri</i>	<i>Labordia helleri</i>
Kauai 25— <i>Labordia pumila</i> –e	<i>Labordia pumila</i>	<i>Labordia pumila</i>
Kauai 25— <i>Lysimachia daphnoides</i> –e	<i>Lysimachia daphnoides</i>	<i>Lysimachia daphnoides</i>
Kauai 25— <i>Melicope degeneri</i> –e	<i>Melicope degeneri</i>	<i>Melicope degeneri</i>
Kauai 25— <i>Melicope puberula</i> –h	<i>Melicope puberula</i>	<i>Melicope puberula</i>
Kauai 25— <i>Myrsine mezii</i> –h	<i>Myrsine mezii</i>	<i>Myrsine mezii</i>
Kauai 25— <i>Phyllostegia renovans</i> –h	<i>Phyllostegia renovans</i>	<i>Phyllostegia renovans</i>
Kauai 25— <i>Platydesma rostrata</i> –r	<i>Platydesma rostrata</i>	<i>Platydesma rostrata</i>
Kauai 25— <i>Psychotria grandiflora</i> –h	<i>Psychotria grandiflora</i>	<i>Psychotria grandiflora</i>
Kauai 25— <i>Tetraplasandra flynnii</i> –h	<i>Tetraplasandra flynnii</i>	<i>Tetraplasandra flynnii</i>

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(b) \* \* \*

(1) \* \* \*

FAMILY AMARANATHACEAE:

*Charpentiera densiflora* (PAPALA)  
 Kauai 7—*Charpentiera densiflora*–a,  
 Kauai 10—*Charpentiera densiflora*–b,  
 Kauai 11—*Charpentiera densiflora*–c,  
 Kauai 11—*Charpentiera densiflora*–d,  
 and Kauai 21—*Charpentiera densiflora*–e,  
 identified in the legal descriptions in  
 paragraph (a)(1) of this section,  
 constitute critical habitat for  
*Charpentiera densiflora* on Kauai.

(i) In units Kauai 7—*Charpentiera densiflora*–a, and Kauai 11—*Charpentiera densiflora*–c, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Shallow soils, little to no herbaceous layer.

(D) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(E) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(F) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

(ii) In units Kauai 10—*Charpentiera densiflora*–b, Kauai 11—*Charpentiera densiflora*–d, and Kauai 21—*Charpentiera densiflora*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

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FAMILY ARALIACEAE:

*Tetraplasandra bisattenuata* (NCN)

Kauai 7—*Tetraplasandra bisattenuata*–a, Kauai 10—*Tetraplasandra bisattenuata*–b, Kauai 11—*Tetraplasandra bisattenuata*–c, Kauai 11—*Tetraplasandra bisattenuata*–d, and Kauai 21—*Tetraplasandra bisattenuata*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Tetraplasandra bisattenuata* on Kauai.

(i) In units Kauai 7—*Tetraplasandra bisattenuata*–a, and Kauai 11—*Tetraplasandra bisattenuata*–c, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Shallow soils, little to no herbaceous layer.

(D) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(E) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(F) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

(ii) In units Kauai 10–*Tetraplasandra bisattenuata*–b, Kauai 11–*Tetraplasandra bisattenuata*–d, and Kauai 21–*Tetraplasandra bisattenuata*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*.

#### FAMILY ARALIACEAE:

*Tetraplasandra flynnii* (NCN)

Kauai 10–*Tetraplasandra flynnii*–a, Kauai 11–*Tetraplasandra flynnii*–b, Kauai 11–*Tetraplasandra flynnii*–c, Kauai 18–*Tetraplasandra flynnii*–d, Kauai 22–*Tetraplasandra flynnii*–e, Kauai 23–*Tetraplasandra flynnii*–f, Kauai 24–*Tetraplasandra flynnii*–g, and Kauai 25–*Tetraplasandra flynnii*–h, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Tetraplasandra flynnii* on Kauai.

(i) In units Kauai 11–*Tetraplasandra flynnii*–c, Kauai 22–*Tetraplasandra flynnii*–e, and Kauai 23–*Tetraplasandra flynnii*–f, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(E) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(F) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

(ii) In units Kauai 10–*Tetraplasandra flynnii*–a, Kauai 11–*Tetraplasandra flynnii*–b, Kauai 18–*Tetraplasandra flynnii*–d, Kauai 24–*Tetraplasandra flynnii*–g, and Kauai 25–*Tetraplasandra flynnii*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

FAMILY ASTELIACEAE: *Astelia waialealae* (PAINIU)

Kauai 10–*Astelia waialealae*–a, Kauai 11–*Astelia waialealae*–b, Kauai 18–*Astelia waialealae*–c, Kauai 24–*Astelia waialealae*–d, and Kauai 25–*Astelia waialealae*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Astelia waialealae* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Hummocks in bogs.

