**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

**[FWS–R1–ES–2008–0046]**
**[MO 92210–0–0008]**

**RIN 1018–AV48**

# Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for 48 Species on Kauai and Designation of Critical Habitat

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), determine endangered status for 48 species on the island of Kauai in the Hawaiian Islands under the Endangered Species Act of 1973, as amended (Act). We also designate 26,582 acres (ac) (10,757 hectares (ha)) of critical habitat for 47 of these species. The critical habitat is located in Kauai County, Hawaii. Critical habitat designation was determined to be not prudent for one species, *Pritchardia hardyi* (a palm), which is threatened by over collection and vandalism.

**DATES:** This rule becomes effective on May 13, 2010.

**ADDRESSES:** This final rule and economic impact analysis are available on the Internet at *http://www.regulations.gov*. Comments and materials received, as well as supporting documentation used in preparing this final are available for public inspection, by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, 300 Ala Moana Boulevard, Box 50088, Honolulu, HI 96850; telephone 808-792-9400; facsimile 808-792-9581.

**FOR FURTHER INFORMATION CONTACT:** Loyal Mehrhoff, Field Supervisor, Pacific Islands Fish and Wildlife Office (see **ADDRESSES** section). If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800-877-8339.

**SUPPLEMENTARY INFORMATION:** This document consists of: (1) a final rule to list 48 species as endangered; and (2) a final critical habitat designation for 47 species.

## Previous Federal Action

Thirty-one of the Kauai species in this final rule were previously candidate species. Candidate species are those taxa for which the Service has sufficient information on their biological status and threats to list as endangered or threatened under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq.*), but for which the development of a listing regulation has been precluded to date by other higher priority listing activities.

The candidates addressed in this final listing rule include the plants *Astelia waialealae* (painiu), *Canavalia napaliensis* (awikiwiki), *Chamaesyce eleanoriae* (akoko), *Chamaesyce remyi* var. *kauaiensis* (akoko), *Chamaesyce remyi* var. *remyi* (akoko), *Charpentiera densiflora* (papala), *Cyanea eleeleensis* (haha), *Cyanea kuhihewa* (also haha), *Cyrtandra oenobarba* (hiiwale), *Dubautia imbricata* subspecies (ssp). *imbricata* (naenae), *Dubautia plantaginea* ssp. *magnifolia* (also naenae), *Dubautia waialealae* (naenae), *Geranium kauaiense* (nohoanu), *Keysseria erici* (no common name (ncn)), *Keysseria helenae* (ncn), *Labordia helleri* (kamakahala), *Labordia pumila* (also kamakahala), *Lysimachia daphnoides* (lehua makanoe), *Melicope degeneri* (alani), *Melicope paniculata* (also alani), *Melicope puberula* (alani), *Myrsine mezii* (kolea), *Pittosporum napaliense* (hoawa), *Platydesma rostrata* (pilo kea lau li i), *Pritchardia hardyi* (loulu), *Psychotria grandiflora* (kopiko), *Psychotria hobdyi* (kopiko), *Schiedea attenuata* (ncn), and *Stenogyne kealiae* (ncn); the bird, akikiki (*Oreomystis bairdi*); and the picture-wing fly, *Drosophila attigua* (now *D. sharpi*, see explanation under "Description of the 48 Species" below).

The candidate status of all of these species was most recently assessed and reaffirmed in the December 10, 2008, Notice of Review of Native Species that are Candidates or Proposed for Listing as Threatened or Endangered (CNOR) (73 FR 75176, December 10, 2008).

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 CNORs dated May 11, 2005 (70 FR 24870), September 12, 2006 (71 FR 53756), December 6, 2007 (72 FR 69033), and December 10, 2008 (73 FR 75176).

On October 11, 2007, we received a petition from Dr. Eric VanderWerf and the American Bird Conservancy to list the akikiki and the akekee (*Loxops caeruleirostris*) 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; are undergoing rapid population and range declines; and 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 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 (59 FR 58982, November 15, 1994). The proposed rule (73 FR 62592, October 21, 2008) and this final designation constitute our response to the October 11, 2007, petition.

In addition to the 31 candidate species and the akekee, we are listing and designating critical habitat for 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 have been identified by the multiagency (Federal, State, and private) Plant Extinction Prevention (PEP) program as being among the rarest of the rare Hawaiian plant species, and in need of immediate conservation. The goal of this program is to prevent the extinction of native plant species with fewer than 50 individuals remaining in the wild on the islands of Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii 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 below ("Description of the 48 Species" and "Summary of Factors Affecting the

Species"). Since these species occur within the same 6 ecosystems and share common threats with the other 32 species, we have included them here in an effort to provide them with Federal protection in an expeditious manner.

On October 21, 2008, we published a proposed rule to list these 48 species as endangered throughout their ranges, and to designate critical habitat for 47 of these species (73 FR 62592). The comment period for that proposal opened on October 21, 2008, and closed on December 22, 2008.

## 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 final 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 threat factors that require similar management actions to reduce or eliminate those threats. 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 final 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 are listing 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 final rule, but is not applicable to any of the other species in this final rule. 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: *Canavalia napaliensis*, *Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Doryopteris angelica*, *Dubautia kenwoodii*, *Labordia helleri*, *Pittosporum napaliense*, *Platydesma rostrata*, *Psychotria hobdyi*, *Tetraplasandra bisattenuata* |
| Lowland Wet | Plants: *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Charpentiera densiflora*, *Cyanea eleeleensis*, *Cyanea kolekoleensis*, *Cyanea kuhihewa*, *Cyrtandra oenobarba*, *Dubautia imbricata* ssp. *imbricata*, *Labordia helleri*, *Melicope paniculata*, *Melicope puberula*, *Phyllostegia renovans*, *Platydesma rostrata*, *Pritchardia hardyi*, *Stenogyne kealiae*, *Tetraplasandra bisattenuata*, *Tetraplasandra flynii* |
| Montane Mesic | Plants: *Chamaesyce remyi* var. *remyi*, *Diellia mannii*, *Labordia helleri*, *Myrsine knudsenii*, *Myrsine mezii*, *Platydesma rostrata*, *Psychotria grandiflora*, *Stenogyne kealiae*, *Tetraplasandra flynnii* Animals: Akekee, Akikiki, *Drosophila sharpi* |
| Montane Wet | Plants: *Astelia waialealae*, *Chamaesyce remyi* var. *remyi*, *Dryopteris crinalis* var. *podosorus*, *Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici*, *Keysseria helenae*, *Labordia helleri*, *Labordia pumila*, *Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Myrsine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, *Tetraplasandra flynnii* Animals: Akekee, Akikiki, *Drosophila sharpi* |
| Dry Cliff | Plants: *Chamaesyce eleanoriae*, *Lysimachia scopulensis*, *Schiedea attenuata*, *Stenogyne kealiae* |
| Wet Cliff | Plants: *Chamaesyce remyi* var. *kauaiensis*, *Chamaesyce remyi* var. *remyi*, *Cyanea dolichopoda*, *Cyrtandra oenobarba*, *Cyrtandra paliku*, *Dubautia plantaginea* ssp. *magnifolia*, *Lysimachia iniki*, *Lysimachia pendens*, *Lysimachia venosa*, *Platydesma rostrata*, *Pritchardia hardyi* |

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 designating 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 final 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 because it provides the physical and biological features necessary for the expansion of populations in the wild. All of the areas designated constitute critical habitat for multiple species, based upon the species' shared habitat requirements. The identification of critical habitat also takes into account any species-specific physical and biological features necessary for the conservation of that species as appropriate. For example, the presence of specific host plants for larval development is essential for the conservation of the picture-wing fly *Drosophila sharpi*, 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 endangered and threatened species in Hawaii, which focused on discrete areas occupied by the species at the time of listing. Because Hawaii has 330 species listed under the Act, the previous approach to critical habitat designations resulted in an overlapping 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 and a designation limited to its present range would be inadequate to ensure the conservation of the species (50 CFR 424.12 (e)).

We believe the approach adopted in this final 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 features essential to the conservation of the species 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 incised 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 incised 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 (914 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. These characteristics include fertility, climate zone, degree of weathering, composition and arrangement of horizons (soil layers), and the soil's developmental history. Eleven of the 12 described soil orders have been reported 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 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 final 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 (914 m) elevation, that receive between 50 and 75 in (127 and 191 cm) of 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 final rule are reported from this ecosystem (Hawaii Biodiversity and Mapping Program (HBMP) 2007; The Nature Conservancy of Hawaii (TNCH) 2007).

Lowland Wet

The lowland wet ecological system is generally found below 3,000 ft (914 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) of 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 Waialealae and Alakai (TNC 2006c). According to TNC, biological diversity is high in this system (TNC 2006c), and 17 of the 48 species included in this final 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 6,600 ft (914 and 2,012 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. The upper elevation for the montane mesic system on Kauai is constrained by the maximum elevation on the island (5,243 ft (1,598 m)). Biological diversity is ranked as moderate in the montane mesic system, according to TNC (TNC 2006e), and 12 of the 48 species included in this final 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 6,600 ft (914 and 2,012 m) and in areas where annual precipitation is greater than 75 in (191 cm) (TNC 2006f). The upper elevation for the montane wet system on Kauai is constrained by the maximum elevation on the island (5,243 ft (1,598 m)). 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 final 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 final rule are reported from this ecosystem (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 final 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, 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. 1461; TNCH 2007). *Astelia waialealae* was known historically from five locations in the Alakai Swamp region of Kauai (Wagner *et al.* 1999, p. 1461; 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 Sincock Bog 1, contained 3 *Astelia* clumps with 3 individuals in one, 5 in another, and possibly 10 in the third, for a total of 18 individuals.

Sincock 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 Sincock Bog 1 and Sincock 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 Sincock Bog 1, and 2 clumps (7 individuals) for Sincock 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. Currently, there are 16 individuals, possibly representing 6 genetically distinct plants (Service 2005a; Wood 2006, pp. 8–9; USFWS Kauai monitoring database 2008; Wood 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). *Canavalia 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 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). *Chamaesyce eleanoriae* was historically known from 10 populations totaling fewer than 500 individuals (K. Wood 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 2007).

*Cyanea eleeleensis* (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 Eleele, 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 (off site) 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 observed 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 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 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, which 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; however, this species is no longer in storage or 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; D. Burney, NTBG, pers. comm. 2009). Much of the suitable habitat (*Metrosideros* lowland wet forest) for this species on Kauai has not been surveyed.

*Cyrtandra oenobarba* (haiwale) is a subshrub (a low-growing 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). *Cyrtandra 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). *Cyrtandra 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 (S. Perlman 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) (Aguraiuja and Wood 2003, p. 155; HBMP 2007; TNCH 2007). *Diellia 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 (Aguraiuja 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–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; S. Perlman 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 2007a). 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 2007a).

*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 Wahaiawa 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). This individual was not observed after Hurricane Iniki, and may possibly be extirpated; however, more individuals may be found in future surveys (D. Burney, NTBG, pers. comm. 2009).

*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 (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 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 3 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, and 3 individuals at the Waialeale Summit Bog (K. Wood 1994b; S. Perlman, pers. comm. 1999b; Wood 2006, p. 10; HBMP 2007; Wood 2008).

*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-Kawaikini 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-Kahuamoa (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 Namolakama (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 on hummocks, 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, and currently at least 40 individuals are known (Marr and Bohm 1997, pp. 270–271; S. Perlman 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; DOFAW 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 2003, 2006, and 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). *Lysimachia 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 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. 1186; HBMP 2007; TNCH 2007). *Melicope 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 at Hanakoa (S. Perlman 2007c; N. Tangalin 2007a). One small mature individual 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). A new population of 9 individuals was found in Wainiha Valley, bringing the total known number of *M. degeneri* to 22, or possibly 23, known individuals (Wood 2008).

*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. 1199; HBMP 2007; TNCH 2007). This species was historically reported from central Kauai (HBMP 2007; Stone *et al.* 1999, p. 1199). Currently, *M. paniculata* is known from 6 sites, with 5 individuals in upper Limahuli Valley, 3 individuals along the north fork of the Wailua River, 1 to 5 individuals along Koaie Stream, and 3 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. 1199; 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. 1202; 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 (referred to as 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 lowland 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 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). *Myrsine mezii* is known from only two locations totaling five individuals, in the Koaie Canyon area of western Kauai (N. Tangalin 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 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 6 populations: approximately 30 surviving individuals reintroduced into Limahuli Valley after the last wild individual from that area died, 23 individuals at Wainiha, 10 individuals at Kalalau Valley, 1 individual in Lumahai Valley, 1 individual at Kapalaoa, and 1 individual at the headwaters of Kamooloa Stream (K. Wood 1994, p. 4; Wagner 1999, p. 275;

HBMP 2007, D. Burney, NTBG, pers. comm. 2009).

*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. 1045–1047; HBMP 2007; TNCH 2007). Historically, *P. napaliense* was known from northwestern Kauai (Wagner *et al.* 1999, p. 1047; HBMP 2007). Currently, this species is known from 3 populations; two of which 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. 1210; HBMP 2007; TNCH 2007). *Platydesma 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* (loulu) is a tree in the palm family (Arecaceae) that occurs in the lowland wet and wet cliff ecosystems (Read and Hodel 1999, p. 1370; 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 1036 m) (Read and Hodel 1999, p. 1370; 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.

*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 2007a; 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 *P. 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 2007d; N. Tangalin 2007c).

*Psychotria hobdyi* (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. 1166–1168; HBMP 2007; TNCH 2007). The first collection of *P. hobdyi* 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. Bruegmann 1994b; Wagner *et al.* 1994, p. 187; Wagner *et al.* 2005, pp. 45–47).

*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 lowland wet, montane mesic, and montane wet ecosystems, at elevations between 2,600 and 4,000 ft (793 and 1,225 m) (Lowry and Wood 2000, p. 42; HBMP 2007; TNCH 2007). Three individuals of *T. flynii* were first discovered in 1988 near Kahuamaa Flat in Kokee State Park, and two more individuals were found in the late 1990s at Kapalaoa-Kamooloa (Lowry and Wood 2000, pp. 40 and 43; HBMP 2007; D. Burney, pers. comm. 2009).

**Animals**

*Akikiki*

The Kauai creeper or akikiki (*Oreomystis bairdi*), is a small Hawaiian honeycreeper found only on the island of Kauai, currently in the montane mesic and montane wet ecosystems (TNCH 2007; E. VanderWerf, pers. comm. 2009). 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, 2008, pp. 195-199). 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 ± 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 ± 530 birds, based on surveys conducted in April and May 2007 (DOFAW and U.S. Geological Survey (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.

*Akekee*

The Kauai akepa or akekee (*Loxops caeruleirostris*), 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 ± 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 ± 704 birds in 2000, and 5,669 ± 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 ± 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 sharpi*

In our October 21, 2008, proposed rule, we proposed to list *Drosophila attigua* as endangered in accordance with the taxonomic treatment of Hardy and Kaneshiro (1969, p. 41). Following publication of our proposal, one of our peer reviewers, Karl Magnacca, Trinity College, Dublin Ireland, informed us of a recent taxonomic revision in which *D. attigua* was found to be identical to, and was synonymized with, *D. sharpi*, a species described and published by Grimshaw in 1901 (Grimshaw 1901, p. 65; Magnacca and O'Grady 2008, p. 55). For this reason, the synonymy of *D. attigua* with *D. sharpi* is currently accepted by the scientific community and by the Service, and is used throughout this rule.

*Drosophila sharpi*, 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 the species was historically found as low as 2,460 ft (750 m). Like most picture-wing flies, the adult flies are believed to be generalist microbivores (microbe eaters) and feed upon a variety of decomposing plant material. The host plants for *D. sharpi* are unknown, but Montgomery (1975, p. 99) has determined that its sibling species, *D. primaeva*, lays its eggs within the decomposing bark of native *Cheirodendron* sp. (olapa) and *Tetraplasandra* sp. trees (both in the family Araliaceae), where the hatching larvae complete development before dropping to the soil to pupate (Kaneshiro and Kaneshiro 1995, p. 14). For this reason, the host plants for *D. sharpi* are believed to be species of native *Cheirodendron* and *Tetraplasandra*.

*Drosophila sharpi* was first collected by Perkins in 1895 at "Koholuamano," a location that is unknown today but is believed to be on the Alakai plateau (Grimshaw 1901, p. 65). *Drosophila sharpi* was historically known from two populations on the island of Kauai: one population south 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). We have no information regarding any observations of this species at Mt. Kahili since 1969. The species was also collected at two other locations: 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. sharpi* 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, Trinity College, pers. comm. 2007).

**Summary of Comments and Recommendations**

On October 21, 2008, we published a proposed rule to list these 48 Kauai species as endangered throughout their ranges, and to designate critical habitat for 47 of these species (73 FR 62592). The comment period for that proposal opened on October 21, 2008, and closed on December 22, 2008. During the comment period, we received 21 comment letters. We did not receive any

requests for public hearings. Nine comments were from peer reviewers, four were from State of Hawaii agencies, two were from Federal agencies, and six were from nongovernmental organizations or individuals. Due to the nature of the proposed rule, we received combined comments from the public on both the listing action and the critical habitat; we have therefore addressed these issues in a single comment section.

Eight of the comment letters supported the listing and designation of critical habitat for the Kauai species. Of the other 13 comments, 12 provided information or declined to oppose or support the listings and critical habitat designation, and 1 opposed the listing of the picture-wing fly. One commenter requested that we exclude 2,795 ac (1,131 ha) (representing portions of 6 different critical habitat units) based on the benefits of ongoing conservation activities on private land. We reviewed all comments received for substantive issues and new information regarding the proposed listing and critical habitat designation for the Kauai species. We have fully considered all substantive comments in this final rule.

Peer Review

In accordance with our policy published on July 1, 1994 (59 FR 34270), we solicited expert opinions from 24 knowledgeable individuals with scientific expertise on the 48 Kauai species and their habitats, including familiarity with the species, the geographic region in which the species occurs, and conservation biology principles. We received responses from nine peer reviewers; eight comments generally supported our methodology and conclusions; five comments supported the listing and designation of critical habitat for the Kauai species; three comments provided new information on one or more of the 48 species; and one comment did not support the listing and designation of critical habitat for the picture-wing fly. We summarize the peer reviewers' comments below, and we took them into consideration in developing this final rule.

We have categorized the peer review comments and our responses by: (1) Those that are general in nature; (2) those related to threats and the proposed listing of the species, and (3) those related to the proposed designation of critical habitat.

**General Peer Reviewer Comments**

(1) *Comment*: One peer reviewer suggested that we publish diacritical marks for the Hawaiian language in the published rule.

*Our response*: In this final rule we omitted diacritical marks because we cannot ensure that they will be printed properly. We recognize the importance of using the marks to accurately portray the pronunciation and meaning of Hawaiian words and regret not being able to use them. In a previous proposed rule (66 FR 30372, June 6, 2001) we attempted to use Hawaiian language diacritical marks, but there were numerous conversion errors and the marks were not printed correctly. In our published correction to that proposal (66 FR 46428, September 5, 2001) we stated that we would either ensure that the marks are used correctly or eliminate their use altogether. Current printing constraints have forced us to choose the latter option.

(2) *Comment*: One peer reviewer commented that the **Federal Register** was a bit obscure for the general public and that the U.S. Fish and Wildlife Service should publish notices of upcoming **Federal Register** documents in the local newspapers.

*Our response*: The publication of our rules and notices related to listing and critical habitat in the **Federal Register** is required by section 4(b)(5)(A)(i) of the Act and the Administrative Procedure Act (5 U.S.C. Subchapter II); however section 4(b)(5)(D) of the Act requires that we publish a summary of the proposed regulation in a newspaper of general circulation in each area of the United States in which the species is believed to occur. Our practice is to publish this newspaper notice within 20 days of publication of the proposed rule. This allows for publication of the newspaper notice before the 45–day time limit for requesting public hearings has expired and provides ample time for readers to provide comment. In accordance with this practice, we published notices of this proposed regulation in the following local newspapers: *Honolulu Advertiser* (Oahu) (October 27, 2008), *Garden Island* (Kauai) (October 31, 2008), and *Star Bulletin* (Oahu) (November 5, 2008).

(3) *Comment*: One peer reviewer was uncertain whether "tribal lands" as referred to in the "Government-to-Government Relationship with Tribes" section of the proposed rule were the same as native Hawaiian lands.

*Our response*: The President's Memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments, and the Department of Interior's Manual at 512 DM 2, set forth our responsibility to communicate meaningfully with federally recognized Native American tribes on a government-to-government basis and identify potential effects on trust resources of federally recognized tribes. Federally recognized tribe means an Indian or Alaska Native tribe or community that is acknowledged as an Indian tribe under the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. 479a. In the list published annually by the Secretary, there are no federally recognized tribes in the State of Hawaii (73 FR 18553, April 4, 2008). Therefore, while we value information on the effects of this rule on the interests of Native Hawaiians, Native Hawaiian lands are not tribal lands for purposes of the requirements of the President's Memorandum or the Department Manual.

**Peer Review Comments on Threats and Listing the Kauai Species**

(4) *Comment*: One peer reviewer stated that if Factor A (the present or threatened destruction, modification, or curtailment of habitat or range) is identified as a primary threat attributable to pigs, goats, or deer in Table 2, which summarizes the primary threats identified for each of the 48 Kauai species, predation by ungulates under Factor C (disease or predation) should also be identified as a primary threat attributable to those animals.

*Our response*: We have persuasive evidence that feral ungulates substantially modify or destroy habitat; however, we can only occasionally infer that they consume parts of or entire plants or animals based on indications of their presence. A study conducted in the 1980s on the feeding habits of feral pigs on Maui found that their rooting was related to foraging for earthworms. In that study, rooting depths averaged 8 in (20 cm), greatly disrupting the leaf litter and topsoil layers, which contributed to erosion and changes in ground topography (Diong 1982, pp. 150, 164–165). While foraging for earthworms, feral pigs may uproot and dislodge plants, contributing to habitat degradation of understory vegetation (Factor A), but they may not feed directly on plants that are disturbed by their activity. Where we have direct confirmation or evidence of predation by feral ungulates on a particular species, it has been identified as a threat under Factor C in Table 2.

*Peer Reviewer Comments-Akekee and Akikiki*

(5) *Comment*: One reviewer commented that the use of puaiohi (*Myadestes palmeri*) as a surrogate

species is somewhat inappropriate, and that the Maui creeper (*Paroreomyza montana*), the Hawaii akepa (*Loxops coccineus coccineus*), or both would represent better surrogate species.

*Our response*: We believe the puaiohi, an endangered bird that inhabits the same areas on Kauai as the akikiki and akekee, is an appropriate surrogate species for akikiki and akekee when considering threats of predation by rats and owls (see below). The puaiohi nests primarily on cliff faces and utilizes habitat along stream margins more so than the akikiki and akekee. However, the puaiohi is exposed to predation pressures from introduced mammalian and avian predators in a manner similar to that expected for akikiki and akekee, since they occur in the same habitat areas on Kauai. Although we do not have direct evidence of rat predation on the akekee or akikiki from nest studies, we believe it is reasonable to assume that birds nesting in the same area as the puaiohi would likely be exposed to similar impacts from rat predation.

(6) *Comment*: One commenter noted that both bird species would benefit from ungulate removal throughout their habitat, which would reduce threats presented by the spread of invasive plants and avian disease transmitted by mosquitoes.