FAMILY ASTERACEAE: *Dubautia imbricata* ssp. *imbricata* (NAENAE)

Kauai 10–*Dubautia imbricata* ssp. *imbricata*–a, Kauai 11–*Dubautia imbricata* ssp. *imbricata*–b, and Kauai 21–*Dubautia imbricata* ssp. *imbricata*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Dubautia imbricata* ssp. *imbricata* on Kauai.

Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(iv) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(v) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(vi) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

FAMILY ASTERACEAE: *Dubautia kalalauensis* (NAENAE)

Kauai 10–*Dubautia kalalauensis*–a, Kauai 11–*Dubautia kalalauensis*–b, Kauai 18–*Dubautia kalalauensis*–c, Kauai 24–*Dubautia kalalauensis*–d, and Kauai 25–*Dubautia kalalauensis*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Dubautia kalalauensis* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

FAMILY ASTERACEAE: *Dubautia kenwoodii* (NAENAE)

Kauai 7–*Dubautia kenwoodii*–a and Kauai 11–*Dubautia kenwoodii*–b, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Dubautia kenwoodii* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(iii) Substrate: Shallow soils, little to no herbaceous layer.

(iv) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(v) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(vi) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

\* \* \* \* \*

FAMILY ASTERACEAE: *Dubautia plantaginea* ssp. *magnifolia* (NAENAE)

Kauai 4–*Dubautia plantaginea* ssp. *magnifolia*–a, Kauai 10–*Dubautia plantaginea* ssp. *magnifolia*–b, Kauai 11–*Dubautia plantaginea* ssp. *magnifolia*–c, Kauai 19–*Dubautia plantaginea* ssp. *magnifolia*–d, and Kauai 20–*Dubautia plantaginea* ssp. *magnifolia*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Dubautia plantaginea* ssp. *magnifolia* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(iii) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(iv) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

\* \* \* \* \*

FAMILY ASTERACEAE: *Dubautia waialealae* (NAENAE)

Kauai 10–*Dubautia waialealae*–a, Kauai 11–*Dubautia waialealae*–b, Kauai 18–*Dubautia waialealae*–c, Kauai 24–*Dubautia waialealae*–d, and Kauai 25–*Dubautia waialealae*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Dubautia waialealae* on Kauai.

Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Bogs.

\* \* \* \* \*

FAMILY ASTERACEAE: *Keysseria erici* (NCN)

Kauai 10–*Keysseria erici*–a, Kauai 11–*Keysseria erici*–b, Kauai 18–*Keysseria erici*–c, Kauai 24–*Keysseria erici*–d, and Kauai 25–*Keysseria erici*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Keysseria erici* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Bogs.

FAMILY ASTERACEAE: *Keysseria helenae* (NCN)

Kauai 10–*Keysseria helenae*–a, Kauai 11–*Keysseria helenae*–b, Kauai 18–*Keysseria helenae*–c, Kauai 24–*Keysseria helenae*–d, and Kauai 25–*Keysseria helenae*–e, identified in the legal descriptions in paragraph (a)(1) of

this section, constitute critical habitat for *Keysseria helenae* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Bogs.

\* \* \* \* \*

FAMILY CAMPANULACEAE: *Cyanea dolichopoda* (HAHA)

Kauai 4–*Cyanea dolichopoda*–a, Kauai 10–*Cyanea dolichopoda*–b, Kauai 11–*Cyanea dolichopoda*–c, Kauai 19–*Cyanea dolichopoda*–d, and Kauai 20–*Cyanea dolichopoda*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Cyanea dolichopoda* on Kauai.

Within these units, the primary constituent elements of critical habitat are:

(i) Annual precipitation: Greater than 75 inches (190 centimeters).

(ii) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(iii) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(iv) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

FAMILY CAMPANULACEAE: *Cyanea eleleensis* (HAHA)

Kauai 10–*Cyanea eleleensis*–a, Kauai 11–*Cyanea eleleensis*–b, and Kauai 21–*Cyanea eleleensis*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Cyanea eleleensis* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(iv) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(v) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(vi) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

FAMILY CAMPANULACEAE: *Cyanea kolekoleensis* (HAHA)

Kauai 10–*Cyanea kolekoleensis*–a, Kauai 11–*Cyanea kolekoleensis*–b, and

Kauai 21–*Cyanea kolekoleensis*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Cyanea kolekoleensis* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(iv) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(v) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(vi) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

FAMILY CAMPANULACEAE: *Cyanea kuhihewa* (HAHA)

Kauai 10–*Cyanea kuhihewa*–a, Kauai 11–*Cyanea kuhihewa*–b, and Kauai 21–*Cyanea kuhihewa*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Cyanea kuhihewa* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(iv) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(v) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(vi) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

\* \* \* \* \*

FAMILY CARYOPHYLLACEAE: *Schiedea attenuata* (NCN)

Kauai 11–*Schiedea attenuata*–a, identified in the legal description in paragraph (a)(1) of this section, constitutes critical habitat for *Schiedea attenuata* on Kauai. Within this unit, the primary constituent elements of critical habitat are:

(i) Annual precipitation: Less than 75 inches (190 centimeters).

(ii) Substrate: Greater than 65 degree slope, rocky talus.

(iii) Subcanopy: *Antidesma*, *Chamaesyce*, *Diospyros*, *Dodonaea*.

(iv) Understory: *Bidens*, *Eragrostis*, *Melanthera*, *Schiedea*.

\* \* \* \* \*

FAMILY EUPHORBIACEAE: *Chamaesyce eleanoriae* (AKOKO)

Kauai 7–*Chamaesyce eleanoriae*–a, Kauai 11–*Chamaesyce eleanoriae*–b, and Kauai 11–*Chamaesyce eleanoriae*–c, identified in the legal descriptions in

paragraph (a)(1) of this section, constitute critical habitat for *Chamaesyce eleanoriae* on Kauai.

(i) In units Kauai 7–*Chamaesyce eleanoriae*–a and Kauai 11–*Chamaesyce eleanoriae*–b, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Shallow soils, little to no herbaceous layer.

(D) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(E) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(F) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

(ii) In unit Kauai 11–*Chamaesyce eleanoriae*–c, the primary constituent elements of critical habitat are:

(A) Annual precipitation: Less than 75 inches (190 centimeters).

(B) Substrate: Greater than 65 degree slope, rocky talus.

(C) Subcanopy: *Antidesma*, *Chamaesyce*, *Diospyros*, *Dodonaea*.

(D) Understory: *Bidens*, *Eragrostis*, *Melanthera*, *Schiedea*.

\* \* \* \* \*

#### FAMILY EUPHORBIACEAE:

*Chamaesyce remyi* var. *kauaiensis* (AKOKO)

Kauai 4–*Chamaesyce remyi* var. *kauaiensis*–a, Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–b, Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–c, Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–d, Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–e, Kauai 19–*Chamaesyce remyi* var. *kauaiensis*–f, Kauai 20–*Chamaesyce remyi* var. *kauaiensis*–g, and Kauai 21–*Chamaesyce remyi* var. *kauaiensis*–h, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Chamaesyce remyi* var. *kauaiensis* on Kauai.

(i) In units Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–b, Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–d, and Kauai 21–*Chamaesyce remyi* var. *kauaiensis*–h, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

(ii) In units Kauai 4–*Chamaesyce remyi* var. *kauaiensis*–a, Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–c, Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–e, Kauai 19–*Chamaesyce remyi* var. *kauaiensis*–f, and Kauai 20–*Chamaesyce remyi* var. *kauaiensis*–g, the primary constituent elements of critical habitat are:

(A) Annual precipitation: Greater than 75 inches (190 centimeters).

(B) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(C) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(D) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

#### FAMILY EUPHORBIACEAE:

*Chamaesyce remyi* var. *remyi* (AKOKO)

Kauai 4–*Chamaesyce remyi* var. *remyi*–a, Kauai 7–*Chamaesyce remyi* var. *remyi*–b, Kauai 10–*Chamaesyce remyi* var. *remyi*–c, Kauai 10–*Chamaesyce remyi* var. *remyi*–d, Kauai 10–*Chamaesyce remyi* var. *remyi*–e, Kauai 11–*Chamaesyce remyi* var. *remyi*–f, Kauai 11–*Chamaesyce remyi* var. *remyi*–g, Kauai 11–*Chamaesyce remyi* var. *remyi*–h, Kauai 11–*Chamaesyce remyi* var. *remyi*–i, Kauai 11–*Chamaesyce remyi* var. *remyi*–j, Kauai 18–*Chamaesyce remyi* var. *remyi*–k, Kauai 19–*Chamaesyce remyi* var. *remyi*–l, Kauai 20–*Chamaesyce remyi* var. *remyi*–m, Kauai 21–*Chamaesyce remyi* var. *remyi*–n, Kauai 22–*Chamaesyce remyi* var. *remyi*–o, Kauai 23–*Chamaesyce remyi* var. *remyi*–p, Kauai 24–*Chamaesyce remyi* var. *remyi*–q, and Kauai 25–*Chamaesyce remyi* var. *remyi*–r, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Chamaesyce remyi* var. *remyi* on Kauai.