*Our response*: Feral ungulates (pigs, goats, black-tailed deer) on Kauai present a significant threat to the six ecosystems addressed in our proposed rule and their associated native species, including the akikiki and akekee. The presence of nonnative feral ungulates is considered to be a primary factor in the alteration and degradation of native vegetation and habitats throughout the Hawaiian Islands. Each of our recovery plans for species that occur in ecosystems similar to the six identified in this final rule recommend ungulate control, fencing, or both as a priority tasks necessary to conserve native Hawaiian plant and animal species.

(7) *Comment*: One reviewer commented that although rats and cats are important predators for some Hawaiian bird species, there is no data to suggest that either are major threats to the akikiki or akekee.

*Our response*: Rats and cats have been identified as significant predator threats to other Hawaiian forest bird species (also see our response to comment 28). Although we do not have direct evidence of rat and cat predation on the akikiki and akekee, we believe these predators are a potential threat to both birds on Kauai for the reasons stated in our October 2008 proposal. We have modified our discussion of rat and cat predation threats on the akikiki and akekee in this final rule. The biology of the akikiki has been little studied and predation on adults and nests has not been documented, but several introduced mammals known to be major predators on Hawaiian forest birds are present in the Alakai swamp on Kauai, where akikiki occur (Tweed *et al.* 2006, p. 759). Black rats (*Rattus rattus*), Polynesian rats (*R. exulans*), Norway rats (*R. norvegicus*), feral cats (*Felis catus*), the native short-eared owl (pueo, *Asio flammeus sandwichensis*), and the introduced barn owl (*Tyto alba*), are known to prey on forest passerines (Snetsinger *et al.* 1994, p. 47). Long-term protection of many Hawaiian birds, including the akikiki and akekee, likely will require large-scale management actions to control nonnative predators, including rats and feral cats.

(8) *Comment*: One peer reviewer commented that the nonnative yellow-jacket wasp (*Vespula pensylvanica*) is a threat to the akikiki and akekee, as it presents significant competition for arthropod food (e.g., insects, insect larvae, and spiders).

*Our response*: The nonnative yellow-jacket wasp may impact the akikiki and akekee through competition for the same native insect food resources, although we have no direct evidence in this regard. Both the akikiki and akekee feed primarily on insects, insect larvae, and spiders (Lepson and Pratt 1997, p. 4; Foster *et al.* 2000, p. 4). Each yellow-jacket wasp colony in Hawaii can produce over a half-million foragers that consume tens of millions of arthropods, including native insects, larvae, and spiders (Gambino and Loope 1992, p. 19). Controlling or eliminating negative effects associated with resource competition with yellow-jacket wasps is identified as a recovery action in our *Revised Recovery Plan for Hawaiian Forest Birds* (USFWS 2006, p. 4–4, 4–85). The akikiki is one of the bird species included in this recovery plan, although it was only a candidate for listing at the time the plan was written. Although the akekee is not specifically covered by the plan, the recovery actions identified in the *Revised Recovery Plan for Hawaiian Forest Birds* should benefit all native forest bird species in the Hawaiian Islands since all of these birds face similar threats, regardless of whether they were listed at the time the recovery plan was published. The control of yellow-jacket wasps is one of those broad recovery actions that will benefit native forest bird species beyond those specifically addressed in the recovery plan.

(9) *Comment*: One peer reviewer commented that stream margins, rather than pig wallows, may support higher levels of *Culex* mosquitoes, which are a disease vector for avian pox and malaria.

*Our response*: In Hawaii, the mechanisms of avian disease transmission include movements of mosquitoes infected with avian disease from lower to higher elevations, as well as mosquitoes breeding in pig wallows and along stream margins at higher elevations. Mosquitoes that breed in forest bird habitats may become infected by biting infected birds, continuing the disease transmission cycle. The relative contribution of mosquitoes breeding in pig wallows versus along stream margins with regard to mosquito vector prevalence on Kauai is unknown. Investigating this uncertainty and developing effective management actions will be identified as a priority task during the recovery planning process.

*Peer Reviewer Comments-Drosophila sharpi* (*D. attigua* in the proposal)

(10) *Comment*: One peer reviewer commented that the proposed rule does not present independent data or assumptions with which to evaluate risks to *Drosophila sharpi*, nor credible scientific evidence that the species is or is not endangered.

*Our response*: We disagree. Since 1963, a multidisciplinary team of biologists has been researching *Drosophila* as part of the University of Hawaii-affiliated Hawaiian *Drosophila* Project. Over 500 scientific papers have been published as a result of this program, and over 500 species of *Drosophila* have been taxonomically described. The information we relied on to prepare this rule included peer reviewed publications, unpublished literature, and other communications from research and field studies covering a period of over 40 years of Hawaiian *Drosophila* research. This final rule is also based on new information that was obtained in response to the publication of the proposed rule. Systematic surveys for the picture-wing fly species and host plants would assist with understanding population trends and status. However, as required by section 4(b)(1)(A) of the Act, we have relied on the best scientific and commercial data available on habitat threats and trends in distribution for the species in making our determination in this final rule.

(11) *Comment*: One peer reviewer stated that surrogate species for *Drosophila sharpi* were not made explicit.

*Our response*: We have clarified in this final rule that our conclusions regarding adult feeding habits, egg laying and larval host plant preferences,

and direct threats are drawn from similar, related species including the 12 Hawaiian picture-wing flies listed in 2006 as endangered or threatened (71 FR 26835, May 9, 2006).

(12) *Comment*: One peer reviewer commented that biocontrol agents are inappropriately implied to be threats to *Drosophila sharpi*, that there is even evidence to the contrary, and that the listing of *D. sharpi* would delay permitting for new biocontrol agents.

*Our response*: In the *Application of the Adverse Modification Standard* section of the proposed rule, we stated that importing nonnative species for research, agriculture, and aquaculture, and releasing biological control agents, may adversely affect critical habitat. Under Factor C (Disease or Predation), we also stated that 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 present 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). We are aware that compliance with regulations that apply to the introduction of biological control agents may seem complicated to some because of combined Federal and State jurisdiction. However, absent a high level of assurance that only safe and effective biological control agents are introduced, nontarget impacts and host switching could occur (Simberloff and Stiling 1996, pp. 185, 190). We acknowledge the importance of biocontrol as a way to control some nonnative species in Hawaii, particularly nonnative invasive plants that threaten rare native plants through competition for space, light, water, and nutrients, and by degrading and destroying native habitat. We are committed to working closely with the State and other Federal agencies to ensure that potential biocontrol measures are implemented in a manner consistent with the conservation needs of these species.

**Peer Review Comments on Critical Habitat Designation**

(13) *Comment*: One peer reviewer commented that Table CDLVI (Table of Protected Species within Each Critical Habitat Unit for Kauai) was confusing, and that the table caption should explain the differences between the columns.

*Our response:* We agree. We have clarified the table's column headings as requested.

(14) *Comment*: One peer reviewer commented that the designation of critical habitat does not preclude management of ungulates for hunting in those areas.

*Our response*: We agree. Critical habitat designation does not create a wilderness area, preserve, or wildlife refuge. It does not require nor preclude activities associated with conservation management such as ungulate control and fencing. Game bird and mammal hunting is a recreational and cultural activity in Hawaii that is regulated by the Hawaii Department of Land and Natural Resources on State and private lands (Hawaii Department of Land and Natural Resources 2002). Critical habitat does not give the Federal government authority to control or otherwise manage feral animals on non-Federal land. These land management options continue to be landowner decisions, and absent Federal involvement, are not affected by the designation of critical habitat. However, the designation of critical habitat does impose a responsibility on Federal agencies to consult with us under section 7 of the Act on actions they carry out, fund, or authorize that might destroy or adversely modify critical habitat. This requirement applies to funding provided by the Service to the State through the Federal Aid in Wildlife Restoration Program (Pittman-Robertson Program). It is well-known that game mammals affect listed plant and animal species in Hawaii. We believe it is important to develop and implement management programs that provide for the recovery of listed species and acknowledge the importance of continued ungulate hunting in game management areas. We welcome opportunities to work closely with the State and other partners to ensure that game management programs are implemented in a manner consistent with both of these needs.

(15) *Comment*: One peer reviewer commented that Lowland Wet section 6 may be within the montane, rather than the lowland, ecosystem.

*Our response*: We followed TNC's Ecoregional Assessment of the Hawaiian High Islands (2006) and ecosystem maps (TNCH 2007) to define ecosystem boundaries in this rule. Following that approach, the proposed Lowland Wet section 6 falls within the lowland wet ecosystem. This ecosystem type occurs below 3,000 ft (1,000 m); contains wet grassland, shrubland, and forest; receives greater than 75 in (191 cm) annual precipitation; and has wet substrate conditions.

*Peer Reviewer Comments-Plants*

(16) *Comment*: One peer reviewer commented that Hanakoa Valley should be included in Lowland Mesic section 3, since *Charpentiera densiflora* occurs along the Kalalau trail in that area.

*Our response*: Although individual *Charpentiera densiflora* plants may occur in the Hanakoa Valley, the reviewer did not present scientific data that we could evaluate to determine whether this area includes the physical and biological features essential to the conservation of the species. Based on our field observations, trail areas are typically disturbed by recreational activity and dominated by nonnative plants.

(17) *Comment*: One reviewer stated that species' previous range is not sufficiently understood, and that historical and paleoecological information indicates that many rare plant species on Kauai had much larger ranges, often in a wide array of habitats. This reviewer acknowledged that the areas proposed as critical habitat were good choices, and recommended that the Service focus funding and protection efforts on the proposed areas rather than proposing additional areas as critical habitat.

*Our response*: More research is needed to better understand the species' historical range. In our proposed rule, we presented the criteria used to identify critical habitat boundaries (73 FR 62622, October 21, 2008), which were based on the best scientific and commercial data available, including current and historical species' location information. Surveying historical habitat and adjacent, potentially suitable habitat will be a high priority during the recovery implementation process for these species. We acknowledge that critical habitat designated at a particular point in time may not include all of the areas that may later be determined to be necessary for the recovery of the species, as new information becomes available. For this reason, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not promote the recovery of the species.

*Peer Reviewer Comments-Akekee and Akikiki*

(18) *Comment*: New survey data for the akikiki and akekee is currently being analyzed by the U.S. Geological Survey-

Biological Resources Discipline (USGS-BRD).

*Our response*: We are aware that recent survey data has been analyzed by the USGS-BRD and is undergoing agency review for publication (Camp *et al.* in press). Information from Camp *et al.* (in press) that was provided during the public comment period indicated that montane mesic habitat proposed as critical habitat for the akekee, several plants, and *Drosophila sharpi* is also occupied by the akikiki and contains the physical and biological features essential to its conservation that may require special management considerations or protection. Based on this new information, we have added 2,976 ac (1,204 ha) of additional montane mesic habitat as critical habitat for the akikiki (*Oreomystis bairdi* Unit 1-Montane Mesic, Unit 2-Montane Mesic, and Unit 3-Montane Mesic). Since this area was already being proposed as critical habitat for other species in the montane mesic ecosystem, adding the akikiki does not change the configuration or amount of critical habitat designated in these units.

(19) *Comment:* Appropriate habitat for the akikiki and akekee (outside of previously surveyed areas) should be surveyed for occurrences.

*Our response:* There is a broader distribution for akekee than akikiki, and there have been some detections of individual akekee beyond the boundaries of the critical habitat proposed in October 2008 (Camp *et al.* in press, p. 136). However, Camp *et al.* did not present scientific data with which we could evaluate whether these additional areas include the physical and biological features essential to the conservation of the species and are in need of special management. In our *Revised Recovery Plan for Hawaiian Forest Birds* (USFWS 2006, pp. 4–7, 4–118), we state that surveys of potentially suitable habitat for the akikiki and akekee are a priority recovery action for these forest birds. In accordance with section 4(b)(2) of the Act, we may also revise designated critical habitat based on new information, if appropriate.

(20) *Comment:* The proposed critical habitat may not be sufficient for the long-term survival of the species, especially given the impact of global climate change.

*Our response:* The impact of climate change on the distribution of the akikiki and akekee is a potential concern, but the specific effects of climate change are difficult to predict with confidence. Benning *et al.* (2002, pp. 14248–14249) analyzed the possible contraction of habitat for Hawaii's forest birds, using Hawaii, Maui, and Kauai as models. Based on their study, they predict that over the next 100 years, the high elevation forest areas that currently serve as a refuge for the birds from mosquito-borne malaria may decrease in size by as much as 85 percent. The authors predict that preventing avian malaria will become the main conservation focus for Hawaiian forest birds, including the akikiki and akekee. Atkinson *et al.* (2009, pp. 58-59) states that without question, the one factor that prevented widespread and rapid extinction of virtually all of Hawaii's endemic and highly susceptible honeycreepers after the introduction of avian malaria and pox was the presence of significant altitudinal gradients on Kauai, Maui, and Hawaii, where susceptible native birds could maintain high populations in relatively disease-free refugia. They also concluded that following a projected 2 degree Celsius (°C) temperature rise resulting from global warming, the Alakai Wilderness Preserve on Kauai would experience an 85 percent loss of forested habitat where transmission is currently highly seasonal to conditions where transmission could occur throughout the year. As new information becomes available, we may revise the critical habitat designation to address climate change if we determine that additional areas are essential to the conservation of the akikiki and akekee.

(21) *Comment:* The units should be expanded so as to be contiguous.

*Our response:* At this time, we believe that the areas designated as critical habitat in this final rule are sufficient to provide for the conservation of the akikiki and akekee. We did not include all historical habitat or all areas adjacent to occupied habitat. The peer reviewer did not present scientific data, which would be needed to evaluate whether these additional areas are occupied and contain the physical and biological features essential to the conservation of the species or whether the areas need special management considerations or protection, or if unoccupied, are essential to the conservation of the species. We could not conclude from the available data whether or not the previously occupied areas currently support, or even could support in the future, the physical and biological features essential for the conservation of the species.

(22) *Comment:* Additional studies are needed regarding breeding, survival, and habitat needs of the akikiki and akekee.

*Our response:* We agree. These studies are identified as priority recovery actions for forest birds in the *Revised Recovery Plan for Hawaiian Forest Birds* (USFWS 2006, pp. 4–96, 4–118), although for the purposes of designating critical habitat we have to rely on the best scientific data available in accordance with section 4(b)(2) of the Act.

(23) *Comment*: Two commenters suggested that critical habitat include all areas where the akikiki and akekee are known to occur, which would extend into areas delineated for the recovery of these species, and that critical habitat for the akikiki should include the montane mesic ecosystem as well as the montane wet ecosystem, although the literature indicates that the akikiki presently is more restricted in distribution than the akekee.

*Our response*: See our responses to comments 18 and 19 above.

(24) *Comment:* One peer reviewer was concerned that the area of designated critical habitat might not be large enough to provide an adequate mosquito buffer to the habitat areas currently occupied by the akikiki and akekee should disease be determined to be the primary factor in population decline. One peer reviewer stated that it may be useful to expand critical habitat for akekee to minimize the number of smaller isolated habitat patches, thus providing larger tracts of contiguous native forest that are optimal for species persistence and less likely to provide corridors for intrusion of avian disease-carrying mosquitoes and invasion by nonnative plants. The commenter suggested we expand critical habitat Unit 2 so that it abuts Units 1 and 5, expand Unit 5 so that it abuts Unit 4, and expand Unit 3 so that it abuts Unit 4.

*Our response:* Larger tracts of contiguous forest habitat may slow upslope movements of disease-carrying mosquitoes into areas occupied by akikiki and akekee by reducing the nonforest-forest boundary along which mosquitoes travel or are transported by prevailing winds. Contiguous forest conditions potentially reduce the availability of a transmission vector for avian disease (Reiter and LaPointe 2007, pp. 865–867). On Kauai, the mechanisms for avian disease transmission appear to differ in some respects from transmission on other high Hawaiian Islands. Avian disease transmission vectors on Kauai likely include windblown movements of mosquitoes from lower into higher elevations, as well as mosquitoes that breed in pig wallows and along stream margins (Baker 1975, pp. 75–76; LaPointe 2008, pp. 605–607). Since the avian disease mechanisms are not completely understood on Kauai, the benefits that would result from

expanding critical habitat to establish larger buffer areas to reduce avian disease transmission are uncertain. Investigating this uncertainty will be a priority during the recovery implementation process (USFWS 2006, pp. 4–62, 4–68–82).

*Peer Reviewer Comments-Drosophila sharpi* (*D. attigua* in the proposal)

(25) *Comment*: One peer reviewer commented that Lowland Wet section 6, south of the Alakai massif, should be designated as critical habitat for the Hawaiian picture wing fly, since the type specimens for *Drosophila sharpi* were collected at Mt. Kahili.

*Our response*: Information from our files indicates that historically *Drosophila sharpi* was known from two areas on Kauai, and was first collected at Kahili, east of the Alakai massif. Although new information provided by one peer reviewer indicates the 1968 type collections were made at Mt. Kahili, south of the Alakai massif, we have no information with which we can evaluate whether these additional areas contain the physical and biological features essential to the conservation of *D. sharpi* that require special management considerations or protection. Although these areas may contain species of *Cheirodendron* and *Tetraplasandra*, the purported larval host plants, we were unable to conclude from the available data whether the previously occupied areas south of the Alakai massif support or could support the physical and biological features essential for the conservation of *D. sharpi*. Surveying historical habitat sites and adjacent potentially suitable habitat for extant populations of *D. sharpi* and its host plants will be a high priority during the recovery planning process. We may consider revising the critical habitat designation at that time if new information becomes available indicating that these areas are essential to the recovery of this species.

(26) *Comment*: One peer reviewer stated that if the Hawaiian picture-wing fly, *Drosophila sharpi*, uses *Cheirodendron* spp. (olapa) as a food source, the abundance and distribution of this plant should be noted, and that *Cheirodendron* spp. has not been specifically identified as a host plant for *D. sharpi*.

*Our response*: In the proposed rule we stated that the adult flies are generalist microbivores (microbe eaters) and feed upon a variety of decomposing plant material. Although the larval host plants for *D. sharpi* are not specifically known, they are most likely to be *Cheirodendron* and *Tetraplasandra* species, based on host plant preferences for *Drosophila primaeva*, a sibling species to *D. sharpi* (Montgomery 1975, p. 99; Kaneshiro and Kaneshiro 1995, p. 14). *Cheirodendron* spp., and to a lesser extent *Tetraplasandra* ssp., are known to be widespread components of the native *Metrosideros* (ohia) forest, especially the lowland wet, montane mesic, and montane wet communities (Anderson *et al.* 1992, pp. 308–309; Gagne and Cuddihy, 1999, pp. 88, 90, 91, 98, 102–107), where *D. sharpi* occurs. Our analysis of criteria used to identify critical habitat boundaries included island-wide GIS coverage (e.g., Gap Analysis Program (GAP) vegetation data (2005)), which reflects the spatial distribution of native plants such as *Cheirodendron* and *Tetraplasandra*. We are unaware of any scientific or commercial data on the abundance and distribution of these plant species on Kauai, but agree that further research is needed to determine the specific larval host species of *Drosophila sharpi*.

**Public Comments-Akekee and Akikiki**

(27) *Comment*: Two commenters suggested that a distinction be made between the threat of predation on the akikiki and akekee by the native owl, pueo, and the introduced barn owl.

*Our response*: While the threat of predation on Hawaiian forest birds by the pueo and the introduced barn owl has been documented by several authors (Snetsinger *et al.* 1994, p. 47; Snetsinger *et al.* 2005, pp. 79–80; Mounce 2008, pp. 19–21), there are no direct observations or studies specifically related to the akikiki or the akekee. Snetsinger *et al.* (1994, p. 4) reported a higher incidence of bird remains in pueo pellets than in barn owl pellets, but suggested that this may be attributed to prey availability rather than prey preference. On Kauai, Snetsinger *et al.* (2005, pp. 79–80) concluded that 10 percent of puaiohi nest failures may be due to predation by pueo, based on pueo presence near predated nests. On Maui, Mounce (2008, p. 19) reported two observations of depredation by pueo on two Maui forest birds, the Maui parrotbill (*Pseudonestor xanthophrys*) and apapane (*Himatione sanguinea*). The author suggested that in Hanawi Natural Area Reserve, pueo may shift habitat during honeycreeper breeding seasons in response to this more abundant and easily captured food, and therefore, may be more of a threat to native birds than previously thought. Such a shift is speculative at this point.

The pueo is a native predator of forest birds in Hawaii, whereas the native Hawaiian forest birds have not coevolved with the introduced barn owl. However, as stated above, we have no direct evidence of predation specific to akikiki or akekee by either the pueo or the barn owl, so it is not possible to compare the potential levels of predation between these two predators.

(28) *Comment*: Two commenters stated that predation by feral cats is a threat to the akikiki and akekee, including areas outside of the Alakai Preserve, and that emphasis should be placed on developing effective methods to control predation, with funding and support for active management.

*Our response*: We do not have direct evidence of feral cat predation on the akikiki and akekee, but believe they are a potential threat for the reasons stated in our October 2008 proposal. The long-term protection of many Hawaiian birds, including the akikiki and akekee, will likely require large-scale control of nonnative predators, including feral cats. This management need is identified as a high priority in the *Revised Recovery Plan for Hawaiian Forest Birds* (USFWS 2006, pp. 2–161, 4–3, 4–52). See also our response to comment 7 for additional discussion of this issue.

(29) *Comment:* One commenter stated that the best scientific evidence indicates that the akikiki and the akekee each should be included in both the montane wet and montane mesic ecosystems; that critical habitat should be designated for each of them in both ecosystems; and the boundaries of some units do not make biological sense for the two bird species and do not appear to agree with descriptions of where the primary constituent elements occur. The commenter also stated that the recovery area identified for the akikiki in the *Revised Recovery Plan for Hawaiian Forest Birds* is considerably larger than the area proposed as critical habitat, and questioned why critical habitat was not designated in other areas where the akikiki or akekee may occur.

*Our response:* We agree that the habitat requirements of the akikiki and akekee are very similar, and critical habitat for the two bird species should be the same; in this final rule, we have designated critical habitat for the akikiki and akekee in both the montane wet and montane mesic ecosystems (See also our responses to comments 18, 19 and 21, above).

Under section 3(5)(A) of the Act, critical habitat can be designated in areas that were occupied at the time of listing and contain the physical and biological features essential to the species' conservation, and which may require special management considerations; or in areas that were unoccupied at the time of listing but have been determined to be essential to

the conservation of the species. To delineate critical habitat for the akikiki and akekee, we focused on the physical and biological features essential to the conservation of those species, which we consider to be the primary constituent elements laid out in the appropriate quantity and spatial arrangement for the conservation of the species. We relied on information and data obtained from several sources, including peer reviewers and other qualified individuals familiar with these species and ecosystems, to derive the final critical habitat designation for the akikiki and akekee. We also considered the recovery area recommended for the akikiki in the *Revised Recovery Plan for Hawaiian Forest Birds* (USFWS 2006). The akikiki was a candidate species at the time of the plan's publication; the akekee was not addressed in the plan.