(i) In units Kauai 7–*Chamaesyce remyi* var. *remyi*–b and Kauai 11–*Chamaesyce remyi* var. *remyi*–g, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Shallow soils, little to no herbaceous layer.

(D) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(E) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(F) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

(ii) In units Kauai 10–*Chamaesyce remyi* var. *remyi*–d, Kauai 11–*Chamaesyce remyi* var. *remyi*–h, and Kauai 21–*Chamaesyce remyi* var. *remyi*–n, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

(iii) In units Kauai 11–*Chamaesyce remyi* var. *remyi*–j, Kauai 22–*Chamaesyce remyi* var. *remyi*–o, and Kauai 23–*Chamaesyce remyi* var. *remyi*–p, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(E) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(F) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

(iv) In units Kauai 10–*Chamaesyce remyi* var. *remyi*–c, Kauai 11–*Chamaesyce remyi* var. *remyi*–f, Kauai 18–*Chamaesyce remyi* var. *remyi*–k, Kauai 24–*Chamaesyce remyi* var. *remyi*–q, and Kauai 25–*Chamaesyce remyi* var. *remyi*–r, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(v) In units Kauai 4–*Chamaesyce remyi* var. *remyi*–a, Kauai 10–*Chamaesyce remyi* var. *remyi*–e, Kauai 11–*Chamaesyce remyi* var. *remyi*–i, Kauai 19–*Chamaesyce remyi* var. *remyi*–l, and Kauai 20–*Chamaesyce remyi* var. *remyi*–m, the primary constituent elements of critical habitat are:

(A) Annual precipitation: Greater than 75 inches (190 centimeters).

(B) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(C) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(D) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

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FAMILY FABACEAE: *Canavalia napaliensis* (AWIKIWIKI)

Kauai 7–*Canavalia napaliensis*–a and Kauai 11–*Canavalia napaliensis*–b, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Canavalia napaliensis* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(iii) Substrate: Shallow soils, little to no herbaceous layer.

(iv) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(v) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(vi) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

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FAMILY GERANIACEAE: *Geranium kauaiense* (NOHOANU)

Kauai 10–*Geranium kauaiense*–a, Kauai 11–*Geranium kauaiense*–b, Kauai 18–*Geranium kauaiense*–c, Kauai 24–*Geranium kauaiense*–d, and Kauai 25–*Geranium kauaiense*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Geranium kauaiense* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Bogs.

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FAMILY GESNERIACEAE: *Cyrtandra oenobarba* (HAIWALE)

Kauai 4–*Cyrtandra oenobarba*–a, Kauai 10–*Cyrtandra oenobarba*–b,

Kauai 10–*Cyrtandra oenobarba*–c, Kauai 11–*Cyrtandra oenobarba*–d, Kauai 11–*Cyrtandra oenobarba*–e, Kauai 19–*Cyrtandra oenobarba*–f, Kauai 20–*Cyrtandra oenobarba*–g, and Kauai 21–*Cyrtandra oenobarba*–h, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Cyrtandra oenobarba* on Kauai.

(i) In units Kauai 10–*Cyrtandra oenobarba*–b, Kauai 11–*Cyrtandra oenobarba*–d, and Kauai 21–*Cyrtandra oenobarba*–h, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

(ii) In units Kauai 4–*Cyrtandra oenobarba*–a, Kauai 10–*Cyrtandra oenobarba*–c, Kauai 11–*Cyrtandra oenobarba*–e, Kauai 19–*Cyrtandra oenobarba*–f, and Kauai 20–*Cyrtandra oenobarba*–g, the primary constituent elements of critical habitat are:

(A) Annual precipitation: Greater than 75 inches (190 centimeters).

(B) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(C) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(D) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

FAMILY GESNERIACEAE: *Cyrtandra paliku* (HAIWALE)

Kauai 4–*Cyrtandra paliku*–a, Kauai 10–*Cyrtandra paliku*–b, Kauai 11–*Cyrtandra paliku*–c, Kauai 19–*Cyrtandra paliku*–d, and Kauai 20–*Cyrtandra paliku*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Cyrtandra paliku* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Annual precipitation: Greater than 75 inches (190 centimeters).

(ii) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(iii) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(iv) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

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FAMILY LAMIACEAE: *Phyllostegia renovans* (NCN)

Kauai 10–*Phyllostegia renovans*–a, Kauai 10–*Phyllostegia renovans*–b, Kauai 11–*Phyllostegia renovans*–c, Kauai 11–*Phyllostegia renovans*–d, Kauai 18–*Phyllostegia renovans*–e, Kauai 21–*Phyllostegia renovans*–f, Kauai 24–*Phyllostegia renovans*–g, and Kauai 25–*Phyllostegia renovans*–h, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Phyllostegia renovans* on Kauai.

(i) In units Kauai 10–*Phyllostegia renovans*–b, Kauai 11–*Phyllostegia renovans*–d, and Kauai 21–*Phyllostegia renovans*–f, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

(ii) In units Kauai 10–*Phyllostegia renovans*–a, Kauai 11–*Phyllostegia renovans*–c, Kauai 18–*Phyllostegia renovans*–e, Kauai 24–*Phyllostegia renovans*–g, and Kauai 25–*Phyllostegia renovans*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

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FAMILY LAMIACEAE: *Stenogyne kealiae* (NCN)

Kauai 10–*Stenogyne kealiae*–a, Kauai 11–*Stenogyne kealiae*–b, Kauai 11–*Stenogyne kealiae*–c, Kauai 11–*Stenogyne kealiae*–d, Kauai 21–*Stenogyne kealiae*–e, Kauai 22–*Stenogyne kealiae*–f, and Kauai 23–*Stenogyne kealiae*–g, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Stenogyne kealiae* on Kauai.

(i) In units Kauai 10–*Stenogyne kealiae*–a, Kauai 11–*Stenogyne kealiae*–c, and Kauai 21–*Stenogyne kealiae*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

(ii) In units Kauai 11–*Stenogyne kealiae*–d, Kauai 22–*Stenogyne kealiae*–f, and Kauai 23–*Stenogyne kealiae*–g, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(E) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(F) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

(iii) In unit Kauai 11–*Stenogyne kealiae*–b, the primary constituent elements of critical habitat are:

(A) Annual precipitation: Less than 75 inches (190 centimeters).

(B) Substrate: Greater than 65 degree slope, rocky talus.

(C) Subcanopy: *Antidesma*, *Chamaesyce*, *Diospyros*, *Dodonaea*.

(D) Understory: *Bidens*, *Eragrostis*, *Melanthera*, *Schiedea*.

FAMILY LOGANIACEAE: *Labordia helleri* (KAMAKAHALA)

Kauai 7–*Labordia helleri*–a, Kauai 10–*Labordia helleri*–b, Kauai 10–*Labordia helleri*–c, Kauai 11–*Labordia helleri*–d, Kauai 11–*Labordia helleri*–e, Kauai 11–*Labordia helleri*–f, Kauai 11–*Labordia helleri*–g, Kauai 18–*Labordia helleri*–h, Kauai 21–*Labordia helleri*–i, Kauai 22–*Labordia helleri*–j, Kauai 23–*Labordia helleri*–k, Kauai 24–*Labordia helleri*–l, and Kauai 25–*Labordia helleri*–m, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Labordia helleri* on Kauai.

(i) In units Kauai 7–*Labordia helleri*–a and Kauai 11–*Labordia helleri*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Shallow soils, little to no herbaceous layer.

(D) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(E) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(F) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

(ii) In units Kauai 10–*Labordia helleri*–c, Kauai 11–*Labordia helleri*–f, and Kauai 21–*Labordia helleri*–i, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

(iii) In units Kauai 11–*Labordia helleri*–g, Kauai 22–*Labordia helleri*–j, and Kauai 23–*Labordia helleri*–k, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(E) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(F) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

(iv) In units Kauai 10–*Labordia helleri*–b, Kauai 11–*Labordia helleri*–d, Kauai 18–*Labordia helleri*–h, Kauai 24–*Labordia helleri*–l, and Kauai 25–*Labordia helleri*–m, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

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FAMILY LOGANIACEAE: *Labordia pumila* (KAMAKAHALA)

Kauai 10–*Labordia pumila*–a, Kauai 11–*Labordia pumila*–b, Kauai 18–*Labordia pumila*–c, Kauai 24–*Labordia pumila*–d, and Kauai 25–*Labordia pumila*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Labordia pumila* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Bogs.

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FAMILY MYRSINACEAE: *Lysimachia daphnoides* (LEHUA MAKANOE)

Kauai 10–*Lysimachia daphnoides*–a, Kauai 11–*Lysimachia daphnoides*–b, Kauai 18–*Lysimachia daphnoides*–c, Kauai 24–*Lysimachia daphnoides*–d, and Kauai 25–*Lysimachia daphnoides*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Lysimachia daphnoides* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

(vii) Bogs.