The *Revised Recovery Plan for Hawaiian Forest Birds* states that the primary strategy for the recovery of the akikiki is the protection and management of remaining forest on Kauai, especially high elevation montane wet forest above 3,000 to 3,500 ft (900 to 1,060 m) in the Alakai Wilderness Preserve and surrounding State and private lands (USFWS 2006, p. 3-16). Although much of the designated critical habitat overlaps with the recovery area recommended in the *Revised Recovery Plan for Hawaiian Forest Birds*, we did not find that all of the recommended recovery area met our definition of critical habitat in terms of providing the physical and biological features essential for the conservation of the species in the appropriate quantity and spatial arrangement. For example, some of the recovery area identified for the akikiki in the recovery plan has a number of residential cabins and other forms of development, resulting in a fair amount of human activity. We determined that while the birds may use this area on occasion, it is unlikely to be utilized by the species to the extent that the features there may be considered essential to the conservation of the species. An additional area, Laau Ridge, was not included because this area is too small and isolated to support viable populations of the birds, as acknowledged in the recovery plan (USFWS 2006, p. 3-16), although another small isolated area, Namolokama Ridge, was designated as critical habitat since it supports several of the plant species.. Some of the recommended recovery area was below the elevation limit that defines the montane wet and montane mesic ecosystems, and hence would harbor mosquito populations that threaten the two bird species with avian malaria; we are not designating such areas as critical habitat for the akikiki and akekee.

Section 3(5)(C) of the Act specifies "Except in those circumstances determined by the Secretary, critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species." The critical habitat designation includes remaining forest areas above the 3,000 ft (914 m) elevation, focusing on the Alakai Wilderness Preserve, as recommended in the *Revised Recovery Plan for Hawaiian Forest Birds*. Although there is limited information available regarding the habitat needs of the akikiki, as acknowledged in the recovery plan (USFWS 2006, p. 3-16), after considering the best available scientific information we have designated critical habitat for the akikiki and the akekee based on providing these species with the physical and biological features essential to their conservation, in the appropriate quantity and spatial arrangement needed for their conservation. However, the Act provides for the revision of this critical habitat designation, if new information should become available indicating that such revision may be appropriate.

**Public Comments-Listing and Climate Change**

(30) *Comment*: One commenter suggested that any predictions about climate change and its impacts on these species would not meet the listing standard under section 4 of the Act, nor the definition of an endangered species under section 3 of the Act.

*Our response*: Section 4 of the Act requires that we determine whether any species is an endangered or threatened species based on any of the following factors: (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; or (E) other natural or manmade factors affecting its continued existence. Climate change may lead to changes in the intensity of threats under any of these factors for a species. As with any threat, we evaluate each climate-induced factor for specific effects and determine the magnitude and immediacy of the threat to a species before proposing to list it under the Act. In this final rule, we acknowledge that climate change may be a significant threat to native species on Kauai, that we are not capable of determining the specific effects of probable climate change on these 48 species at this time, and conclude that at present we are unable to determine the magnitude of this threat with confidence. Although climate change may potentially present a threat in the future, we are not listing any of these 48 species as endangered based on the threat of climate change alone.

**Federal Agency Comments**

(31) *Comment:* The U.S. Navy, on behalf of the National Aeronautics and Space Administration, requested that we exclude the portions of Kokee Sites D and E that overlap with the proposed critical habitat. They characterized the areas as fenced and developed, and commented that these areas would be unlikely to support any of the 47 species for which critical habitat is proposed.

*Our response:* We have modified units Lowland Mesic Section 1 and Montane Mesic Section 1 (Kokee Sites D and E) to exclude areas lacking the physical and biological features (primary constituent elements) essential to the conservation of the species, in response to the above comment. Manmade features and structures within the boundaries of the areas mapped as critical habitat, such as buildings, roads, existing fences, telecommunications equipment towers and associated structures and equipment, communication facilities and regularly maintained associated rights-of-way, radars, telemetry antennas, paved areas, and other landscaped areas, existing on the effective date of this final rule do not contain one or more of the primary constituent elements described for any of the 47 proposed species. Accordingly, the text of the rule clarifies that these types of areas are not included in the critical habitat designation, even if they appear to occur within the boundary of a mapped critical habitat unit.

**Comments from the State of Hawaii**

(32) The State of Hawaii Department of Land and Natural Resources–Land and Engineering Division and State Water Commission's Stream Protection and Management Branch reviewed the proposed rule. Neither agency expressed support or concerns with regard to the proposed listing or designation of critical habitat for the species included in this rule.

**Other Public Comments**

(33) *Comment*: One commenter stated that because we are designating critical habitat in unoccupied areas, the rule would establish a prohibition against the adverse modification of critical habitat under section 9 of the Act where one would otherwise not exist.

*Our response*: Except as provided in sections 6(g)(2) and 10 of the Act, with respect to any endangered species of fish or wildlife listed under section 4 of the Act, it is unlawful for any person subject to the jurisdiction of the United States to:

(A) Import or export any such species from the United States;

(B) Take any such species within the United States or the territorial sea of the United States;

(C) Take any such species upon the high seas;

(D) Possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such species taken in violation of (B) and (C) above;

(E) Deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of a commercial activity, any such species;

(F) Sell or offer for sale in interstate or foreign commerce any such species; or

(G) Violate any regulation pertaining to such species or to any threatened species of fish or wildlife listed under authority provided under the Act.

The Act does not establish a section 9 prohibition against the adverse modification of critical habitat.

(34) *Comment*: One landowner opposed the designation of critical habitat on private lands within Wainiha Valley. They believe the designation will negatively impact the rights of private landowners, and serve as a disincentive for landowners to participate in voluntary conservation efforts. They stated that the designation of additional critical habitat is unnecessary in light of the ongoing conservation management activities benefiting endangered species in the valley. They also stated that critical habitat designation would result in little if any additional benefit to the species, and that any limited regulatory, educational, or recovery benefits that might arise from the designation would be outweighed by the benefits of encouraging voluntary conservation efforts by other private landowners.

*Our response*: We agree that developing and maintaining public and private partnerships for species conservation is important. The conservation agreement between this landowner and The Nature Conservancy has established the third largest private nature preserve of over 7,000 ac (2,833 ha) in Wainiha Valley. Based on the nature of the agreement and the ongoing conservation actions being implemented, we are excluding some of the subject property within Montane Wet Section 1 from the final critical habitat designation under section 4(b)(2) of the Act. The private landowner is proactively managing this area in a way that provides conservation benefits for 18 of the 44 plant species, the akikiki and akekee, *Drosophila sharpi*, and several other listed species. The excluded area is not already designated as critical habitat for other species, and we believe that there is a higher likelihood that beneficial conservation activities will continue by not including this area in the critical habitat designation. The rationale for concluding that the benefits of exclusion outweigh the benefits of including this area as critical habitat is discussed in detail in the "Exclusions Under Section 4(b)(2) of the Act" section below. However, we considered but did not exclude other proposed lands owned by this private landowner that are already designated as critical habitat for other species, since we could not conclude that the benefits of excluding these areas would outweigh the benefits of designating them as critical habitat. Designating critical habitat in areas that are already designated as critical habitat for other species will likely not impose any appreciable difference in regulatory requirements under section 7 of the Act for ongoing or future management activities that may be undertaken on these areas. The essential physical and biological features (primary constituent elements) defined in previous critical habitat designations, and special management considerations or protection needed for those species, are similar to those for the species addressed in this final rule.

(35) *Comment*: One commenter suggested that the impact of listing and critical habitat designation would primarily impact sportsmen who hunt game in those units.

*Our response*: A critical habitat designation does not create a wilderness area, preserve, or wildlife refuge, nor does it automatically close an area to human access or use. Its federal regulatory effect applies only to activities where there is some Federal involvement. Land uses such as logging, grazing, and recreation that may require Federal permits would require compliance with the Act's section 7(a)(2) requirement that Federal action in issuing the permit not destroy or adversely modify critical habitat. Critical habitat designations do not constitute land management plans, and the designation of critical habitat does not require a private or State landowner to fence the designated areas or remove game mammals. It is well understood that feral ungulates are responsible for the decline of native vegetation in Hawaii (Cuddihy and Stone 1990, pp. 40, 63–67) and that they present a primary threat to the native species in each of the ecosystems described in this final rule, including the 48 species addressed in this final rule. The Service recognizes that the populations of many game mammal species directly or indirectly affect the distribution and abundance of many listed endangered plant and animal species to varying degrees. We are also aware that game mammal hunting is a highly valued activity to a portion of the present-day Hawaiian culture, and that hunting is an important tool to manage wild game populations. We support hunting as a recreational activity and hunting programs within the State of Hawaii. We will continue to work in partnership with the State in this regard, as Federal law requires that hunting programs that receive federal funding be designed and implemented in a manner compatible with endangered species conservation.

(36) *Comment*: Two commenters stated that it appears that critical habitat was designated with a priority given to plants rather than the akikiki and akekee, and one commenter stated that Laau ridge between the Alakai Wilderness Preserve and Namolokama should be included as critical habitat for both birds.

*Our response*: As explained in the Criteria Used to Identify Critical Habitat Boundaries section of the proposed rule, we proposed critical habitat on lands occupied by the species that contain the physical and biological features essential to the conservation of each species that may require special management considerations or protection. We also proposed critical habitat on lands that were not occupied by the species, but were determined to be essential to their conservation. Based on the best scientific data available, we believe this final rule adequately reflects the areas essential for the conservation of the 47 species for which we are designating critical habitat, including the akikiki and akekee. Although Laau ridge may potentially be important to the recovery of the akikiki and akekee, the reviewer did not present scientific data with which we could evaluate whether this area is essential to their conservation. We have no information indicating that Laau ridge is occupied by either akikiki or akekee. The last confirmed observation of the akikiki on Laau ridge that we are aware of was in 1969 (Service 1983, pp. 53, 66).

(37) *Comment*: Two commenters stated that the Hawaiian honeycreepers should be included in the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) to gain protections under that

statute. One commenter suggested that the MBTA specifically and arbitrarily excludes Hawaiian honeycreepers, and that the inadequacy of existing regulatory mechanisms (Factor D) presents a threat to the akikiki and akekee because they are not protected under the MBTA. The commenter states that these species should be protected under the MBTA since they are members of the avian family Fringillidae, which is covered by the statute.

*Our response*: A species qualifies for protection under the MBTA if it meets one or more criteria, including whether it belongs to a family or group of species named in the Canadian convention of 1961, as amended in 1996; the Mexican convention of 1936, as amended in 1972; the annex to the Japanese convention of 1972, as amended; or the Russian convention of 1976. The proposed rule (71 FR 50194, August 24, 2006) to revise the List of Migratory Birds that receive protections under the MBTA states that the MBTA does not apply to native species that belong to families or groups represented in the United States that are not expressly mentioned in the Canadian, Mexican, or Russian treaties. Although the Hawaiian honeycreepers, including akikiki and akekee are in the family Fringillidae, and fringillids are covered by the MBTA, the proposed rule to revise the List of Migratory Birds specifically names the subfamily Drepanidinae (the Hawaiian honeycreepers) as one of those groups that do not receive protections under the MBTA (71 FR 50205). However, regulatory actions under the MBTA are beyond the scope of this final rule.

**Summary of Changes from Proposed Rule**

We fully considered comments from the public and peer reviewers on the proposed rule to develop this final listing and critical habitat designation for the 48 species from Kauai. This final rule incorporates the following substantive changes to our proposed listing and designation, based on the comments that we received.

(1) At the time we proposed *Drosophila attigua* as endangered, we followed the taxonomic treatment of Hardy and Kaneshiro (1969, p. 41). Subsequently, a peer reviewer informed us of a recent taxonomic revision in which *D. attigua* was determined to be identical to, and synonymized with, *D. sharpi*, a species described by Grimshaw in 1901 (Grimshaw 1901, p. 65; Magnacca and O'Grady 2008, p. 55). Since the synonymy of *D. attigua* with *D. sharpi* is currently accepted by the scientific community, we are listing this picture-wing fly species as endangered in the final rule under the name *D. sharpi* rather than *D. attigua*. We are also designating critical habitat for *D. sharpi* in this final rule. This name change does not affect the boundaries of the proposed designation of critical habitat.

(2) We designated an additional 2,936 ac (1,204 ha) of montane mesic habitat as critical habitat for the akikiki (*Oreomystis bairdi* Units 1–3 Montane Mesic) based on information received during the public comment period indicating that these areas are occupied by this species and contain the physical and biological features essential to its conservation that may require special management considerations or protection (see our response to comment 18 above). The addition of this area does not increase the total amount of critical habitat we are designating in this final rule, since these areas were already proposed as critical habitat for the akekee, *Drosophila sharpi*, and several plant species.

(3) We designated an additional 5,013 ac (2,029 ha) of lowland wet habitat as critical habitat for the plant *Tetraplasandra flynii* (Kauai 10–*Tetraplasandra flynii*–b, Kauai 11–*Tetraplasandra flynii*–d, Kauai 21–*Tetraplasandra flynii*–g). These areas were not proposed as critical habitat for *T. flynii* in our proposed rule, but information we received during the public comment period indicates these areas are occupied by the species and contain the physical and biological features essential to its conservation that may require special management considerations or protection. The addition of this area does not increase the total amount of critical habitat we are designating in this final rule, since the areas were already proposed as critical habitat for several other plant species.

(4) We excluded 1,052 ac (426 ha) owned by Alexander and Baldwin, Inc., from this final critical habitat designation. We proposed this area as critical habitat for 18 plants, akekee, akikiki, and *Drosophila attigua* within several units (as described in the proposed rule: Kauai 18–Montane Wet for 18 plants; *Drosophila attigua*–Unit 5–Montane Wet; *Oreomystis bairdi*–Unit 1–Montane Wet; and *Loxops caeruleirostris*–Unit 4–Montane Wet). The "Exclusions Under Section 4(b)(2) of the Act" section of this final rule presents a detailed explanation of our analysis of this area.

This exclusion additionally resulted in a change to some of the critical habitat unit numbers. As Kauai 18–Montane Wet as described in the proposed rule was excluded, that left the critical habitat unit numbered Kauai 18 "vacant" in the final rule, with the end result that the unit Kauai 19–Wet Cliff from the proposed rule is now Kauai 18–Wet Cliff in this final rule. The effects of this change are also seen in various maps and tables throughout this final rule, as all new critical habitat units have been renumbered from the proposed rule, starting with Unit 18, through Unit 25.

(5) In accordance with Terrell *et al.* (2005, p. 818), we changed the scientific name for *Hedyotis* to *Kadua*. This change is reflected in Table 3–Ecosystem-level Primary Constituent Elements (PCEs) for Each Species and in the Regulation Promulgation section of this rule.

(6) We revised certain unit boundaries for plants (Kauai 11–Lowland Mesic and Kauai 11–Montane Mesic in §17.99(a)(1)); akekee (*Loxops caeruleirostris*–Unit 1–Montane Mesic in §17.95(b)); and the picture-wing fly (*Drosophila sharpi*–Unit 1–Montane Mesic in §17.95(i)) based on comments received from the U.S. Navy (see our response to comment 31 above).

(7) We corrected the upper elevation limit of the ecosystem-level PCEs for the Montane Mesic and Montane Wet Ecosystems (See Table 3). The upper limit is now 5,243 ft (1,598 m) instead of 6,600 ft (2,000 m), as 5,243 ft (1,598 m) represents the maximum elevation on Kauai.

(8) We corrected the species-specific PCE for *Lysmiachia daphnoides* in Table 4 and elsewhere in the final rule; this PCE now clarifies that the species utilizes not bogs, but more specifically hummocks in bogs.

(9) We have corrected the species-specific PCE for *Drosophila sharpi* to reflect the fact that this picture-wing fly uses both *Cheirodendron* sp. and *Tetraplasandra* sp. as larval host plants; the genus *Tetraplasandra* was not included as a species-specific PCE in the proposed rule.

(10) We made some corrections to Table CDLIX (Table Of Protected Species Within Each Critical Habitat Unit For Kauai) in the Regulation Promulgation section of this rule to accurately reflect which units are occupied or unoccupied by the species.

**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. Listing actions may be warranted based on any of the above threat factors, singly or in combination. 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 because we have no information on primary threats to the species that would fall 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 inverte-brates | Other species-specific threats |
| *Astelia waialealae* | MW (hum-mocks in bogs) | X | X | X | | | X | | X | | X | | | LN, NR |
| *Canavalia napaliensis* | LM | X | | X | | X | X | | X | | X | X | X | |
| *Chamaesyce eleanoriae* | LM, DC | X | | X | | | X | L | X | | X | X | | LN |
| *Chamaesyce remyi* var. *kauaiensis* | LW, WC | X | X | | | | X | L | X | | X | | | |
| *Chamaesyce remyi* var. *remyi* | LM, LW,MM, MW, WC | X | X | X | X | | X | L | X | | X | X | X | |
| *Charpentiera densiflora* | LM, LW | X | | X | | X | X | L, F | X | | X | X | X | |
| *Cyanea dolichopoda* | WC | X | | | | | X | L | X | | | | X | NW |
| *Cyanea eleeleensis* | LW | X | X | | | | X | L | X | | X | X | X | NW |
| *Cyanea kolekoleensis* | LW | X | X | | | | X | F | X | | X | X | X | NW |
| *Cyanea kuhihewa* | LW | X | X | | | | X | L | X | | X | X | X | NW |
| *Cyrtandra oenobarba* | LW, WC | X | X | X | | | X | L, F | X | | X | X | X | |
| *Cyrtandra paliku* | WC | X | | | | | X | L | X | | | | | LN |
| *Diellia mannii* | MM | X | X | | X | X | X | L | X | | X | | | LN |
| *Doryopteris angelica* | LM | X | X | X | X | | X | | X | | X | X | | LN |
| *Dryopteris crinalis* var. *podosorus* | MW | X | X | | | | X | | X | | | | | LN |
| *Dubautia imbricata* ssp. *imbricata* | LW | X | X | | | | X | | X | | X | | | |
| *Dubautia kalalauensis* | MW | X | | X | | | X | | X | | X | | | LN |
| *Dubautia kenwoodii* | LM | X | X | X | | | X | FR | X | | X | | | NW |
| *Dubautia plantaginea* ssp. *magnifolia* | WC | X | X | | | | X | L | X | | X | | | |

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 | Land-slides or Flooding | Climate Change | Illegal collection | Predation by ungulates | Predation by rats | Predation by non-native inverte-brates | Other species-specific threats |
| *Dubautia waialealae* | MW (bogs only) | X | X | X | | | X | | X | | X | | | |
| *Geranium kauaiense* | MW (bogs only) | X | X | | | | X | | X | | X | | | |
| *Keysseria erici* | MW (bogs only) | X | X | | | | X | | X | | X | | | |
| *Keysseria helenae* | MW (bogs only) | X | X | | | | X | | X | | X | | | |
| *Labordia helleri* | LM, LW,MM, MW | X | X | X | X | | X | | X | | X | X | | |
| *Labordia pumila* | MW (bogs only) | X | X | | | | X | | X | | X | | | |
| *Lysimachia daphnoides* | MW (hum-mocks in bogs) | X | X | | | | X | | X | | X | | | |
| *Lysimachia iniki* | WC | X | | | | | X | L | X | | | | | LN |
| *Lysimachia pendens* | WC | X | X | | | | X | L | X | | X | | | LN |
| *Lysimachia scopulensis* | DC | X | X | X | | | X | L | X | | X | | | LN |
| *Lysimachia venosa* | WC | X | | | | | X | L | X | | | | | NW |
| *Melicope degeneri* | MW | X | X | X | | | X | | X | | X | | X | LN, NR |
| *Melicope paniculata* | LW | X | X | X | | | X | L | X | | X | | X | |
| *Melicope puberula* | LW, MW | X | X | X | | | X | | X | | X | | X | |
| *Myrsine knudsenii* | MM | X | X | X | X | | X | | X | | X | X | | LN |
| *Myrsine mezii* | MM, MW | X | X | X | | | X | L | X | | X | | | LN |
| *Phyllostegia renovans* | LW, MW | X | X | X | | | X | L | X | | X | X | | LN |
| *Pittosporum napaliense* | LM | X | | X | | | X | | X | | X | X | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Platydesma rostrata* | LM, LW, MMMW, WC | X | X | X | X | | X | L | X | | X | X | X | |
| *Pritchardia hardyi* | LW, WC | X | X | X | | | X | | X | X | X | X | | |
| *Psychotria* grandiflora | MM, MW | X | X | X | X | | X | | X | | X | X | | LN, NR |
| *Psychotria hobdyi* | LM | X | X | X | X | X | X | | X | | X | X | X | |
| *Schiedea attenuata* | DC | X | | X | | X | X | L | X | | X | | | LN |
| *Stenogyne kealiae* | LW, MM, DC | X | X | X | X | X | X | L | X | | X | X | | |
| *Tetraplasandra bisattenuata* | LM, LW | X | X | | | | X | | X | | X | X | | LN |
| *Tetraplasandra flynnii* | LW, MM, MW | X | X | X | | | X | | X | | X | | | LN |
| Animals | | | | | | | | | | | | | | |
| Akekee | MM, MW | X | X | X | | | X | | X | | | X | | AD, pPCO |
| Akikiki | MM, MW | X | X | X | | | X | | X | | | X | | AD, pPCO |
| Picture-wing fly, *Drosophila sharpi* | MM, MW | X | X | X | X | X | X | | X | | | X | X | CTF |

LM = Lowland Mesic
LW = Lowland Wet
MM = Montane Mesic
MW = Montane Wet
DC = Dry Cliff
WC = Wet Cliff
L = Landslides
F = Flooding
LN = Limited numbers ≤ 50 wild individuals
NR = No reproduction
FR = Falling rocks
NW = Not extant in wild
AD = Avian diseases
pPCO = Potential predation by feral cats, nonnative owls
CTF = Competition with nonnative tipulid flies
Factor A - Habitat Modification
Factor B - Overutilization
Factor C - Disease or Predation
Factor E - Other

*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 (*Lasirus 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) states 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. 88-95).

*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 nonnative mammals began with pigs, dogs, and rats that arrived with the Polynesians around 400 A.D. (Kirch 1982, pp. 3–4). Nonnative species impacts to 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 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 nonnative mammals is one of the primary factors underlying the alteration and degradation of native vegetation and habitats on the island of Kauai. Each of the six ecosystems and the associated native species therein are threatened by the destruction or degradation of habitat due to nonnative ungulates, 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. These animals 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 fertilizing the disturbed soil through their feces. Pigs feed preferentially on the fruits of many nonnative plants, such as *Passiflora tarminiana* (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. 120–126; 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 present a significant threat to native Hawaiian forest birds, including the akikiki and akekee (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 they contribute to erosion by eating young trees and young shoots of plants before they can become established. They also create trails that can damage native vegetative cover, destabilize substrate, and create gullies that convey water and exacerbate erosion, as well as dislodge stones from ledges that can damage vegetation below (Cuddihy and Stone 1990, p. 64). 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 erosion and landslides.