FAMILY MYRSINACEAE: *Lysimachia iniki* (NCN)

Kauai 4–*Lysimachia iniki*–a, Kauai 10–*Lysimachia iniki*–b, Kauai 11–*Lysimachia iniki*–c, Kauai 19–*Lysimachia iniki*–d, and Kauai 20–*Lysimachia iniki*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Lysimachia iniki* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Annual precipitation: Greater than 75 inches (190 centimeters).

(ii) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(iii) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(iv) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

FAMILY MYRSINACEAE: *Lysimachia pendens* (NCN)

Kauai 4–*Lysimachia pendens*–a, Kauai 10–*Lysimachia pendens*–b, Kauai 11–*Lysimachia pendens*–c, Kauai 19–*Lysimachia pendens*–d, and Kauai 20–*Lysimachia pendens*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Lysimachia pendens* on Kauai.

Within these units, the primary constituent elements of critical habitat are:

(i) Annual precipitation: Greater than 75 inches (190 centimeters).

(ii) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(iii) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(iv) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

FAMILY MYRSINACEAE: *Lysimachia scopulensis* (NCN)

Kauai 11–*Lysimachia scopulensis*–a, identified in the legal description in paragraph (a)(1) of this section, constitutes critical habitat for *Lysimachia scopulensis* on Kauai. Within this unit, the primary constituent elements of critical habitat are:

(i) Annual precipitation: Less than 75 inches (190 centimeters).

(ii) Substrate: Greater than 65 degree slope, rocky talus.

(iii) Subcanopy: *Antidesma*, *Chamaesyce*, *Diospyros*, *Dodonaea*.

(iv) Understory: *Bidens*, *Eragrostis*, *Melanthera*, *Schiedea*.

FAMILY MYRSINACEAE: *Lysimachia venosa* (NCN)

Kauai 4–*Lysimachia venosa*–a, Kauai 10–*Lysimachia venosa*–b, Kauai 11–*Lysimachia venosa*–c, Kauai 19–*Lysimachia venosa*–d, and Kauai 20–*Lysimachia venosa*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Lysimachia venosa* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Annual precipitation: Greater than 75 inches (190 centimeters).

(ii) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(iii) Subcanopy: *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros*.

(iv) Understory: Ferns, Bryophytes, *Coprosoma*, *Dubautia*, *Hedyotis*, *Peperomia*.

FAMILY MYRSINACEAE: *Myrsine knudsenii* (KOLEA)

Kauai 11–*Myrsine knudsenii*–a, Kauai 22–*Myrsine knudsenii*–b, and Kauai 23–*Myrsine knudsenii*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Myrsine knudsenii* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(iii) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(iv) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(v) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(vi) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

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FAMILY MYRSINACEAE: *Myrsine mezii* (KOLEA)

Kauai 10–*Myrsine mezii*–a, Kauai 11–*Myrsine mezii*–b, Kauai 11–*Myrsine mezii*–c, Kauai 18–*Myrsine mezii*–d, Kauai 22–*Myrsine mezii*–e, Kauai 23–*Myrsine mezii*–f, Kauai 24–*Myrsine mezii*–g, and Kauai 25–*Myrsine mezii*–h, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Myrsine mezii* on Kauai.

(i) In units Kauai 11–*Myrsine mezii*–c, Kauai 22–*Myrsine mezii*–e, and Kauai 23–*Myrsine mezii*–f, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(E) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(F) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

(ii) In units Kauai 10–*Myrsine mezii*–a, Kauai 11–*Myrsine mezii*–b, Kauai 18–*Myrsine mezii*–d, Kauai 24–*Myrsine mezii*–g, and Kauai 25–*Myrsine mezii*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

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FAMILY PITTOSPORACEAE: *Pittosporum napaliense* (HOAWA)

Kauai 7–*Pittosporum napaliense*–a and Kauai 11–*Pittosporum napaliense*–b, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Pittosporum napaliense* on Kauai.

Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(iii) Substrate: Shallow soils, little to no herbaceous layer.

(iv) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(v) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(vi) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

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FAMILY RUBIACEAE: *Psychotria grandiflora* (KOPIKO)

Kauai 10–*Psychotria grandiflora*–a, Kauai 11–*Psychotria grandiflora*–b, Kauai 11–*Psychotria grandiflora*–c, Kauai 18–*Psychotria grandiflora*–d, Kauai 22–*Psychotria grandiflora*–e, Kauai 23–*Psychotria grandiflora*–f, Kauai 24–*Psychotria grandiflora*–g, and Kauai 25–*Psychotria grandiflora*–h, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Psychotria grandiflora* on Kauai.

(i) In units Kauai 11–*Psychotria grandiflora*–c, Kauai 22–*Psychotria grandiflora*–e, and Kauai 23–*Psychotria grandiflora*–f, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum*.