Black-tailed deer (also known as mule deer) were first introduced to Kauai in 1961 for the purposes 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, pp. 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 identified 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 final rule (lowland mesic, lowland wet, montane mesic, montane wet, dry cliff, and wet cliff) and the native species dependent on these habitat types are directly and indirectly adversely impacted by feral ungulates, resulting in the destruction and degradation of habitat for the native Kauai species. These effects include the destruction of vegetative cover; trampling of plants and seedlings; consumption of native vegetation; soil disturbance; dispersal of alien plant seeds on hooves, coats, and through the spread of seeds in feces; and the creation of open disturbed areas conducive to further invasion by nonnative pest plant species. Each 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 final 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 final 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 in this rule 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 these 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 septemnervium* (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 *Melinus minutiflora* (molasses grass), *Oplismenus hirtellus* (basketgrass), *Paspalum conjugatum* (Hilo grass), *P. urvillei* (Vasey grass), and *Setaria parviflora* (yellow foxtail) that present 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 septemnervium*, *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 septemnervium, Paspalum urvillei*, *Passiflora tarminiana* (banana poka), *Rubus argutus*, 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. 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* (Perlman 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 final 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, some 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 present a threat to the species that occur in the ecosystems being addressed in this final 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 included in 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. 1500–1502; Cook *et al.* 2005, p. 4).
- *Blechnum appendiculatum* is a fern with fronds to 23 in (60 cm) long which 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 designated as noxious weeds 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. *Corynocarpus 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. 1421).
- *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 rhizomes 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 native plants 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 margins (Motooka *et al.* 2003a).
- *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. 1320).
- *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 septemnervium* is an invasive shrub that 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).
- *Melinus minutiflora* forms dense mats that can fuel more intense fires that destroy native plants (O'Connor 1999, p. 1562; 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, pp. 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. 1565; 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.* 2003b, p. 1).
- *Passiflora edulis* is a vigorous, climbing vine cultivated for its fruit in Hawaii (Escobar 1999, p. 1010). 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. 1012). 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 a member of the Melastomataceae family. The basis for its classification as invasive is the species' germination rate, 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.
- *Rhodomyrtus tomentosa* forms dense thickets and produces large amounts of seeds 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. 1107; U.S. Army 2006, pp. 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 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 their ability to attach 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. 1592; 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 7 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. 1325). 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. 1615).
- *Youngia japonica* is an annual herb 3 ft (0.9 m) tall that is native to southeastern Asia and is now a pantropical (distributed throughout the tropics) 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-Dombois (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* Stone *et al.* 1992, p. 396) 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* (hairgrass) and stands of native shrub species and *Acacia koa*.

Alien-dominated grasslands and shrublands constitute the greatest fire threat to native lowland vegetation, including the lowland mesic ecosystem described in this final rule. 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 final 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 six6 Kauai ecosystems and their associated species identified in this final 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 final rule, 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 final 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 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 three3 of the species in this final rule, *Lysimachia iniki, L. pendens*, and *L. venosa*, were adversely impacted by hurricanes Iwa and Iniki through wind damage, canopy disruption, and landslides (S. Perlman 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 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 exacerbate 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 impact many of the species addressed in this final rule, including: *Chamaesyce eleanoriae, C. remyi* var. *kauaiensis, C. remyi* var. *remyi, Charpentiera densiflora*, *Cyanea dolichopoda, C. eleeleensis*, *C. kolekoleensis, C. kuhihewa*, *Cyrtandra oenobarba, C. paliku*, *Diellia mannii, Dubautia kenwoodii*, *D. 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 *S. 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 *Cyaneaoenobarba* 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 final 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. 14246 and 14248; 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 (Benning *et al.* 2002, pp. 14248–14249).

According to some climate change projections, temperature increases could present an additional threat specific to the akekee and akikiki by causing an increase in the elevation at which regular transmission of avian malaria occurs, potentially reducing the remaining suitable habitat for these species by 85 percent (Benning *et al.* 2002). Experimental evidence has shown that the malaria parasite does not develop in birds in an environment below 55 degrees Fahrenheit (°F) (13 °C)), and field studies have found that maximum malaria transmission occurs where mean ambient summer temperature is 63 °F (17 °C) (Benning *et al.* 2002, p. 14,246). Between 55 and 63 °F (13 and 17 °C), malaria transmission is sporadic and usually associated with warmer periods, such as El Niño events (Benning *et al.* 2002, p. 14246). There are no forested areas on Kauai where mean ambient temperature is below 55 °F (13 °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 °F (2 °C), which is within the range predicted by some climate models (e.g. Still *et al.* 1999 and references therein, p. 608; IPCC 2001, pp. 67–69), would raise the 63 °F (17 °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 final rule may be among the species 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 in this final rule would be expected to include habitat loss and alteration 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 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 final 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 presented by introduced ungulates is significant for the following reasons:

(1) They trample and graze areas, directly impacting the plant species addressed in this final rule;

(2) They increase soil disturbance, leading to mechanical damage to individuals of these plants and host plants of *Drosophila sharpi*;

(3) They trample and graze on native plants used for nesting and foraging by the akekee and akikiki, and for larvae development and foraging by *D. sharpi*;

(4) They create open, disturbed areas that are conducive to weedy plant invasion and establishment of alien plants from dispersed fruits and seeds. Over time, this results 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) They increase watershed erosion and sedimentation; and

(6) They create breeding sites for mosquitoes, the primary vector for the transmission of avian diseases, which threaten the akikiki and akekee.

These significant threats are ongoing and are expected to continue or increase in magnitude and intensity into the foreseeable future without control or eradication.

Nonnative plants represent a significant and immediate threat to all 48 species being addressed in this final 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 sharpi*, which depend upon native plant species for essential life history needs. The significant threat presented by nonnative plants is ongoing and is expected to continue or increase in magnitude and intensity into the foreseeable future without the implementation of effective native ecosystem restoration actions.

The threat from fire to the species in this final 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 final 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 final 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 1992, p. 1). Hurricanes present 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 final 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 final 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, or changes in disturbance regimes (e.g., storms and hurricanes). The probability of species going extinct increases when ranges are restricted, habitat decreases, and population numbers decline, as is the case with small populations of single-island endemic species. Each of the 48 Kauai species are particularly vulnerable to extinction because of these kinds of environmental changes. In addition, climate change may present a significant threat specific to the akekee and akikiki by causing an increase in the elevation at which regular transmission of avian malaria occurs, thereby reducing available habitat. 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. Each of the Factor A threats are ongoing and are expected to continue or increase in magnitude and intensity into the foreseeable future. These threats are acting in concert with other threats to the species, magnifying the cumulative detrimental effects on the status of each of the 48 Kauai species identified in this rule.

*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 illegally removed 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, and is vulnerable to vandalism and illegal collection, we consider overutilization to be an immediate and significant threat to *P. hardyi* throughout its entire range. We do not consider overutilization to present 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 many Hawaiian forest bird species and present

a significant and immediate threat to the akekee and akikiki throughout their ranges (Benning *et al.* 2002, p. 14246). Like many other native Hawaiian forest birds, the akikiki and akekee are no longer found at lower elevations, and are now restricted to the higher elevation montane mesic and montane wet ecosystems where mosquitoes and the diseases they carry are less prevalent (Scott *et al.* 1986, pp. 367–368). In the warmer fall months, *C. 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 became exposed to mosquito-borne avian diseases when mosquitoes were introduced to the islands in 1827 with imported caged 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), and 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 present 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. 14246–14247). Atkinson *et al.* (2009, pp. 58-59) state that in the Alakai Wilderness Preserve, a projected 2 °C temperature rise from global warming would reduce the forested habitat where transmission is currently highly seasonal to conditions where transmission could occur throughout the year by 85 percent.

Disease is not known to be a threat to the 45 plants or Hawaiian picture-wing fly addressed in this final rule.

*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 45 plant species in this final rule are likely impacted by ungulates due to trampling and eating individual plants. This information is also presented in Table 2.

*Feral pigs*

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 *Kadua* (*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*

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* 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, including the root systems that support suckers and vegetative reproduction. An exclosure analysis demonstrated that restricting goat access using 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. Wood 1994; S. Perlman 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 can be up to 2 goats per hectare in areas in Hawaii (C. Kessler, pers. comm. 2008).

*Black-tailed deer*

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 feed 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-tailed deer affect the species and ecosystems addressed in this final rule by damaging native plants through browsing or trampling, resulting in plant mortality and 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 6 of the Kauai ecosystems, and rat predation threatens at least 19 of the 45 plant species addressed in this final 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). On 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 in this listing, 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 plants of *Drosophila sharpi,* and 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 (Birds of North America Online, 2008a,b). Captive-raised puaiohi constructed 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 apparent that puaiohi cliff nests and cup nests in trees are both 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 birds nesting in the same area as the puaiohi would be exposed to similar impacts from rat predation.

*Cats and Owls*

Feral cats 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 and the introduced barn owl, 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 14 of the plant and animal species (see Table 2) in this final 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 final rule: *Cyanea dolichopoda, C. eleeleensis*, *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 four 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 final rule: *Chamaesyce remyi* var. *remyi* (K. Wood, pers. comm. 2000), *Cyanea kuhihewa* (Wood 2004), *Platydesma rostrata* (HBMP 2007), and *Psychotria hobdyi* (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 (generalist) 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* species in Hawaii (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 present a serious threat to Hawaii's native *Drosophila*, both through direct predation or parasitism as well as competition for food and space; therefore, these nonnative arthropods may be a threat to *Drosophila sharpi* (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 present a predation threat to the Hawaiian picture-wing flies, including *Drosophila sharpi* (Gambino *et al.* 1987, p. 170; Foote and Carson 1995, p. 370; Kaneshiro and Kaneshiro 1995, p. 12). Hawaiian arthropods, including *D. sharpi*, 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 sharpi* is present within the elevation range occupied by the yellow-jacket wasps, which are voracious predators in most ecosystems in which they are found. Compared with typical North American populations, yellow-jacket wasps 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 wasp 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 the flies' 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. sharpi* 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 sharpi*, 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. sharpi* (Foote and Carson 1995, p. 370; Kaneshiro and Kaneshiro 1995, pp. 41–45; Science Panel 2005, p. 25).

*Summary of Predation*

We consider predation and parasitism by nonnative animal species (pigs, goats, deer, rats, and invertebrates) to present an immediate and significant threat to 44 of the 48 species in this final rule throughout their ranges for the following reasons:

(1) Browsing and trampling by pigs, goats, and deer has been documented for 40 of the plant species included in this final rule (*Astelia waialealae, Canavalia napaliensis*, *Chamaesyce eleanoriae, Chamaesyce remyi* var. *kauaiensis, Chamaesyce remyi* var. *remyi, Charpentiera densiflora*, *Cyanea eleeleensis, Cyanea kolekokeensis*, *Cyanea kuhihewa, Cyrtandra oenobarba*, *Diellia mannii, Doryopteris angelica*, *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*, *Lysmachia pendens, Lysmachia scopulensis*, *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 flynii*); other studies

have documented the negative impacts of ungulate browsing and trampling on other native plant species from the Hawaiian islands (Spatz and Mueller-Dombois 1973, p. 874; Diong 1982, p. 160; Cuddihy and Stone 1990, p. 67);

(2) Mechanical damage caused by nonnative invertebrates and rats has been documented for 23 of the plant species in this final rule (*Canavalia napaliensis, Chamaesyce eleanoriae*, *Chamaesyce remyi* var. *remyi, Charpentiera densiflora*, *Cyanea dolichopoda, Cyanea eleeleensis*, *Cyanea kolekokeensis, Cyanea kuhihewa*, *Cyrtandra oenobarba, Doryopteris angelica*, *Labordia helleri, Melicope degeneri*, *Melicope paniculata, Melicope puberula*, *Myrsine knudsenii, Phyllostegia renovans*, *Pittosporum napaliense, Platydesma rostrata*, *Pritchardia hardyi, Psychotria grandiflora, Psychotria hobdyi, Stenogyne kealiae, and Tetraplasandra bisattenuata*);

(3) Nonnative invertebrates such as yellow-jacket wasps prey upon, parasitize, and kill *Drosophila sharpi*, and rat predation likely impacts the larval host plants of *D. sharpi*; 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).

These significant threats are ongoing, acting in concert with other threats to the species, and are expected to continue or increase in magnitude and intensity into the foreseeable future without effective management actions to control or eradicate them.

*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 final 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. The MBTA does not provide protection for any Hawaiian honeycreepers (Drepanidinae), including the two species being addressed in this final rule (akikiki and akekee), because they belong to a group not expressly mentioned by the Canadian, Mexican, or Russian treaties (71 FR 50205; August 24, 2006). The regulatory mechanisms of the MBTA are directed at the taking, possession, transportation, sale, purchase, barter, exportation, and importation of migratory birds. Since none of the activities regulated under the MBTA pose a threat to either the akikiki or akekee, we do not consider the lack of regulatory protection under the MBTA to pose a threat to either of these two bird species.

*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 sharpi* 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. sharpi* larvae during their development. The effect of this competition is a reduction in available host plant material for *D. sharpi* 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.

The nonnative yellow-jacket wasp may impact the akikiki and akekee through competition for the same native insect food resources. Both the akikiki and akekee feed primarily on insects, insect larvae, and spiders (Lepson and Pratt 1997, p. 4; Foster *et al.* 2000, p. 4). Wasp colonies in Hawaii do not "overwinter" (that is, they do not become dormant but remain active throughout the year), so there is a greater potential for the wasp colonies to become quite large (Gambino *et al.* 1987, p. 169). Yellow-jacket wasp colonies in Hawaii can each produce over a half-million foragers that consume tens of millions of arthropods (Gambino and Loope 1992, p. 19). While there is no available data that documents the foraging habits of yellow-jacket wasps in the same habitat as the akikiki and akekee or that yellow-jacket wasps significantly threaten other species of Hawaiian birds through competition for the same prey, it has been suggested that this nonnative wasp may be a potential threat to the akikiki and akekee (D. LaPointe, pers. comm. 2009).

*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 Soule 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 final rule, 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 24 plant species in this final rule are threatened by the effects of small population size (fewer than 50 wild 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, 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 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 2006 and 2007).
- *Diellia mannii* is known from only one individual in the wild (Carr 1998, p. 8; HBMP 2007),
- Research on *Pittosporum* species suggests that small populations are susceptible to loss of genetic variation through inbreeding and drift (C. Gemmill, Center of Biodiversity and Ecology Research, pers. comm. 2009),
- Six species, *Cyanea dolichopoda, C. eleeleensis*, *C. kolekoleensis, C. kuhihewa*, *Dubautia kenwoodii*, and *Lysimachia venosa,* have not been confirmed to persist in the wild. None of these species are in storage or propagation, but individuals familiar with these species believe they may possibly remain extant and that much of their suitable habitat (lowland mesic, lowland wet, and wet cliff) on Kauai remains to be surveyed (Wood 2006, p. 11; S. Perlman 2007; S. Perlman and K. Wood, pers. comm. 2007; D. Burney, NTBG, pers. comm. 2009).

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

The threat to *Drosophila sharpi* 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 *D. sharpi*, and the effect of this competition is a reduction in available host plant material for *D. sharpi* larvae. This threat occurs throughout the range of *D. sharpi*. 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.

The threat to at least 24 plant species in this final rule 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.

The nonnative yellow-jacket wasp is believed to be a potential threat to the akekee and akikiki through competition for the same native insect food resources, however we have no evidence indicating that competition with the nonnative yellow-jacket wasp poses a significant or immediate threat to the akikiki or akekee at this time.

**Conclusion and 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 the increased likelihood of malarial transmission. However, we acknowledge that there is limited information on the specific nature of potential impacts from climate change to the species included in this final rule (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 44 of the species by nonnative pigs, goats, deer, rats, 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 sharpi* (Factor E) (see Table 2). In addition, the palm *Pritchardia hardyi* is threatened by overcollection (Factor B). Cats and owls are likely predators on roosting or incubating adults, nests, and young of the akekee and akikiki (Factor C). 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." 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. Based on our analysis, we have no reason to believe that population trends for any of the species addressed in this final rule will improve, nor will the effects of current threats acting on the species be ameliorated in the foreseeable future. Therefore, on the basis of the best available scientific and commercial information, we are listing the following 48 species as endangered under the Act: the plants *Astelia waialealae, 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 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 flynii;* the birds, akekee

(*Loxops caeruleirostris*) and akikiki (*Oreomystis bairdi*); and the insect *Drosophila sharpi*.

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 in this listing 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 determination applies to each species throughout its entire range.

**Available Conservation Measures**

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing results in public awareness and conservation by Federal, State, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and requires that recovery actions be carried out for all listed species. The protection measures required of Federal agencies and the prohibitions against certain activities involving listed animals and plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(1) of the Act mandates that all Federal agencies shall utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species listed in accordance with section 4 of the Act. 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 a listed species or result in destruction or adverse modification of critical habitat. If a Federal action may affect the continued existence of a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

For the 48 species in this rule, Federal agency actions that may require consultation as described in the preceding paragraph include, but are not limited to, actions within the jurisdiction of the Natural Resources Conservation Service, Fish and Wildlife Service, and branches of the Department of Defense (DOD).

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered wildlife and plants. The prohibitions, codified at 50 CFR 17.21 and 17.61, apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export, take, possess, transport in interstate or foreign commerce in the course of a commercial activity, sell or offer for sale in interstate or foreign commerce, or remove and reduce to possession listed wildlife species from areas under Federal jurisdiction. In addition, for plants listed as endangered, the Act prohibits the malicious damage or destruction on areas under Federal jurisdiction and the removal, cutting, digging up, or damaging or destroying of such plants in knowing violation of any State law or regulation, including State criminal trespass law. Certain exceptions to the prohibitions apply to agents of the Service and State conservation agencies. Federal listing of the species included in this rule will automatically invoke State listing under Hawaii's Endangered Species law and supplement the protection available under other State laws.

We may issue permits to carry out otherwise prohibited activities involving threatened or endangered wildlife and plant species under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22 and 17.62 for endangered wildlife and plants, respectively. Such permits are available for scientific purposes and to enhance the propagation and survival of the species and for incidental take in connection with otherwise lawful activities. Requests for copies of the regulations regarding listed species and inquiries about prohibitions and permits may be addressed to U.S. Fish and Wildlife Service, Ecological Services, Eastside Federal Complex, 911 N.E. 11th Avenue, Portland, OR 97232-4181 (telephone 503-231-6158; facsimile 503-231-6243).

**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 any 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 private 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) of the Act would apply, but even in the event of a destruction or adverse modification finding, the Federal action agency's and the applicant'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.

To be included in a critical habitat designation, habitat within the geographic area occupied by the species at the time it was listed must contain the physical and biological features that are essential to the conservation of the species, and will 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 that provide essential life cycle needs of the species (i.e., areas on which are found those physical and biological features essential to the conservation of the species). Under the Act and our implementing regulations, 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 and that designation limited to those areas occupied at the time of listing would be inadequate to ensure 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), (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 those areas that should be designated as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, 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. For these reasons, a critical habitat designation does not signal that habitat outside the designation is unimportant or may not be required for recovery.

Areas that are important to the conservation of the species, but are outside the critical habitat designation, will continue to be subject to conservation actions implemented by the Service and other Federal agencies under section 7(a)(1) of the Act. They may also be subject to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available information at the time of the agency action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas 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, 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 and entire plants of *P. hardyi* have been illegally removed from an outplanting site in the past (A. Kyono, pers. comm. 2000; 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; 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. Since collecting and vandalism is identified as a threat specific to *P. hardyi* in our threats analysis, and the designation of critical habitat for this species would exacerbate this ongoing threat, we have determined 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 be beneficial by serving to focus conservation efforts on the restoration and maintenance of ecosystem functions that are essential for attaining the species' recovery and long-term viability. The designation of critical habitat also 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 (e.g., the availability of sufficient arthropod prey for the akikiki and akekee, or hummocks in bog systems for *Astelia waialeale*). We have therefore determined that designation of critical habitat is prudent for the following 47 Kauai species: (1) Plants—*Astelia waialealae, 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 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*, *Psychotria grandiflora, Psychotria hobdyi*, *Schiedea attenuata, Stenogyne kealiae*, *Tetraplasandra bisattenuata*, and *Tetraplasandra flynii;* (2) Animals—akekee, akikiki, and *Drosophila sharpi*.

## Methods

As required by section 4(b) of the Act, we used the best scientific data available to designate critical habitat. We began our analysis by evaluating the following data sources:

- The known locations of the 47 species, including site-specific species information from the 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 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 2007).

Based upon the best scientific data available, we determined that the 47 species addressed in this final rule occupy or require for their conservation 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).

*Physical and Biological Features*

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 occupied areas to designate as critical habitat, we consider those physical and biological features essential to the conservation of the species that may require special management considerations or protection. We consider the physical and biological features to be the primary constituent elements (PCEs) laid out in the appropriate quantity and spatial arrangement for the conservation of the species. These include, but are not limited to:

(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

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

We derive the specific PCEs for each of the 47 species based on their biological needs as described below and the physical and biological features that support the successful functioning of the ecosystem upon which they depend. 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 or inaccessible areas, the generalized description of the essential physical and biological features that provide for the successful function of the ecosystem is 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 final rule; these are termed "ecosystem-level PCEs."

Each species identified in this rule requires the ecosystem-level PCEs for each ecosystem in which it occurs, as identified in Table 4. The ecosystem-level PCEs are defined by elevation, annual levels of precipitation, substrate type and slope, as well as the characteristic native plant genera that are found in the canopy, subcanopy, and understory levels of the vegetative community, where applicable. Where further information is available that identifies specific life-history requirements for some species, PCEs relating to these requirements are described separately as "species-specific PCEs," which are also identified in Table 4. In summary, the PCEs for each species are derived from the PCEs necessary for the functioning of its associated ecosystem(s), in combination with any additional species-specific requirements shown in Table 4. The ecosystem-level PCEs identified in Table 4 for each species are presented in detail in Table 3; Table 3 and Table 4 read together 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)

| Primary Constituent Elements | | | | | | |
|---|---|---|---|---|---|---|
| Ecosystem | Elevation | Annual Precipitation | Substrate | One or More of these Associated Native Plants (by Genus) | | |
| | | | | Canopy | Subcanopy | Understory |
| Lowland Mesic[1] | < 3,000 ft (< 914 m) | 50-75 in (127-190 cm) | shallow soils, little to no herbaceous layer | *Acacia*, *Diospyros*, *Metrosideros*, *Myrsine*, *Pouteria*, *Santalum* | *Dodonaea*, *Freycinetia*, *Leptecophyllya*, *Melanthera*, *Osteomeles*, *Pleomele*, *Psydrax* | *Carex*, *Dicranopteris*, *Diplazium*, *Elaphoglossum*, *Peperomia* |

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

| Primary Constituent Elements | | | | | | |
|---|---|---|---|---|---|---|
| Ecosystem | Elevation | Annual Precipitation | Substrate | One or More of these Associated Native Plants (by Genus) | | |
| | | | | Canopy | Subcanopy | Understory |
| Lowland Wet[2] | < 3,000 ft (< 914 m) | > 75 in (> 190 cm) | clays, ashbeds, deep well-drained soils, lowland bogs | *Antidesma*, *Metrosideros*, *Myrsine*, *Pisonia*, *Psychotria* | *Cibotium*, *Claoxylon*, *Kadua*, *Melicope* | *Alyxia*, *Cyrtandra*, *Dicranopteris*, *Diplazium*, *Machaerina*, *Microlepia*, |
| Montane Mesic[3] | 3,000-5,243 ft (914-1,598 m) | 50-75 in (127-190 cm) | weathered aa lava, rocky mucks, thin silty loams, deep volcanic ash soils | *Acacia*, *Metrosideros*, *Psychotria*, *Tetraplasandra*, *Zanthoxylum* | *Cheirodendron*, *Coprosma*, *Kadua*, *Ilex*, *Myoporum*, *Myrsine* | *Bidens*, *Dryopteris*, *Leptecophylla*, *Poa*, *Scaevola*, *Sophora* |
| Montane Wet[4] | 3,000-5,243 ft (914-1,598 m) | > 75 in (> 190 cm) | well-developed soils, montane bogs | *Acacia*, *Charpentiera*, *Cheirodendron*, *Metrosideros* | *Broussaisia*, *Cibotium*, *Eurya*, *Ilex*, *Myrsine* | Ferns, *Carex*, *Coprosma*, *Leptecophylla*, *Oreobolus*, *Rhynchospora*, *Vaccinium* |
| Dry Cliff[5] | unrestricted | < 75 in (< 190 cm) | > 65° slope, rocky talus | none | *Antidesma*, *Chamaesyce*, *Diospyros*, *Dodonaea* | *Bidens*, *Eragrostis*, *Melanthera*, *Schiedea* |
| Wet Cliff[6] | unrestricted | > 75 in (> 190 cm) | > 65° slope, shallow soils, weathered lava | none | *Broussaisia*, *Cheirodendron*, *Leptecophylla*, *Metrosideros* | Ferns, Bryophytes, *Coprosma*, *Dubautia*, *Kadua*, *Peperomia* |

[1]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.
[2]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.
[2]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.
[3]The PCEs for species in the montane mesic ecosystem apply to the following critical habitat units: Kauai–Montane Mesic Units 1, 2, and 3.
[4]The PCEs for species in the montane wet ecosystem apply to the following critical habitat units: Kauai–Montane Wet Units 1, 2, and 3.
[5]The PCEs for species in the dry cliff ecosystem apply to the following critical habitat units: Kauai–Dry Cliff Units 1 and 2.
[6]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 | | | | | | | |
| *Astelia waialealae* | | | | X | | | hummocks in bogs |
| *Canavalia napaliensis* | X | | | | | | |
| *Chamaesyce eleanoriae* | X | | | | X | | |
| *Chamaesyce remyi* var. *kauaiensis* | | X | | | | X | |
| *Chamaesyce remyi* var. *remyi* | X | X | X | X | | X | |
| *Charpentiera densiflora* | 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 | |
| *Cyanea dolichopoda* | | | | | | X | |
| *Cyanea eleeleensis* | | X | | | | | |
| *Cyanea kolekoleensis* | | X | | | | | |
| *Cyanea kuhihewa* | | X | | | | | |
| *Cyrtandra oenobarba* | | X | | | | X | |
| *Cyrtandra paliku* | | | | | | X | |
| *Diellia mannii* | | | X | | | | |
| *Doryopteris angelica* | X | | | | | | |
| *Dryopteris crinalis* var. *podosorus* | | | | X | | | |
| *Dubautia imbricata* ssp. *imbricata* | | X | | | | | |
| *Dubautia kalalauensis* | | | | X | | | |
| *Dubautia kenwoodii* | X | | | | | | |
| *Dubautia plantaginea* ssp. *magnifolia* | | | | | | X | |
| *Dubautia waialealae* | | | | X | | | bogs |
| *Geranium kauaiense* | | | | X | | | bogs |
| *Keysseria erici* | | | | X | | | bogs |
| *Keysseria helenae* | | | | X | | | bogs |
| *Labordia helleri* | X | X | X | X | | | |
| *Labordia pumila* | | | | X | | | bogs |
| *Lysimachia daphnoides* | | | | X | | | hummocks in bogs |
| *Lysimachia iniki* | | | | | | X | |
| *Lysimachia pendens* | | | | | | X | |
| *Lysimachia scopulensis* | | | | | X | | |
| *Lysimachia venosa* | | | | | | X | |
| *Melicope degeneri* | | | | X | | | |
| *Melicope paniculata* | | X | | | | | |
| *Melicope puberula* | | X | | X | | | |
| *Myrsine knudsenii* | | | X | | | | |
| *Myrsine mezii* | | | X | X | | | |
| *Phyllostegia renovans* | | X | | X | | | |
| *Pittosporum napaliense* | X | | | | | | |
| *Platydesma rostrata* | X | X | X | X | | X | |
| *Psychotria grandiflora* | | | 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 | |
| *Psychotria hobdyi* | X | | | | | | |
| *Schiedea attenuata* | | | | | X | | |
| *Stenogyne kealiae* | | X | X | | X | | |
| *Tetraplasandra bisattenuata* | X | X | | | | | |
| *Tetraplasandra flynnii* | | X | X | X | | | |
| Animals | | | | | | | |
| Akekee | | | X | X | | | arthropod prey |
| Akikiki | | | X | X | | | arthropod prey |
| *Drosophila sharpi* | | | X | X | | | larval host plants *Cheirodendron* sp., *Tetraplasandra* sp. |

Many of the species addressed in this final rule occur in more than one ecosystem. The PCEs for these species are described separately for each ecosystem in which they occur, because each species requires a different suite of environmental conditions depending upon the ecosystem in which it occurs. For example, *Stenogyne kealiae* requires a different level of annual precipitation, occurs on different soil types and slopes, and is associated with different native plant species in the dry cliff ecosystem, compared to those physical and biological features in the lowland wet and montane mesic ecosystems where it also occurs. All of the primary constituent elements described for each ecosystem in which a species occurs are essential in maintaining the species' geographical and ecological distribution across the different ecosystem types in which it occurs. The PCEs are also essential in retaining genetic representation that allows this species to successfully adapt to different environmental conditions in various native ecosystems. Although these species are adaptable enough to occur in multiple native ecosystems, their declining abundance in light of ongoing threats is evidence that they are not broad habitat generalists and are unable to persist in highly altered habitats. Based on the best available information, functioning native ecosystems are necessary to 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. To determine the PCEs for the plant *Cyanea dolichopoda*, one would review Table 4 and observe that the PCEs for *C. dolichopoda* are provided by the ecosystem-level PCEs for the wet cliff ecosystem. Referring back to Table 3 indicates that the PCEs for the wet cliff ecosystem include no restrictions on elevation; annual precipitation greater than 75 inches (190.5 cm); shallow soils or weathered lava at greater than 65 degree slope; no canopy vegetation; 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*, *Kadua*, 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 indicates that the PCEs for the picture-wing fly *Drosophila sharpi* 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 genera *Cheirodendron* and *Tetraplasandra*. The PCEs for *D. sharpi* 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 plants *Cheirodendron* and *Tetraplasandra*. 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 designating critical habitat in this final rule.

**Criteria Used to Identify Critical Habitat**

We considered several factors in determining the specific boundaries for critical habitat for these 47 species. We are designating 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 22 geographic subunits that we refer to as "sections." Compliance with **Federal Register** publication requirements required that we subdivide the ecosystem areas presented here into smaller subunits so they could be correlated with the existing critical habitat units previously published in the Code of Federal Regulations (CFR). This was necessary because much of the critical habitat for the plant species in this final rule overlies critical habitat already designated for other plants on the island of Kauai. The reference to ecosystem

"sections" in this rule is primarily intended to emphasize conservation focused on the contiguous ecosystem areas of interest in this final rule. However, especially for purposes of section 7 consultation, it must be recognized that multiple critical habitat units actually make up these sections. Further details on this approach are presented under the "Critical Habitat Designation," section below.

The critical habitat we are designating in this final rule includes areas currently occupied by a species in a particular ecosystem, as well as areas that may be currently unoccupied by that species within that ecosystem. Because of the extremely remote and inaccessible nature of the area, surveys are relatively infrequent and may be limited in scope. Therefore, it is difficult to determine the presence or absence of individual representatives of a rare species with certainty. 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 they depend. Because of the small population sizes, few numbers of individuals, and reduced geographic range of each of the 47 species for which we are designating critical habitat in this rule, we have determined that limiting critical habitat designation to occupied areas would be inadequate to provide for their conservation.

Areas not known to be occupied (i.e., unoccupied areas) are essential for the conservation and recovery of the species because they provide the physical and biological features necessary for the expansion and/or reestablishment of wild populations within the historic range. We are designating unoccupied habitat with no known occupied habitat for six of the plant species in this final rule: *Cyanea dolichopoda, C. eleeleensis, C. kolekoleensis*, *C. kuhihewa, Dubautia kenwoodii*, and *Lysimachia venosa.* Although these species have not recently been documented at their last observed locations, the designation of unoccupied critical habitat is essential for their recovery for the reasons stated above. Critical habitat boundaries were delineated in a manner that will promote the recovery and conservation of these species by protecting the functioning ecosystems on which they depend.

With the exception of the six plant species described above, all of the critical habitat units in these ecosystems contain some areas that are occupied by a species and some areas that are currently unoccupied, but have been determined to be essential for the conservation of that species. As discussed above, because of the small numbers of individuals or low population sizes, each of the 47 species requires suitable habitat and space for the expansion of existing populations for recovery. For example, although *Platydesma rostrata* is found in multiple critical habitat units in 5 ecosystem types, only approximately 100 individuals comprise this entire distribution. Therefore, the unoccupied areas within each unit are essential to provide for the expansion of this species to viable population numbers and to maintain its historical geographical and ecological distribution.

We used current and historical species location information to develop preliminary critical habitat boundaries (polygons) in each of the 6 ecosystems that individually and collectively provide for the conservation of the 47 species addressed in this rule. We superimposed the polygons over digital topographic maps of the island of Kauai and and further evaluated the results. We removed land areas that were identified as highly degraded from the designated critical habitat units, and we used natural or manmade features (e.g., ridge lines, valleys, streams, coastlines, roads, obvious land features) to delineate the 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 the habitat that are essential for population reestablishment or 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 by ecosystem type in Table 6, which also identifies the sections that have been designated as unoccupied habitat for the 6 species that have not been observed in the wild at their last documented locations.

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

| | | | Land ownership (acres) | | |
|---|---|---|---|---|---|
| Critical habitat area | Size of section in acres | Size of section in hectares | State | Private | Corresponding critical habitat units and maps in the Code of Federal Regulations (CFR) |
| 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 |
| —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 20, Map 217c. |
| —Section 2 | 172 | 70 | 172 | 0 | Plants: 50 CFR 17.99, Unit 11, Map 70a |

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

| | | | Land ownership (acres) | | |
|---|---|---|---|---|---|
| Critical habitat area | Size of section in acres | Size of section in hectares | State | Private | Corresponding critical habitat units and maps in the Code of Federal Regulations (CFR) |
| —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 | 2,421 | 980 | 2,421 | 0 | Plants: 50 CFR 17.99, Unit 11, Map 70c. Akekee and Akikiki: 50 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 21, map 217d. Akekee and Akikiki: 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 22, Map 217e. Akekee and Akikiki: 50 CFR 17.95(b), Unit 3 – Montane Mesic. Picture-wing fly: 50 CFR 17.95(i), Unit 3 – Montane Mesic. |
| TOTAL Montane Mesic | 2,935 | 1,188 | 2,935 | 0 | |
| Kauai—Montane Wet | | | | | |
| —Section 1 | 13,055 | 5,283 | 12,628 | 427 | Plants: 50 CFR 17.99, Unit 10, Map 35a; Unit 11, Map 74a; Unit 23, Map 217f; Unit 24, Map 217g, Unit 25, Map 217h. Akekee and Akikiki: 50 CFR 17.95(b), Unit 4 – Montane Wet. Picture-wing fly: 50 CFR 17.95(i), Unit 4 – 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 5 – Montane Wet. Picture-wing fly: 50 CFR 17.95(i), Unit 5 – 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 6 – Montane Wet. Picture-wing fly: 50 CFR 17.95(i), Unit 6 – Montane Wet. |
| TOTAL Montane Wet | 14,258 | 5,770 | 13,574 | 684 | |
| Kauai—Dry Cliff | | | | | |
| —Section 1 | 404 | 163 | 404 | 0 | Plants: 50 CFR 17.99, Unit 11, Map 67a. |
| —Section 2 | 309 | 125 | 309 | 0 | Plants: 50 CFR 17.99, Unit 11, map 67a. |
| TOTAL Dry Cliff | 713 | 288 | 713 | 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 18, Map 217a. |
| —Section 3 | 61 | 24 | 8 | 53 | Plants: 50 CFR 17.99, Unit 4, Map 5a; Unit 19, Map 217b. |
| TOTAL Wet Cliff | 1,035 | 418 | 976 | 60 | |
| TOTAL ALL SECTIONS | 26,582 | 10,757 | 21,666 | 4,918 | |

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 | | | | | | |
| *Astelia waialealae* | | | | X | | |
| *Canavalia napaliensis* | X | | | | | |
| *Chamaesyce eleanoriae* | X | | | | X | |
| *Chamaesyce remyi* var. *kauaiensis* | | X | | | | X |
| *Chamaesyce remyi* var. *remyi* | X | X | X | X | | X |
| *Charpentiera densiflora* | X | X | | | | |
| *Cyanea dolichopoda** | | | | | | X |
| *Cyanea eleeleensis** | | X | | | | |
| *Cyanea kolekoleensis** | | X | | | | |
| *Cyanea kuhihewa** | | X | | | | |
| *Cyrtandra oenobarba* | | X | | | | X |
| *Cyrtandra paliku* | | | | | | X |
| *Diellia mannii* | | | X | | | |
| *Doryopteris angelica* | X | | | | | |
| *Dryopteris crinalis* var. *podosorus* | | | | X | | |
| *Dubautia imbricata* ssp. *imbricata* | | X | | | | |
| *Dubautia kalalauensis* | | | | X | | |
| *Dubautia kenwoodii** | X | | | | | |
| *Dubautia plantaginea* ssp. *magnifolia* | | | | | | X |
| *Dubautia waialealae* | | | | X | | |
| *Geranium kauaiense* | | | | X | | |
| *Keysseria erici* | | | | X | | |
| *Keysseria helenae* | | | | X | | |
| *Labordia helleri* | X | X | X | X | | |
| *Labordia pumila* | | | | X | | |
| *Lysimachia daphnoides* | | | | X | | |
| *Lysimachia iniki* | | | | | | X |
| *Lysimachia pendens* | | | | | | X |
| *Lysimachia scopulensis* | | | | | X | |
| *Lysimachia venosa** | | | | | | X |
| *Melicope degeneri* | | | | X | | |
| *Melicope paniculata* | | X | | | | |
| *Melicope puberula* | | X | | X | | |
| *Melicope knudsenii* | | | X | | | |
| *Myrsine mezii* | | | X | 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 |
| *Phyllostegia renovans* | | X | | X | | |
| *Pittosporum napaliense* | X | | | | | |
| *Platydesma rostrata* | X | X | X | X | | X |
| *Psychotria grandiflora* | | | X | X | | |
| *Psychotria hobdyi* | X | | | | | |
| *Schiedea attenuata* | | | | | X | |
| *Stenogyne kealiae* | | X | X | | X | |
| *Tetraplasandra bisattenuata* | X | X | | | | |
| *Tetraplasandra flynnii* | | X | X | X | | |
| Animals | | | | | | |
| Akikiki *(Oreomystis bairdi)* | | | X | X | | |
| Akekee *(Loxops caeruleirostris)* | | | X | X | | |
| Picture-wing fly *(Drosophila sharpi)* | | | X | X | | |

* Species with an asterisk are those that, to the best of our knowledge, may 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 critical habitat boundaries within this final rule, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands 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 lands inadvertently left inside critical habitat boundaries shown on the maps of this final rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands would not trigger section 7 consultation with respect to critical habitat unless the specific action would affect the PCEs in the adjacent critical habitat.

**Special Management Considerations or Protections**

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing contains the physical or biological features essential to the conservation of the species that may require special management considerations or protection. It is recognized that activities in and adjacent to areas designated as critical habitat may affect one or more of the PCEs found in these areas. Special management is needed throughout each of the designated critical habitat units. The following discussion of special management needs is applicable to each of the 47 Kauai species for which we are designating critical habitat.

These 47 Kauai species include 41 species that are currently found in the wild, and 6 species that are not currently extant in the wild. For each of the 41 Kauai species found in the wild, we have determined that the features essential to their conservation are primarily dependent on maintaining the successful functioning of the ecosystem(s) in which they occur (Tables 3 and 4). In some cases, additional species-specific primary constituent elements have also been identified (Table 4). Special management considerations or protections are necessary throughout the critical habitat areas designated 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, predation by nonnative species, 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 final rule.

All designated critical habitat in this rule requires active management to address the ongoing degradation and loss of native habitat caused by feral ungulates (pigs, goats, and black-tailed deer). Feral ungulates also impact the habitat through predation and trampling. The State of Hawaii provides game mammal (feral pigs and goats, and black-tailed deer) hunting opportunities on one or more State-designated public hunting areas on the islands of Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii (Hawaii Administrative Rules 13-123; DLNR 2009a). Management of game animals by the State ranges from providing maximal sustained public hunting opportunities and benefits (e.g., "sustained yield") in some areas to game animal removal by State staff, or their designees, in other areas (DLNR 2009b). Public hunting areas are not fenced, and game mammals have unrestricted access to most areas across the landscape, regardless of the underlying land use designation. While fences are sometimes built to provide protection from game

mammals to the natural resources within the fenced area, the current number and locations of fences are not sufficient to prevent habitat destruction and degradation. Without special management, the features that are essential for the conservation of these species will continue to be degraded and destroyed.

All designated critical habitat in this rule 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 presented by fire to three 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 primarily due to the presence of nonnative species, such as the grasses *Andropogon* sp. and *Setaria* sp., which 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 (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 designating 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 each of these threats is presented above, under the Summary of Factors Affecting the Species section.

**Critical Habitat Designation**

We are designating critical habitat in 6 ecosystem types for 47 species; including 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 26,582 ac (10,757 ha) of lands under State and private ownership fall within the boundaries of this critical habitat designation; 25,988 ac (10,517 ha), or 98 percent is within areas already designated as critical habitat for other listed species. The critical habitat units described below constitute our best assessment of those areas that meet the definition of critical habitat for the 47 species of plants and animals.

Because 98 percent of the designated 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 final 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 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 that follow represent the 6 essential ecosystem areas we have identified as being essential for the conservation of each of the 47 species, which have been subdivided into 22 sections. For the 44 plant species, the critical habitat unit numbers that collectively represent these ecosystem areas and the corresponding map numbers that will be published at 50 CFR 17.99(a)(1) are presented to provide a crosswalk with the CFR (see text below and figures 1A through 6C). Critical habitat for each of the three3 animal species is published in a separate section of the CFR (50 CFR 17.95(b) for the akekee and akikiki; 50 CFR 17.95(i) for the picture-wing fly), and thus have 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.

We present a brief description of each critical habitat unit and the reasons why it meets the definition of critical habitat below.

*Kauai—Lowland Mesic—Section 1*

Lowland Mesic–Section 1 consists of 2,006 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).

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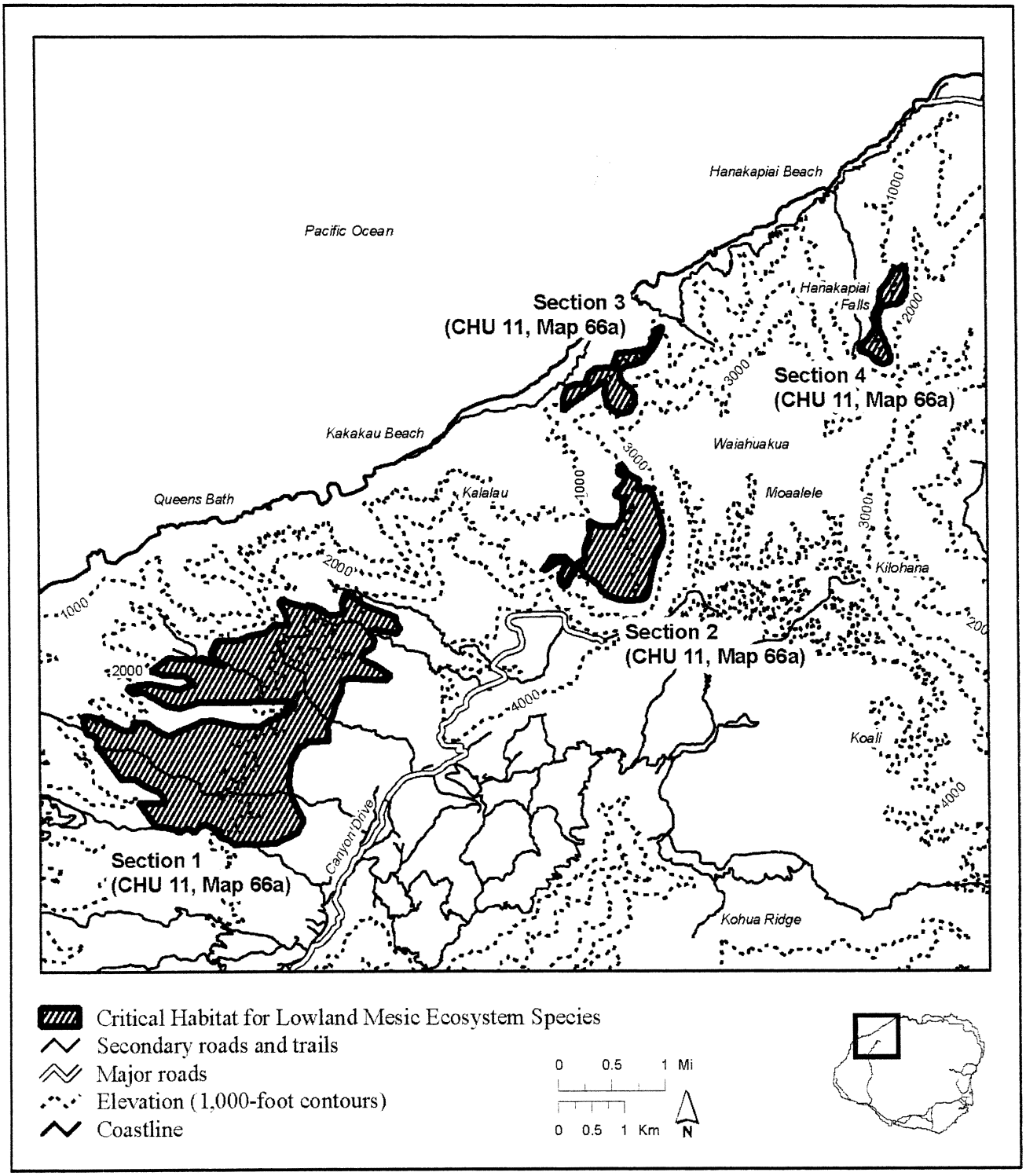


**Figure 1-A.** Areas designated as critical habitat for 11 plant species in the Lowland Mesic Ecosystem (Sections1, 2, 3, and 4). Critical habitat unit (CHU) numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

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The entire section is State-owned and within previously designated critical habitat; it falls within Critical Habitat Unit 11 of 50 CFR 17.99(a)(1), Map 66a. This section is occupied by the plants *Doryopteris angelica, Labordia helleri*, *Platydesma rostrata* 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 four species by providing the physical and biological features necessary for the expansion of the existing wild populations. Although 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 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 their historic range. 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 recovery.