(E) Subcanopy: *Cheirodendron*, *Coprosma*, *Hedyotis*, *Ilex*, *Myoporum*, *Myrsine*.

(F) Understory: *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora*.

(ii) In units Kauai 10–*Psychotria grandiflora*–a, Kauai 11–*Psychotria grandiflora*–b, Kauai 18–*Psychotria grandiflora*–d, Kauai 24–*Psychotria grandiflora*–g, and Kauai 25–*Psychotria grandiflora*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

FAMILY RUBIACEAE: *Psychotria hobdyi* (KOPIKO)

Kauai 7–*Psychotria hobdyi*–a and Kauai 11–*Psychotria hobdyi*–b, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Psychotria hobdyi* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(iii) Substrate: Shallow soils, little to no herbaceous layer.

(iv) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(v) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(vi) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

FAMILY RUTACEAE: *Melicope degeneri* (ALANI)

Kauai 10–*Melicope degeneri*–a, Kauai 11–*Melicope degeneri*–b, Kauai 18–*Melicope degeneri*–c, Kauai 24–*Melicope degeneri*–d, and Kauai 25–*Melicope degeneri*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Melicope degeneri* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(v) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(vi) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

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FAMILY RUTACEAE: *Melicope paniculata* (ALANI)

Kauai 10–*Melicope paniculata*–a, Kauai 11–*Melicope paniculata*–b, and Kauai 21–*Melicope paniculata*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Melicope paniculata* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(iv) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(v) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(vi) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

FAMILY RUTACEAE: *Melicope puberula* (ALANI)

Kauai 10–*Melicope puberula*–a, Kauai 10–*Melicope puberula*–b, Kauai 11–*Melicope puberula*–c, Kauai 11–*Melicope puberula*–d, Kauai 18–*Melicope puberula*–e, Kauai 21–*Melicope puberula*–f, Kauai 24–*Melicope puberula*–g, and Kauai 25–*Melicope puberula*–h, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Melicope puberula* on Kauai.

(i) In units Kauai 10–*Melicope puberula*–b, Kauai 11–*Melicope puberula*–d, and Kauai 21–*Melicope puberula*–f, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*.

(ii) In units Kauai 10–*Melicope puberula*–a, Kauai 11–*Melicope puberula*–c, Kauai 18–*Melicope puberula*–e, Kauai 24–*Melicope puberula*–g, and Kauai 25–*Melicope puberula*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros*.

(E) Subcanopy: *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine*.

(F) Understory: Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium*.

FAMILY RUTACEAE: *Platydesma rostrata* (PILO KEA LAU)

Kauai 4–*Platydesma rostrata*–a, Kauai 7–*Platydesma rostrata*–b, Kauai 10–*Platydesma rostrata*–c, Kauai 10–*Platydesma rostrata*–d, Kauai 10–*Platydesma rostrata*–e, Kauai 11–*Platydesma rostrata*–f, Kauai 11–*Platydesma rostrata*–g, Kauai 11–*Platydesma rostrata*–h, Kauai 11–*Platydesma rostrata*–i, Kauai 11–*Platydesma rostrata*–j, Kauai 18–*Platydesma rostrata*–k, Kauai 19–*Platydesma rostrata*–l, Kauai 20–*Platydesma rostrata*–m, Kauai 21–*Platydesma rostrata*–n, Kauai 22–*Platydesma rostrata*–o, Kauai 23–*Platydesma rostrata*–p, Kauai 24–*Platydesma rostrata*–q, and Kauai 25–*Platydesma rostrata*–r, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Platydesma rostrata* on Kauai.

(i) In units Kauai 7–*Platydesma rostrata*–b and Kauai 11–*Platydesma rostrata*–g, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Shallow soils, little to no herbaceous layer.

(D) Canopy: *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum*.

(E) Subcanopy: *Dodonaea*, *Freycinetia*, *Leptecophylla*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax*.

(F) Understory: *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia*.

(ii) In units Kauai 10–*Platydesma rostrata*–d, Kauai 11–*Platydesma rostrata*–h, and Kauai 21–*Platydesma rostrata*–n, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (1,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Clays, ashbeds, deep well-drained soils, lowland bogs.

(D) Canopy: *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria*.

(E) Subcanopy: *Cibotium*, *Claoxylon*, *Hedyotis*, *Melicope*.