*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(a)(1), Map 66a. This section is occupied by the plants *Canavalia napaliensis, Chamaesyce eleanoriae*, *C. remyi* var. *remyi, Charpentiera densiflora*, *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. Although Lowland Mesic–Section 2 is not known to be occupied by the species *Doryopteris angelica, Dubautia kenwoodii*, *Labordia helleri, Platydesma rostrata*, and *Tetraplasandra bisattenuata*, we have 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 their historical range. 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 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(a)(1), 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. Although 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 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 their historic range. 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 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(a)(1), 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. Although 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 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 their historic range. 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 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. Haupu, on privately owned land (Figure 1-B).

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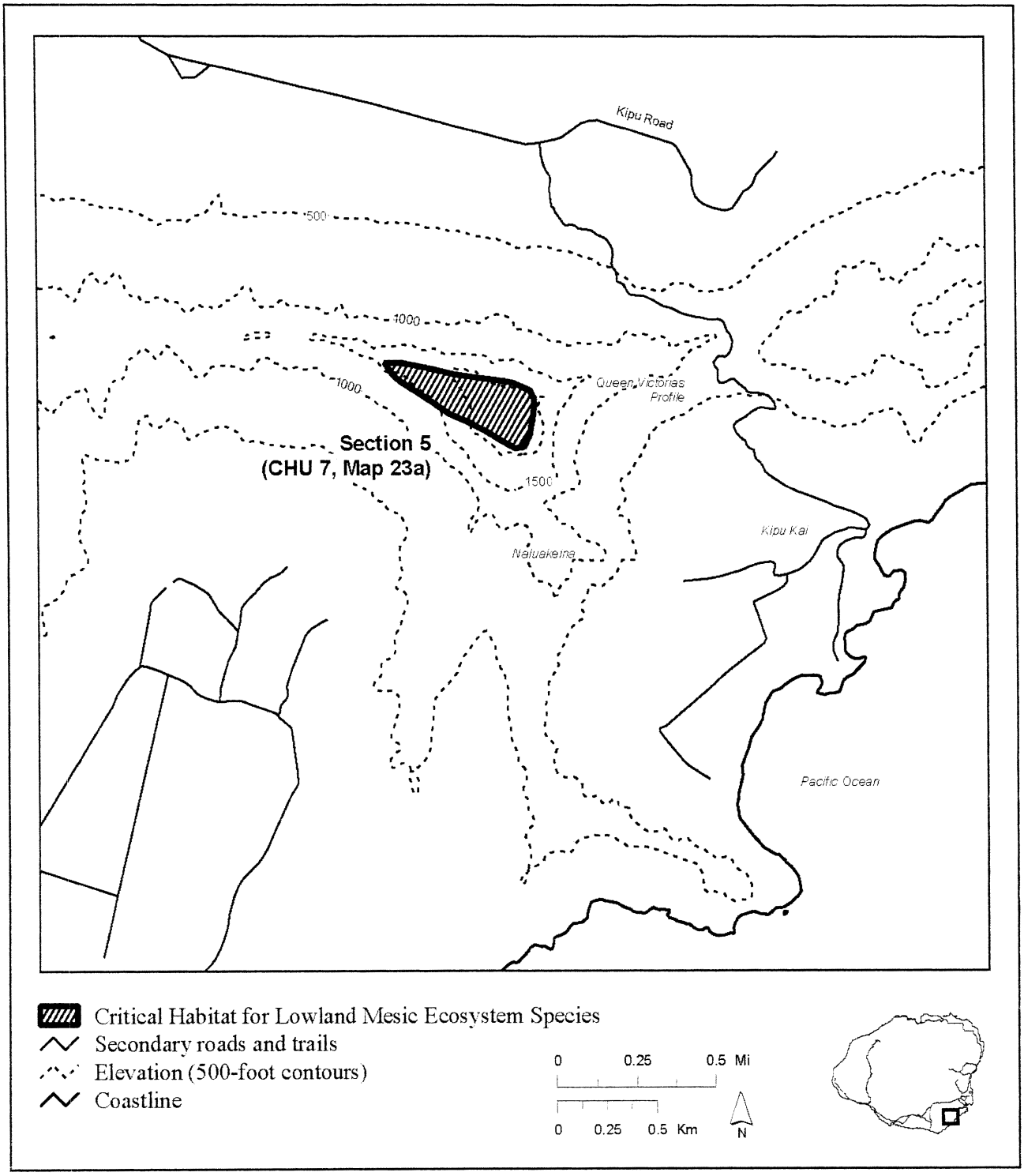


**Figure 1-B.** Area designated as critical habitat for 11 plant species in the Lowland Mesic Ecosystem (Section 5). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99(a)(a)), are provided for ease of referencing.

The entire section is within previously designated critical habitat, and falls within Critical Habitat Unit 7 of 50 CFR 17.99(a)(1), 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. Although 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 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 their historic range. 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 recovery.

*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).

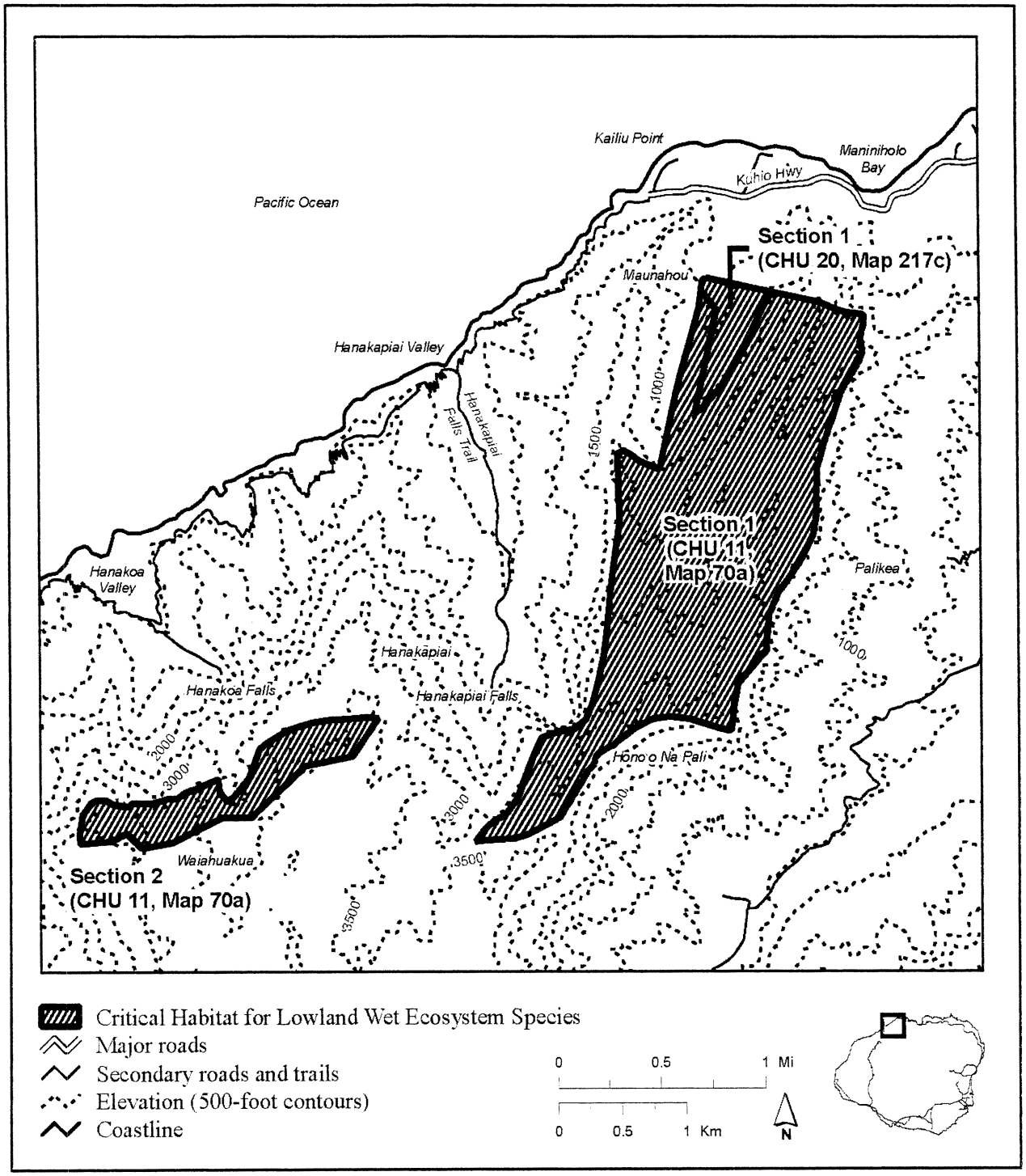


**Figure 2-A.** Areas designated as critical habitat for 16 plant species in the Lowland Wet Ecosystem (Sections 1and 2). Section 1 overlies an existing critical habitat unit (CHU) on Kauai (CHU 11) and an area not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

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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 designated critical habitat on private land. The area that falls within designated critical habitat lies within Critical Habitat Unit 11 of 50 CFR 17.99(a)(1), Map 70a, and newly designated Critical Habitat Unit 20, Map 217c. 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 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). Although Lowland Wet–Section 1 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis, Cyanea eleeleensis*, *C. kolekoleensis, C. kuhihewa*, *Cyrtandra oenobarba, Dubautia imbricata* ssp. *imbricata, Melicope paniculata*, *M. puberula, Platydesma rostrata*, *Stenogyne kealiae, Tetraplasandra bisattenuata*, and *T. flynnii*, we have 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 their historic range. 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 recovery.

*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(a)(1), 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). Although Lowland Wet–Section 2 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis, C. remyi* var. *remyi, Charpentiera densiflora*, *Cyanea eleeleensis, C. kolekoleensis*, *C. kuhihewa, Cyrtandra oenobarba*, *Dubautia imbricata* ssp. *imbricata, Labordia helleri*, *Melicope paniculata, Phyllostegia renovans*, *Platydesma rostrata, Stenogyne kealiae*, *Tetraplasandra bisattenuata*, and *T. flynii*, we have 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 their historic range. 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 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).

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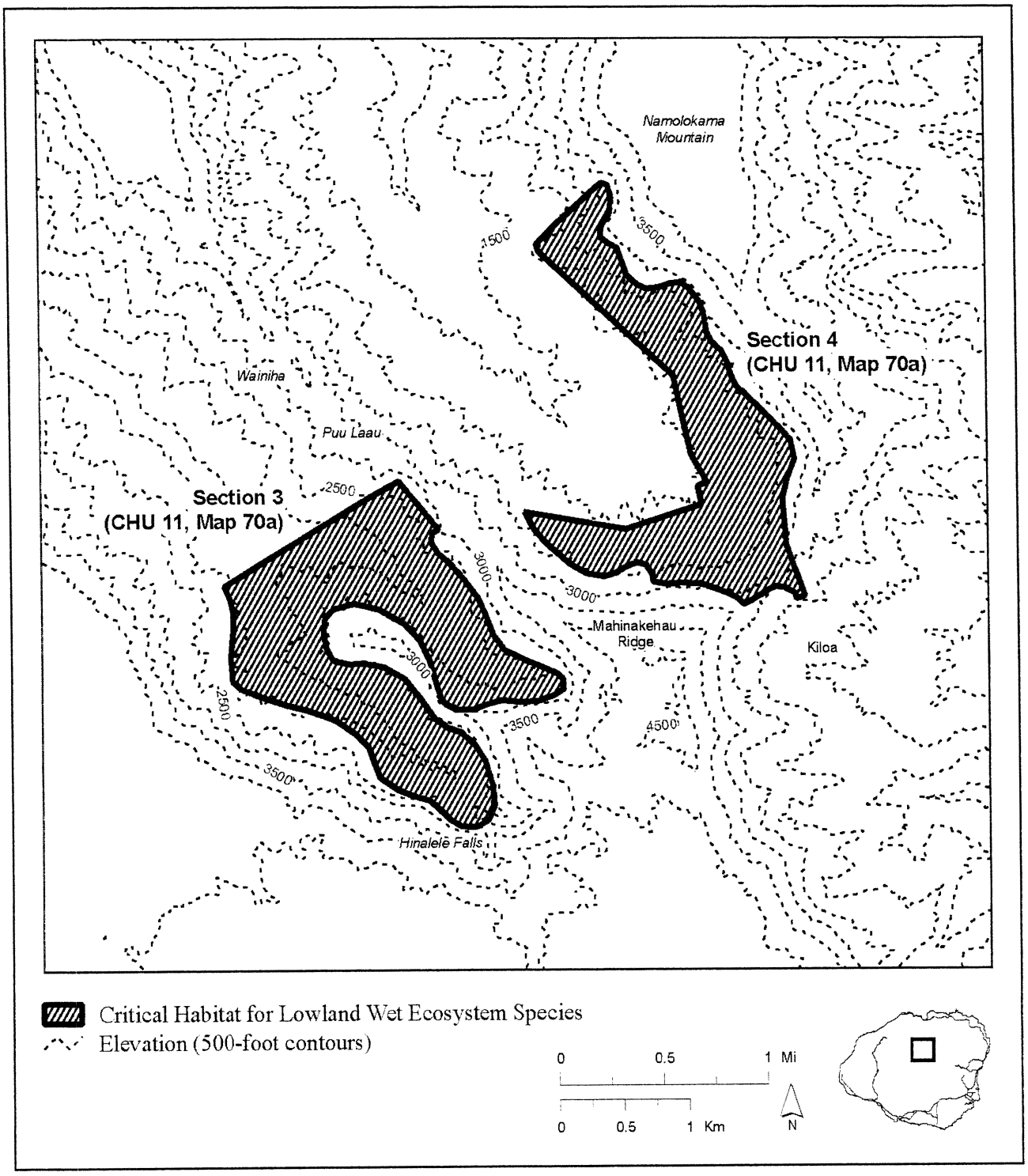


**Figure 2-B.** Areas designated as critical habitat for 16 plant species in the Lowland Wet Ecosystem (Sections 3 and 4). Critical habitat unit (CHU) numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

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The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 11 of 50 CFR 17.99(a)(1), Map 70a, and is occupied by the plants *Chamaesyce remyi* var. *kauaiensis, Cyrtandra oenobarba*, *Melicope puberula, Phyllostegia renovans*, and *Stenogyne kealiae*. 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). Although Lowland Wet–Section 3 is not known to be occupied by the species *Chamaesyce remyi* var. *remyi, Charpentiera densiflora*, *Cyanea eleeleensis, C. kolekoleensis*, *C. kuhihewa, Dubautia imbricata* ssp. *imbricata, Labordia helleri*, *Melicope paniculata, Platydesma rostrata*, *Tetraplasandra bisattenuata*, and *T. flynii*, we have 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 their historic range. 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 recovery.

*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(a)(1), 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). Although Lowland Wet–Section 4 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis, Charpentiera densiflora*, *Cyanea eleeleensis, C. kolekoleensis*, *C. kuhihewa, Dubautia imbricata* ssp. *imbricata, Labordia helleri*, *Melicope puberula, Stenogyne kealiae*, *Tetraplasandra bisattenuata*, and *T. flynii*, we have 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 their historic range. Due to the small numbers of individuals or low population numbers of each of these species, each requires suitable habitat and space for expansion or reintroduction to achieve 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).

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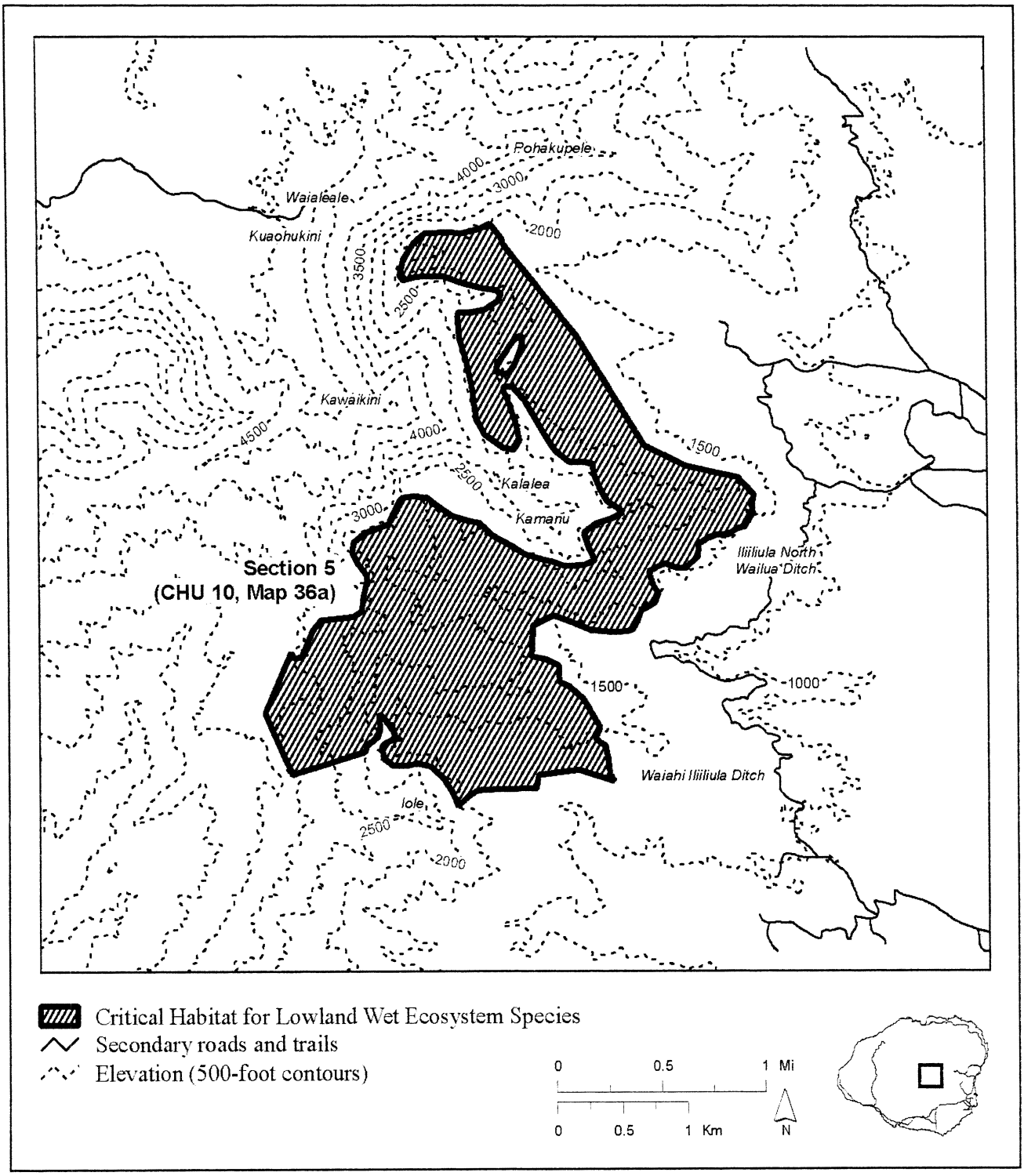


**Figure 2-C.** Area designated as critical habitat for 16 plant species in the Lowland Wet Ecosystem (Section 5). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 10 of 50 CFR 17.99(a)(1), Map 36a, and is occupied by the plants *Cyrtandra oenobarba, Dubautia imbricata* ssp. *imbricata, Melicope paniculata*, *Phyllostegia renovans*, and *Platydesma rostrata*. This section also contains unoccupied habitat that is essential to the conservation of these five5 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). Although Lowland Wet–Section 5 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis, C. remyi* var. *remyi, Charpentiera densiflora*, *Cyanea eleeleensis, C. kolekoleensis*, *C. kuhihewa, Labordia helleri*, *Melicope puberula, Stenogyne kealiae*, *Tetraplasandra bisattenuata*, and *T. flynii*, we have 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 their historic range. 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 recovery.

*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).

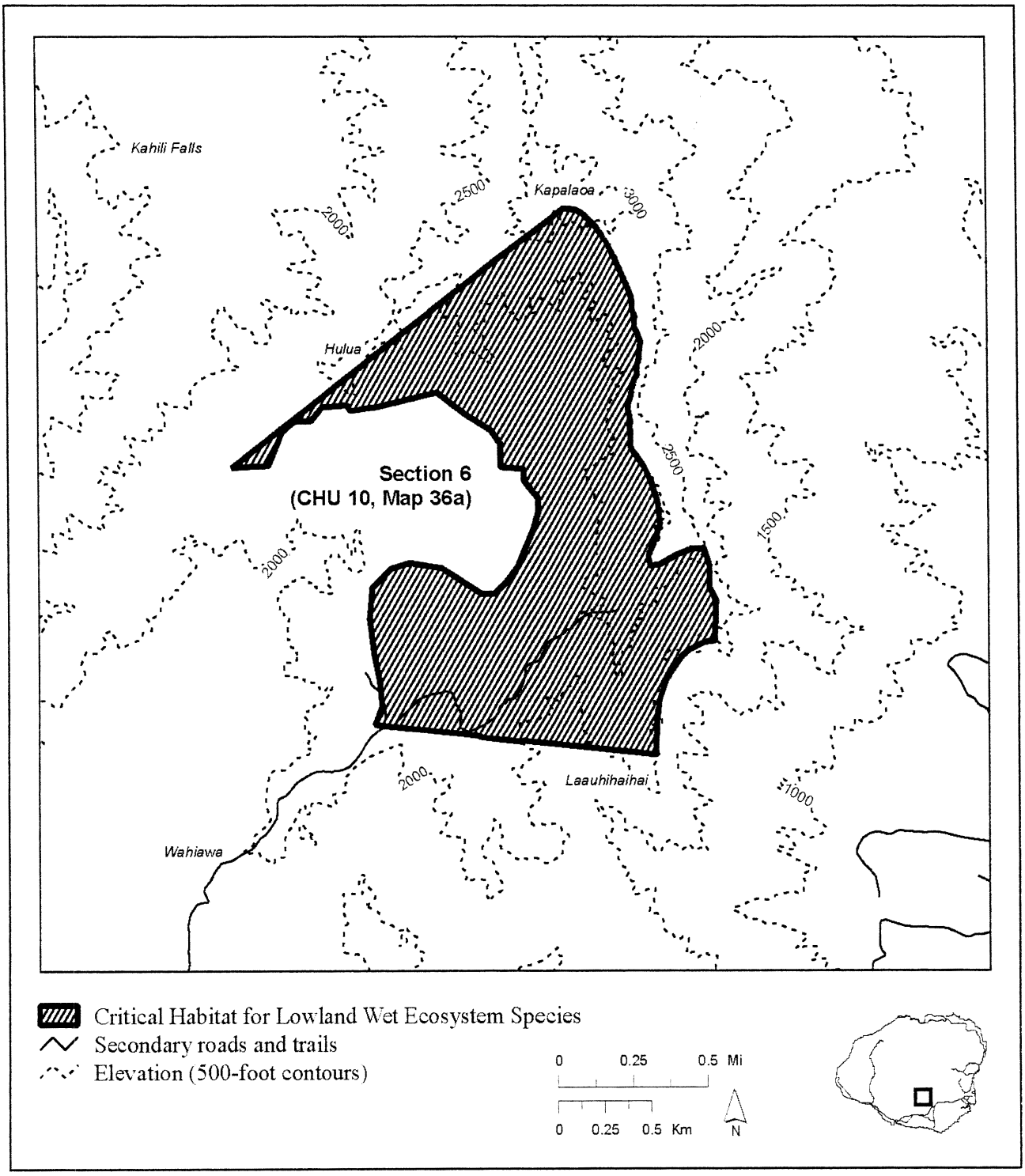


**Figure 2-D.** Area designated as critical habitat for 16 plant species in the Lowland Wet Ecosystem (Section 6). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 10 of 50 CFR 17.99(a)(1), 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). Although Lowland Wet–Section 6 is not known to be occupied by the species *Chamaesyce remyi* var. *kauaiensis, Charpentiera densiflora*, *Cyanea eleeleensis, C. kolekoleensis*, *C. kuhihewa, Labordia helleri*, *Melicope paniculata, M. puberula*, *Phyllostegia renovans, Stenogyne kealiae*, and *Tetraplasandra flynii*, we have 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 their historic range. 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 recovery.

*Kauai—Montane Mesic—Section 1*

Montane Mesic–Section 1 consists of 2,423 ac (980 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).

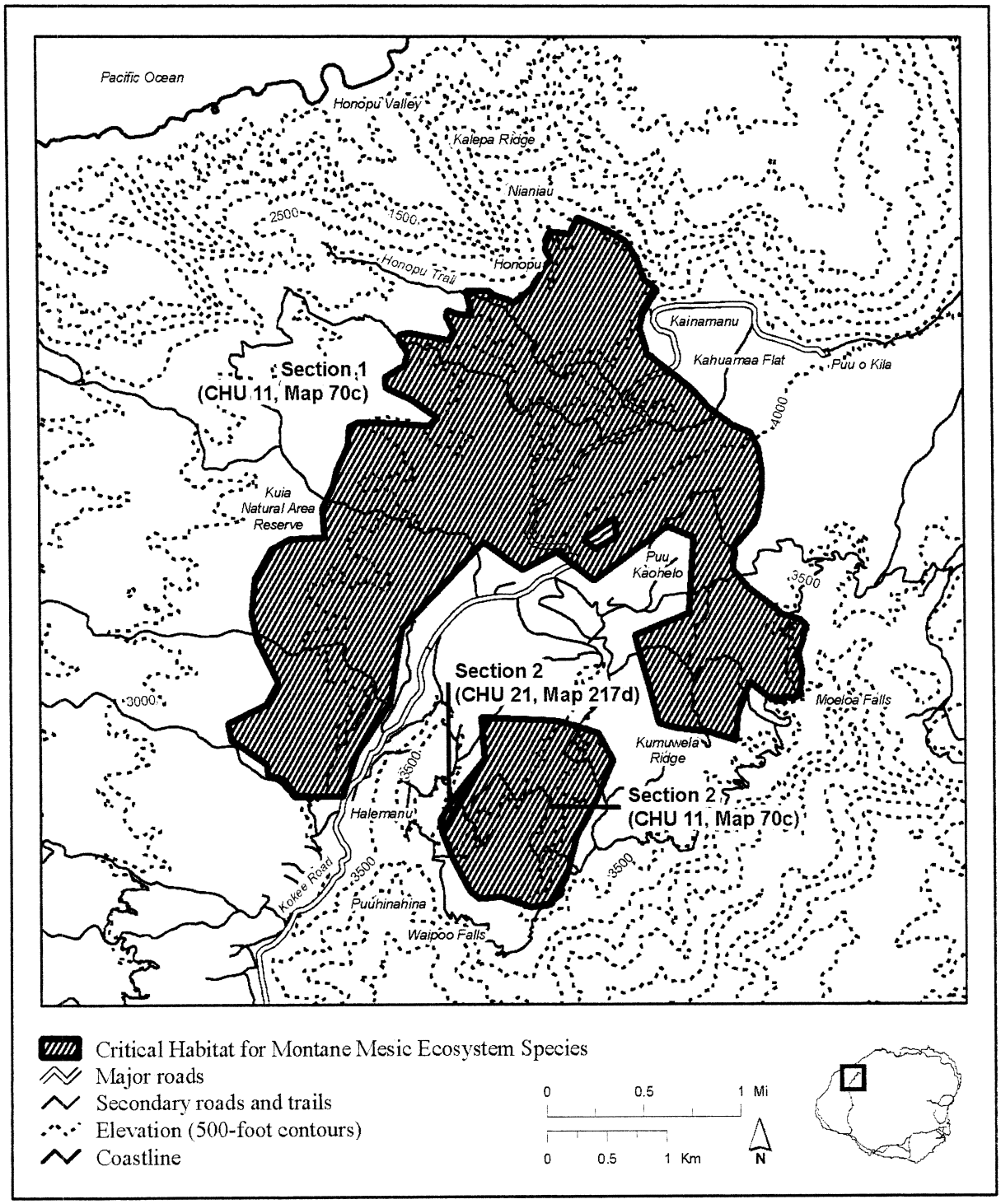


**Figure 3-A.** Areas designated as critical habitat for 9 plant species, the akekee and akikiki, and the picture-wing fly in the Montane Mesic Ecosystem (Sections 1 and 2). For the plants, section 2 overlies an existing critical habitat unit (CHU) on Kauai (CHU 11) and an area not currently designated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

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The entire section is within previously designated critical habitat for the plant species, falling within Critical Habitat Unit 11 of 50 CFR 17.99(a)(1), Map 70c, and is occupied by the plants *Chamaesyce remyi* var. *remyi, Labordia helleri*, *Myrsine knudsenii, Platydesma rostrata*, *Psychotria grandiflora, Stenogyne kealiae*, and *Tetraplasandra flynii*. This section is also occupied by the akekee and the picture-wing fly; maps of critical habitat for these species can be found at 50 CFR 17.95(b) for the akekee and akikiki (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 and akikiki (arthropod prey) and picture-wing fly (the larval-stage host plants, *Cheirodendron* sp. and *Tetraplasandra* sp.). Although Montane Mesic–Section 1 is not known to be occupied by the species *Diellia mannii, Myrsine mezii*, and the akikiki, we have 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 their historic range. 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 recovery.

*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, above). The entire section is State-owned within Kokee State Park, and includes 8 ac (3 ha) of newly designated critical habitat. This section is occupied by *Diellia mannii* and the picture-wing fly *Drosophila sharpi*, 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 plants (*Cheirodendron* sp. and *Tetraplasandra* 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. Although 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 birds the akekee and akikiki, we have 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 their historical range, as well as species-specific PCEs for the akekee and akikiki (arthropod prey). 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 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(a)(1), Map 70c. The previously undesignated land comprises Critical Habitat Unit 21 of 50 CFR 17.99(a)(1), Map 217d. Maps of critical habitat for the akekee and akikiki 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 139 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).

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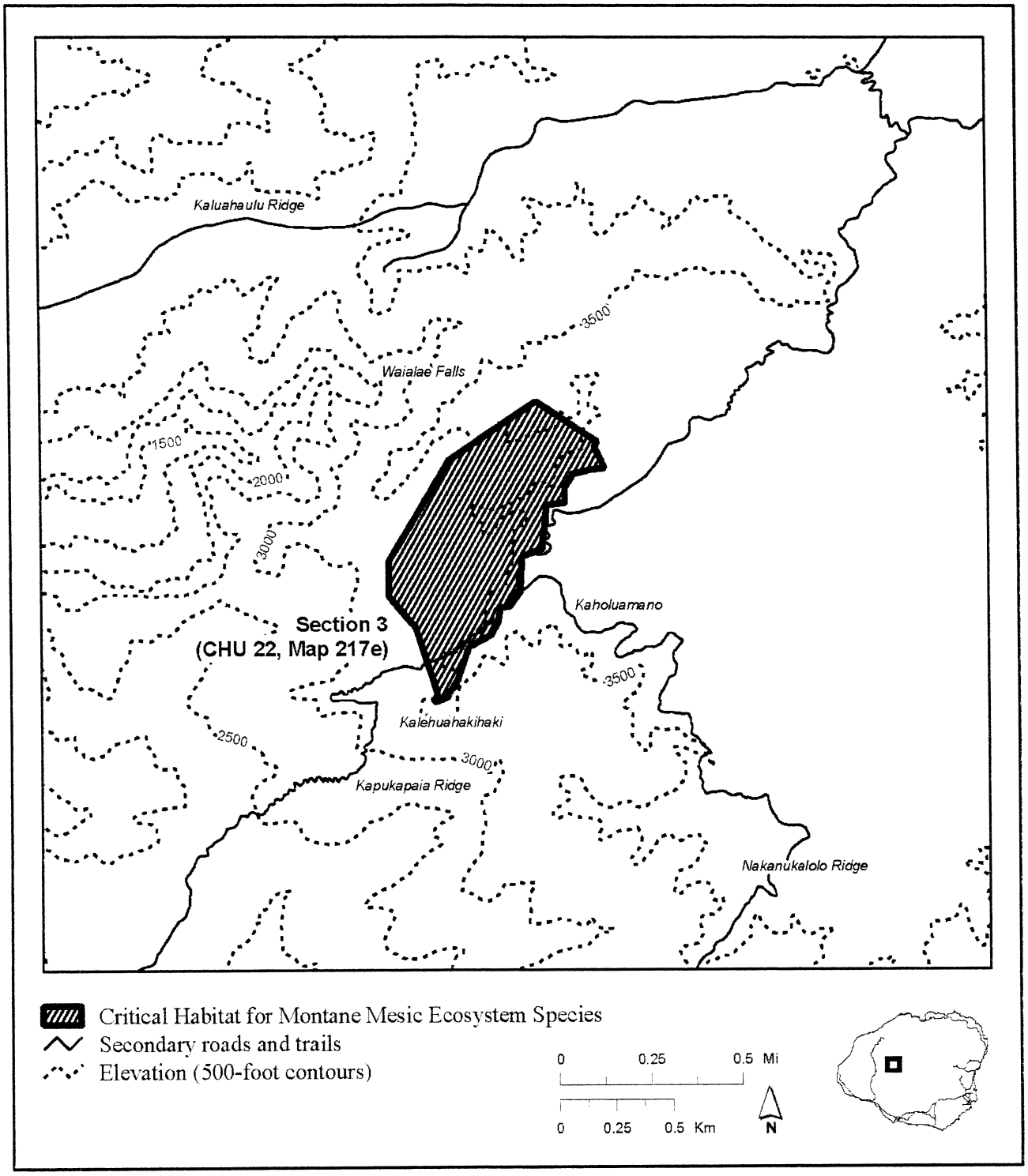


**Figure 3-B.** Area designated as critical habitat for 9 plant species, the akekee and akikiki, and the picture-wing fly in the Montane Mesic Ecosystem (Section 3). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

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. Although 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 birds the akekee and akikiki; or by the picture-wing fly *Drosophila sharpi*, we have 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 their historic range. It also provides for the species-specific PCEs for the akekee and akikiki (arthropod prey) and the larval-stage host plants (*Cheirodendron* sp. and *Tetraplasandra* sp.) associated with *D. sharpi*. 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 recovery.

For the plants, this section comprises Critical Habitat Unit 22 of 50 CFR 17.99(a)(1), Map 217e. Maps of critical habitat for the akekee and akikiki 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).

*Kauai—Montane Wet—Section 1*

Montane Wet–Section 1 consists of 13,055 ac (5,257 ha) in the montane wet ecosystem, extending across the Alakai Plateau from Hanakoa to Mount Waialeale, on State (12,628 ac, 5,110 ha) and privately owned (427 ac, 173 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).

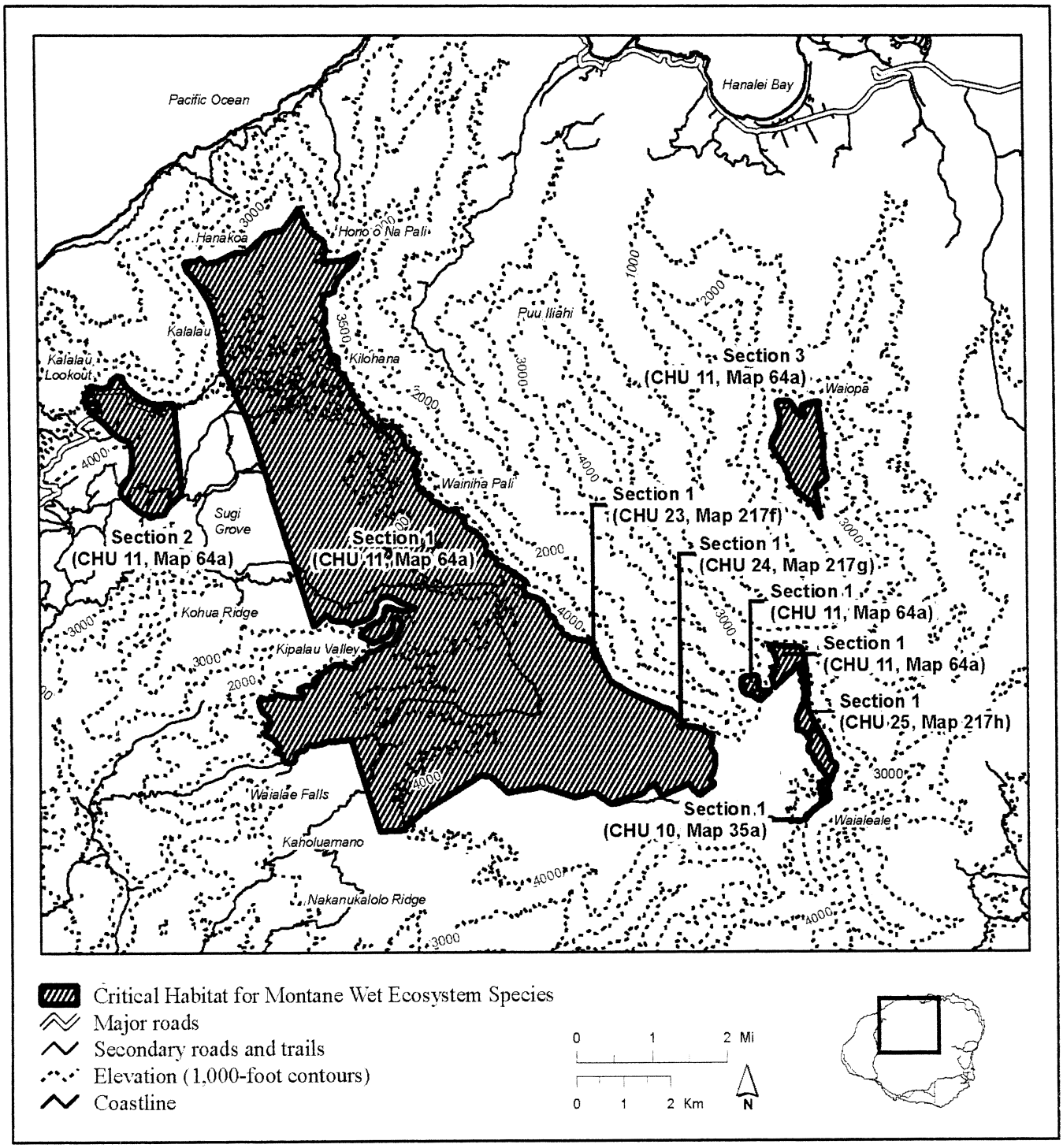


**Figure 4.** Areas designated as critical habitat for 18 plant species, the akekee and akikiki, and the picture-wing fly in the Montane Wet Ecosystem (Sections 1, 2, and 3). For the plants, section 1 overlies two existing critical habitat units (CHU) on Kauai (CHU 10 and CHU 11) and areas not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

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It is occupied by the plants *Astelia waialealae, Chamaesyce remyi* var. *remyi, Dryopteris crinalis* var. *podosorus, Dubautia waialealae*, *Geranium kauaiense, Keysseria erici*, *K. helenae, Labordia helleri*, *L. pumila, Lysimachia daphnoides*, *Melicope degeneri, M. 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*) (2) bog hummocks (identified as PCEs for *Astelia waialealae* and *Lysimachia daphnoides*); (3) arthropod prey (identified as PCEs for the akekee and the akikiki); and (4) larval-stage host plants, *Cheirodendron* and *Tetraplasandra* sp., (identified as a PCE for the picture-wing fly). Although Montane Wet–Section 1 is not known to be occupied by the plants *Dubautia kalalauensis, Psychotria grandiflora*, and *Tetraplasandra flynnii*, we have 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 their historical range. 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 recovery.

For the plants, those portions of the section that overlie previously designated critical habitat fall within two existing Critical Habitat Units of 50 CFR 17.99(a)(1): Unit 10, Map 35a; and Unit 11, Map 64a. The previously undesignated land comprises Unit 23, Map 217f; and Unit 24, Map 217g. Maps of critical habitat for the akekee and akikiki can be found at 50 CFR 17.95(b) (Unit 4–Montane Wet), and for the picture-wing fly *Drosophila sharpi* at 50 CFR 17.95(i) (Unit 4–Montane Wet).

*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*, *Labordia helleri, Melicope puberula*, *Platydesma rostrata, Psychotria grandiflora,* and *Tetraplasandra flynii*, and by the akekee. This section includes montane wet forest, potentially some small-scale boggy areas, 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). Although 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 pumila*, *Lysimachia daphnoides, Melicope degeneri*, *Myrsine mezii*, and *Phyllostegia renovans*; by the akikiki; or by the picture-wing fly, *Drosophila sharpi*, we have 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 their historical range. This area also supports the arthropod prey identified as a PCE for the akikiki, and the larval-stage host plants (*Cheirodendron* and *Tetraplasandra* spp.) identified as a PCE for the picture-wing fly. 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 recovery.

For the plants, critical habitat falls within previously designated Critical Habitat Unit 11 of 50 CFR 17.99(a)(1), Map 64a. Maps of critical habitat for the akekee and akikiki can be found at 50 CFR 17.95(b) (Unit 5–Montane Wet), and for the picture-wing fly *Drosophila sharpi* at 50 CFR 17.95(i) (Unit 5–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, above). 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*). Although 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*, *D. waialeale, Geranium kauaiense*, *Keysseria helenae, Labordia helleri*, *Lysimachia daphnoides, Melicope degeneri*, *M. puberula, Myrsine mezii*, *Phyllostegia renovans, Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynnii*; by the akekee and akikiki; or by the picture-wing fly, *Drosophila sharpi*, we have 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 their historic range. It also supports the arthropod prey identified as a PCE for the akekee and akikiki, and the larval-stage host plants (*Cheirodendron* and *Tetraplasandra* spp.) identified as a PCE for the picture-wing fly. 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 recovery.

For the plants, critical habitat falls within Critical Habitat Unit 11 of 50 CFR 17.99(a)(1), Map 64a. Maps of critical habitat for the akekee and akikiki can be found at 50 CFR 17.95(b) (Unit 6–Montane Wet), and for the picture-wing fly *Drosophila sharpi* at 50 CFR 17.95(i) (Unit 6–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).

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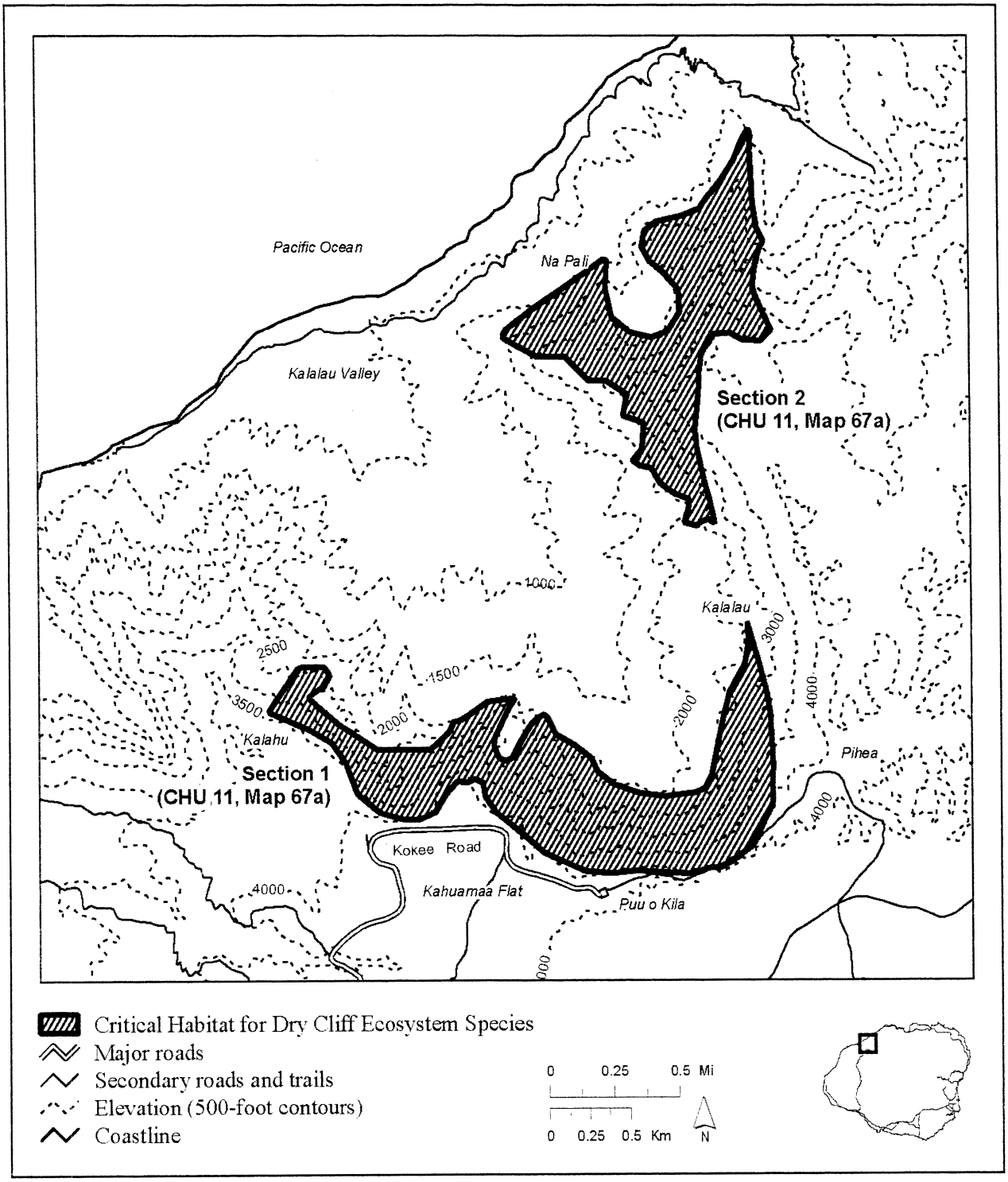


**Figure 5.** Areas proposed designated as critical habitat for 4 plant species in the Dry Cliff Ecosystem (Sections 1 and 2). Critical habitat unit (CHU) numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

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(a)(1), 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).

*Kauai—Dry Cliff—Section 2*

Dry Cliff–Section 2 consists of 309 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, 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(a)(1), 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). Although Dry Cliff - Section 3 is not known to be occupied by the plants *Lysimachia scopulensis, Schiedea attenuata*, and *Stenogyne kealiae*, we have 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 their historic 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 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).