(F) Understory: *Alyxia, Cyrtandra, Dicranopteris, Diplazium, Machaerina, Microlepia.*

(iii) In units Kauai 11–*Platydesma rostrata*–j, Kauai 22–*Platydesma rostrata*–o, and Kauai 23–*Platydesma rostrata*–p, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(C) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(D) Canopy: *Acacia, Metrosideros, Psychotria, Tetraplasandra, Zanthoxylum.*

(E) Subcanopy: *Cheirodendron, Coprosma, Hedyotis, Ilex, Myoporum, Myrsine.*

(F) Understory: *Bidens, Dryopteris, Leptecophylla, Poa, Scaevola, Sophora.*

(iv) In units Kauai 10–*Platydesma rostrata*–c, Kauai 11–*Platydesma rostrata*–f, Kauai 18–*Platydesma rostrata*–k, Kauai 24–*Platydesma rostrata*–q, and Kauai 25–*Platydesma rostrata*–r, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(B) Annual precipitation: Greater than 75 inches (190 centimeters).

(C) Substrate: Well-developed soils, montane bogs.

(D) Canopy: *Acacia, Charpentiera, Cheirodendron, Metrosideros.*

(E) Subcanopy: *Broussaisia, Cibotium, Eurya, Ilex, Myrsine.*

(F) Understory: Ferns, *Carex, Coprosma, Leptecophylla, Oreobolus, Rhynchospora, Vaccinium.*

(v) In units Kauai 4–*Platydesma rostrata*–a, Kauai 10–*Platydesma rostrata*–e, Kauai 11–*Platydesma rostrata*–i, Kauai 19–*Platydesma rostrata*–l, and Kauai 20–*Platydesma rostrata*–m, the primary constituent elements of critical habitat are:

(A) Annual precipitation: Greater than 75 inches (190 centimeters).

(B) Substrate: Greater than 65 degree slope, shallow soils, weathered lava.

(C) Subcanopy: *Broussaisia, Cheirodendron, Leptecophylla, Metrosideros.*

(D) Understory: Ferns, Bryophytes, *Coprosoma, Dubautia, Hedyotis, Peperomia.*

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FAMILY ASPLENIACEAE: *Diellia mannii* (NCN)

Kauai 11–*Diellia mannii*–a, Kauai 22–*Diellia mannii*–b, and Kauai 23–*Diellia mannii*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Diellia mannii* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(iii) Substrate: Weathered aa lava flows, rocky mucks, thin silty loams, deep volcanic ash soils.

(iv) Canopy: *Acacia, Metrosideros, Psychotria, Tetraplasandra, Zanthoxylum.*

(v) Subcanopy: *Cheirodendron, Coprosma, Hedyotis, Ilex, Myoporum, Myrsine.*

(vi) Understory: *Bidens, Dryopteris, Leptecophylla, Poa, Scaevola, Sophora.*

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FAMILY DRYOPTERIDACEAE: *Dryopteris crinalis* var. *podosorus* (PALAPALAI AUMAKUA)

Kauai 10–*Dryopteris crinalis* var. *podosorus*–a, Kauai 11–*Dryopteris crinalis* var. *podosorus*–b, Kauai 18–*Dryopteris crinalis* var. *podosorus*–c, Kauai 24–*Dryopteris crinalis* var. *podosorus*–d, and Kauai 25–*Dryopteris crinalis* var. *podosorus*–e, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Dryopteris crinalis* var. *podosorus* on Kauai. Within these units, the primary

constituent elements of critical habitat are:

(i) Elevation: 3,000 to 6,600 ft (1,000 to 2,000 m).

(ii) Annual precipitation: Greater than 75 inches (190 centimeters).

(iii) Substrate: Well-developed soils, montane bogs.

(iv) Canopy: *Acacia, Charpentiera, Cheirodendron, Metrosideros.*

(v) Subcanopy: *Broussaisia, Cibotium, Eurya, Ilex, Myrsine.*

(vi) Understory: Ferns, *Carex, Coprosma, Leptecophylla, Oreobolus, Rhynchospora, Vaccinium.*

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FAMILY PTERIDACEAE: *Doryopteris angelica* (NCN)

Kauai 7–*Doryopteris angelica*–a and Kauai 11–*Doryopteris angelica*–b, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Doryopteris angelica* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (1,000 m).

(ii) Annual precipitation: 50 to 75 inches (127 to 190 centimeters).

(iii) Substrate: Shallow soils, little to no herbaceous layer.

(iv) Canopy: *Acacia, Diospyros, Metrosideros, Myrsine, Pouteria, Santalum.*

(v) Subcanopy: *Dodonaea, Freycinetia, Leptecophylla, Melanthera, Osteomeles, Pleomele, Psydrax.*

(vi) Understory: *Carex, Dicranopteris, Diplazium, Elaphoglossum, Peperomia.*

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Dated: September 12, 2008

**Lyle Laverty,**

*Assistant Secretary for Fish and Wildlife and Parks*

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