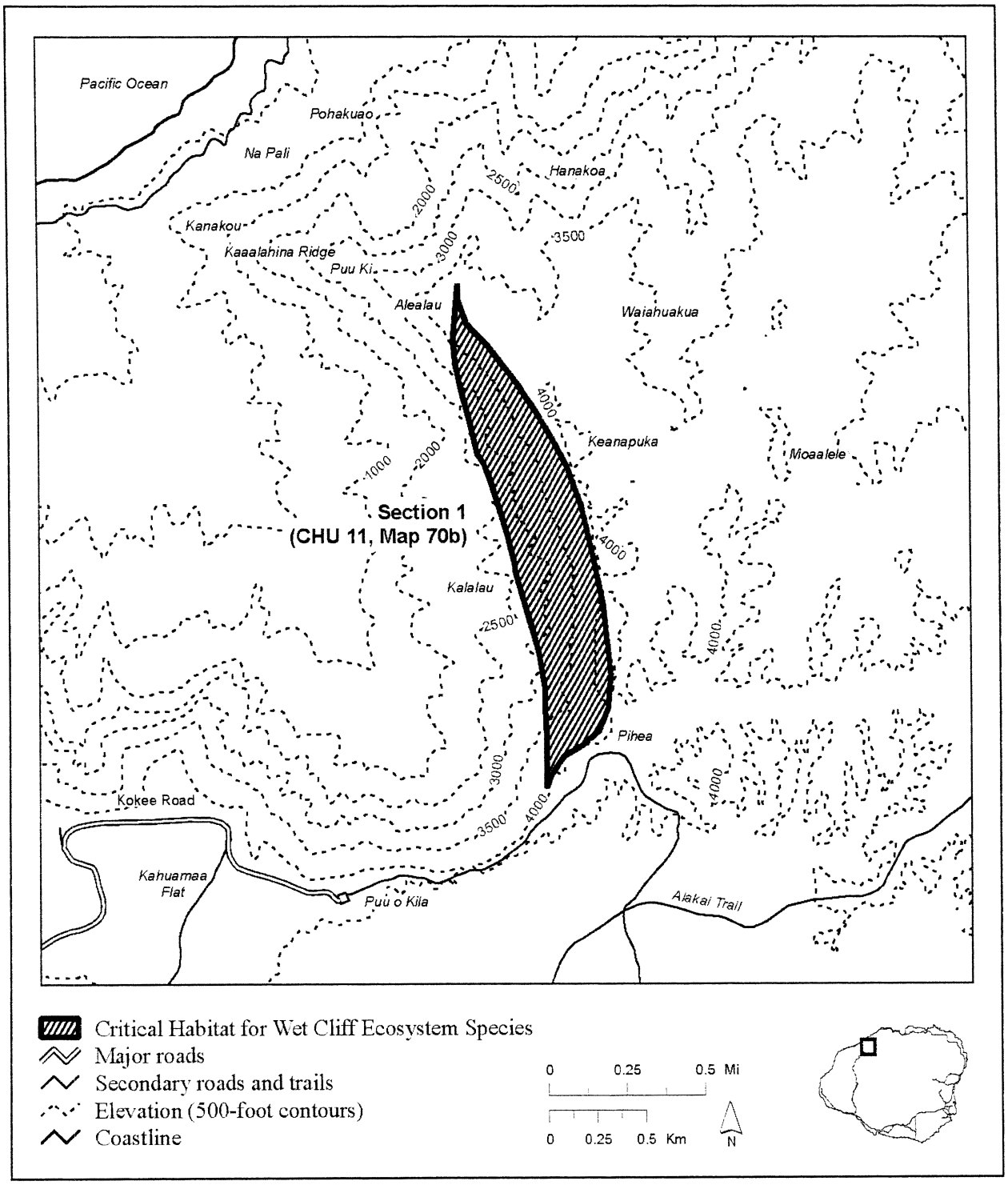


**Figure 6-A.** Area designated as critical habitat for 10 plant species in the Wet Cliff Ecosystem (Section 1). Critical habitat unit (CHU) number and map number, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

The entire section is within previously designated critical habitat, falling within Critical Habitat Unit 11 of 50 CFR 17.99(a)(1), 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). Although Wet Cliff–Section 1 is not known to be occupied by the plants *Chamaesyce remyi* var. *kauaiensis, Cyanea dolichopoda*, *Cyrtandra oenobarbara, C. paliku*, *Dubautia plantaginea* ssp. *magnifolia, Lysimachia iniki*, *L. pendens, L. venosa*, and *Platydesma rostrata*, we have 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 their historical range. 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 recovery.

*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 (6 ac, 3 ha) land in the Lihue-Koloa Forest Reserve (Figure 6-B).

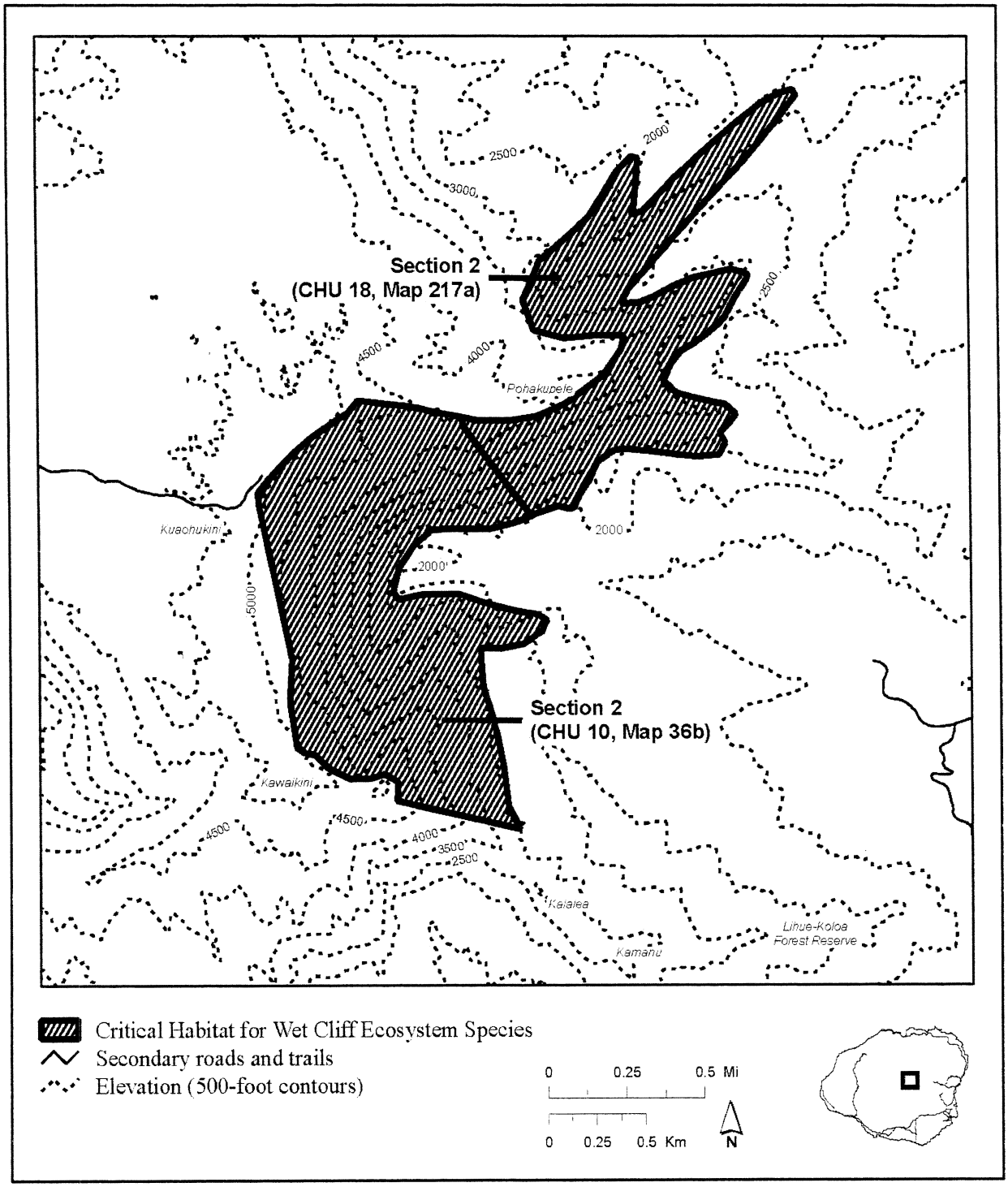


**Figure 6-B.** Area designated as critical habitat for 10 plant species in the Wet Cliff Ecosystem (Section 2). Section 2 overlies an existing critical habitat unit (CHU) on Kauai (CHU 10) and an area not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

There are 489 ac (198 ha) within previously designated critical habitat and 296 ac (120 ha) of newly designated 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(a)(1), Map 36b. The newly designated portion of the section comprises Critical Habitat Unit 18 of 50 CFR 17.99(a)(1), Map 217a. This section is occupied by the plants *Chamaesyce remyi* var. *kauaiensis, Cyrtandra oenobarba*, *Dubautia plantaginea* ssp. *magnifolia, Lysimachia iniki*, *L. 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). Although Wet Cliff–Section 2 is not known to be occupied by the plants *Chamaesyce remyi* var. *remyi, Cyanea dolichopoda*, *Cyrtandra paliku*, and *Lysimachia venosa,* we have 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 their historic range. 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 recovery.

*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).

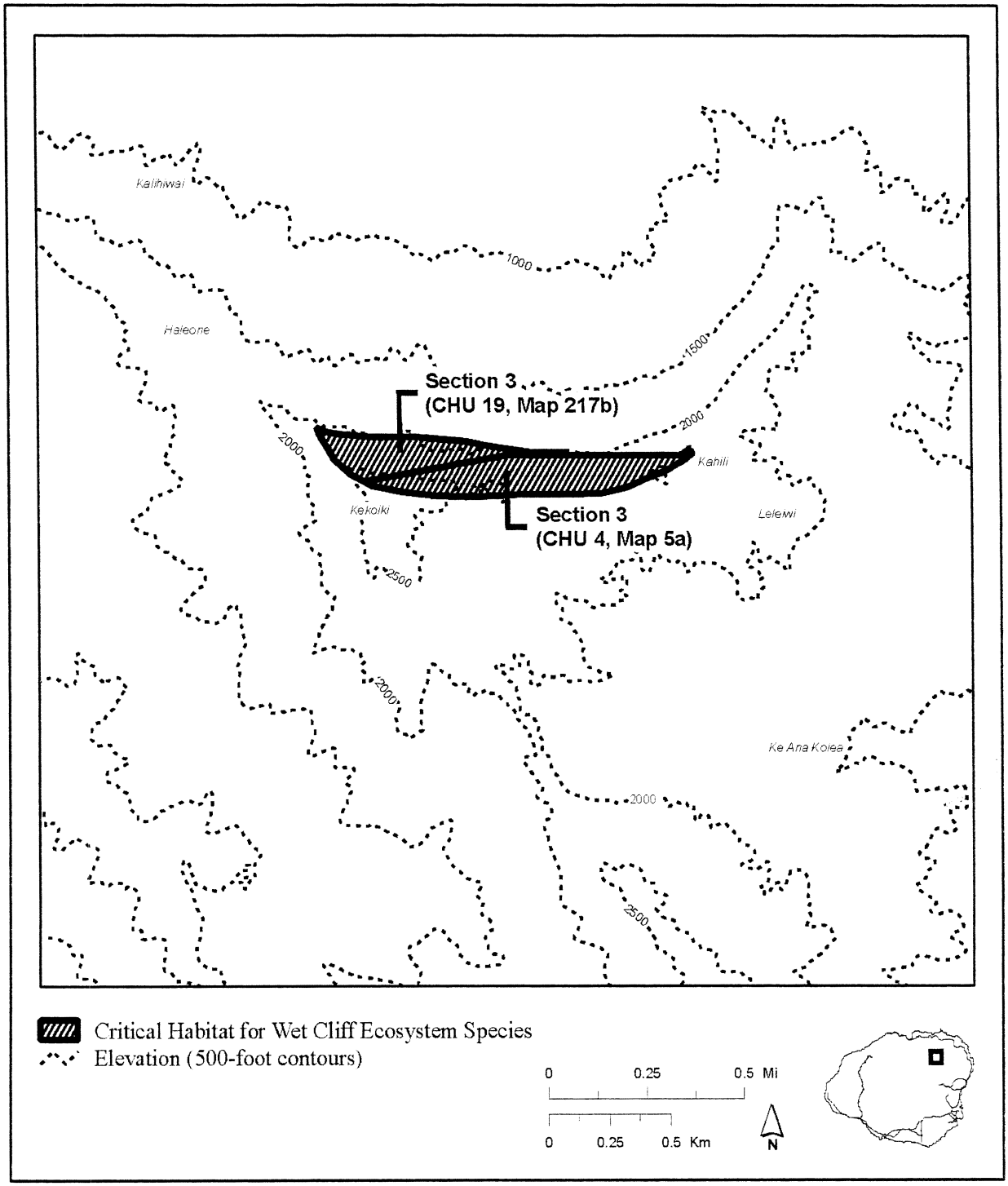


**Figure 6-C.** Area designated as critical habitat for 10 plant species in the Wet Cliff Ecosystem (Section 3). Section 3 overlies an existing critical habitat unit (CHU) on Kauai (CHU 4) and an area not currently designated as critical habitat. CHU numbers and map numbers for each section, as published in the Code of Federal Regulations (50 CFR 17.99(a)(1)), are provided for ease of referencing.

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There are 23 ac (9 ha) of newly designated critical habitat on privately owned land within this section. That portion of the section that falls within previously designated critical habitat is within Critical Habitat Unit 4 of 50 CFR 17.99(a)(1), Map 5a. The newly designated portion of the section comprises Critical Habitat Unit 19 of 50 CFR 17.99(a)(1), Map 217b. 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). Although Wet Cliff–Section 3 is not known to be occupied by the plants *Chamaesyce remyi* var. *kauaiensis, C. remyi* var. *remyi, Cyanea dolichopoda*, *Cyrtandra oenobarbara, Dubautia plantaginea* ssp. *magnifolia, Lysimachia iniki*, *L. pendens, L. venosa*, and *Platydesma rostrata*, we have 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 their historic range. 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 recovery.

**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 jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Decisions by the Fifth and Ninth 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, we determine destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional (or retain those physical and biological features that relate to the ability of the area to support the species) 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. As a result of this consultation, we issue either:

(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:

(1) Can be implemented in a manner consistent with the intended purposes of the action,

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,

(3) Are economically and technologically feasible, and

(4) 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 final rule or their designated critical habitat require section 7(a)(2) consultation under the Act. Activities on State, local government, 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, local government, 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 retain those PCEs that relate to the ability of the area to support the species. The role of critical habitat is to support the life history needs of the 47 species identified in this final rule and provide for their conservation.

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 should result in consultation include, but are not limited to:

(1) Activities that may affect the primary constituent elements for the species, such as: 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 present a risk of fire.

(2)Activities that may alter watershed characteristics in ways that would affect groundwater recharge or alter natural, wetland, or vegetative communities, such as: New water diversions or impoundments, groundwater pumping,

and manipulation of vegetation through activities such as the ones mentioned above.

(3)Recreational activities that may affect 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.

Please see "Special Management Considerations or Protections" section for a more detailed discussion on the impacts of these actions to the listed species.

**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 within the critical habitat designation. Therefore, no lands have been exempted from this critical habitat designation under section 4(a)(3) of the Act.

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

*Background*

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. 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 a determination that the benefits of exclusion would outweigh the benefits of inclusion of an area, 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. 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 by the Department of Defense (DOD) where a national security impact might exist. We also consider whether landowners have developed any conservation plans for the area, or whether there are existing or potential conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. We also consider any social or other impacts that might occur because of the designation.

In developing this final rule, we have determined that the lands within the designation of critical habitat for the 47 species are not managed by the Department of Defense, and there are currently no habitat conservation plans (HCPs) for these species. As such, we do not anticipate any impacts to national security or HCPs from this final critical habitat designation.

In the following sections, we address a number of general issues that are relevant to the exclusion considered in this final critical habitat rule.

*Benefits of Designating Critical Habitat*

The process of designating critical habitat as described in the Act requires that the Service identify those areas within the geographical area occupied by the species at the time of listing on which are found the physical or biological features essential to the conservation of the species that may require special management considerations or protection, and those areas outside the geographical area occupied by the species at the time of listing that are essential for the conservation of the species. In identifying those areas, the Service must consider the recovery needs of the species, such that, on the basis of the best scientific and commercial data available at the time of designation, the features and areas identified, if managed or protected, could aid in providing for the survival and recovery of the species.

The identification of areas that contain the features essential to the conservation of the species, or are otherwise essential for the conservation of the species if outside the geographical area occupied by the species at the time of listing, is a benefit resulting from the designation. The critical habitat designation process includes peer review and public comment on the identified physical and biological features and areas, and provides a mechanism to educate landowners, State and local governments, and the public regarding the potential conservation value of an area. This helps focus and promote conservation efforts by other parties by clearly delineating areas of high conservation value for the species, and is valuable to land owners and managers in developing conservation management plans by describing the PCEs and special management actions or protections that are needed for identified areas. Including lands in critical habitat also informs State agencies and local governments about areas that could be conserved under State laws or local ordinances.

The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of critical habitat. As discussed above, Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species, and in some locations, the outcome of these analyses will be similar because effects on habitat will often result in effects on the species. However, the regulatory standard is different, as the jeopardy analysis looks at the action's impact on survival and recovery of the species, while the adverse modification analysis looks at the action's effects to the designated habitat's contribution to the species' conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

There are two limitations to the regulatory effect of critical habitat. First, a section 7(a)(2) consultation is required only where there is a Federal nexus (an action authorized, funded, or carried out by any Federal agency)—if there is no Federal nexus, the critical habitat designation of private lands itself does not restrict any actions that destroy or adversely modify critical habitat. Second, the designation only limits destruction or adverse modification. By its nature, the prohibition on adverse

modification is designed to ensure that the conservation role and function of those areas identified as critical habitat are not appreciably reduced as a result of a Federal action. Critical habitat designation alone, however, does not require property owners to undertake specific steps toward recovery of the species.

Once an agency determines that consultation under section 7(a)(2) of the Act is necessary, the process may conclude informally when the Service concurs in writing that the proposed Federal action is not likely to adversely affect the species or critical habitat. However, if we determine through informal consultation that adverse impacts are likely to occur, then formal consultation is initiated. Formal consultation concludes with a biological opinion issued by the Service on whether the proposed Federal action is likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

For critical habitat, a biological opinion that concludes in a determination of no destruction or adverse modification may recommend additional conservation measures to minimize adverse effects to primary constituent elements, but such measures would be discretionary on the part of the Federal agency. A biological opinion that concludes in a determination of no destruction or adverse modification would not suggest the implementation of any reasonable and prudent alternative, as we suggest reasonable and prudent alternatives to the proposed Federal action only when our biological opinion results in a jeopardy finding or an adverse modification conclusion.

As stated above, the designation of critical habitat does not require that any management or recovery actions take place on the lands included in the designation. Even in cases where consultation has been initiated under section 7(a)(2) of the Act, the end result of consultation is to avoid jeopardy to the species or adverse modification of its critical habitat, but not necessarily to manage critical habitat or institute recovery actions on critical habitat. On the other hand, voluntary conservation efforts implemented through management plans can remove or reduce known threats to a species or its habitat by implementing recovery actions. We believe that in many instances the regulatory benefit of critical habitat is minimal when compared to the conservation benefit that can be achieved through implementing HCPs under section 10 of the Act, or other voluntary conservation efforts or management plans. The conservation achieved through implementing HCPs or other habitat management plans can be greater than what we achieve through multiple site-by-site, project-by-project, section 7(a)(2) consultations involving consideration of critical habitat. Management plans commit resources to implement long-term management and protection to particular habitat for at least one and possibly other listed or sensitive species. Section 7(a)(2) consultations commit Federal agencies to preventing adverse modification of critical habitat caused by the particular project; consultation does not require Federal agencies to provide for conservation or long-term benefits to areas not affected by the proposed project. Thus, implementation of any HCP or management plan that incorporates enhancement or recovery as the management standard may often provide as much or more benefit than a consultation for critical habitat designation.

*Conservation Partnerships on Non-Federal Lands*

Section 4(b)(2) of the Act allows the Secretary to exclude areas from critical habitat for other relevant impacts 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. As discussed below, we believe that in some cases designation can negatively affect the working relationships and conservation partnerships formed with private landowners, and may serve as a disincentive for the formation of future partnerships that would have the potential to provide conservation benefits. The Service recognizes that most federally listed species in the United States will not recover without the cooperation of non-Federal landowners. More than 60 percent of the United States is privately owned (US Department of Agriculture 2002), and at least 80 percent of endangered or threatened species occur either partially or solely on private lands (Crouse *et al.* 2002, p. 720). Eight-eight percent of the State of Hawaii is made up of non-Federal lands. Stein *et al.* (1995, p. 400) found that only about 12 percent of listed species in the United States were found almost exclusively on Federal lands (90 to100 percent of their known occurrences restricted to Federal lands) and that 50 percent of listed species are not known to occur on Federal lands at all.

Given the distribution of listed species with respect to land ownership, conservation of listed species in many parts of the United States is dependent upon working partnerships with a wide variety of entities and the voluntary cooperation of many non-Federal landowners (Wilcove and Chen 1998, p. 1407; Crouse *et al.* 2002, p. 720; James 2002, p. 271). Building partnerships and promoting voluntary cooperation of landowners is essential to understanding the status of species on non-Federal lands and is necessary to implement recovery actions such as reintroducing listed species, habitat restoration, and habitat protection.

Many non-Federal landowners derive satisfaction in contributing to endangered species recovery. However, private landowners are often wary of the possible consequences of encouraging endangered species conservation on their property, and of regulatory action by the Federal government under the Endangered Species Act (Act). Social research has demonstrated that for many private landowners, government regulation under the Act is perceived as a loss of individual freedoms, regardless of whether that regulation may in fact result in any actual impact to the landowner (Brook *et al.* 2003, pp. 1644–1648; Conley *et al.* 2007, p. 141). The magnitude of this negative outcome is greatly amplified in situations where active management measures (such as reintroduction, fire management, and the control of invasive species) are necessary for species conservation (Bean 2002, pp. 3–4). Furthermore, in a recent study of private landowners who have experience with regulation under the Act, only 2 percent of respondents believed the Federal government rewards private landowners for good management of their lands and resources (Conley *et al.* 2007, p. 141, 144).

As described above, the Service recognizes that in many cases, building partnerships and promoting the voluntary cooperation of private landowners will be essential to the successful conservation and recovery of threatened and endangered species. Since government actions such as the designation of critical habitat on private lands may be perceived as an infringement of private property rights, and may reduce the likelihood that landowners will support and carry out conservation actions for the benefit of listed species, we believe that the judicious exclusion of specific areas of non-federally owned lands from critical habitat designations can contribute to

species recovery and provide a greater level of species conservation than critical habitat designation alone. Although we believe that the potentially positive contribution of private landowners with a demonstrated record of conservation management should be an important consideration when designating critical habitat, we wish to emphasize that we will continue to be discriminating in our evaluation of potential exclusions, and private lands will only be excluded should we determine that the benefits of exclusion outweigh the benefits of inclusion following a rigorous examination of the record on a case-by-case basis.

The purpose of designating critical habitat is to contribute to the conservation of threatened and endangered species and the ecosystems upon which they depend. The outcome of the designation, triggering regulatory requirements for actions funded, authorized, or carried out by Federal agencies under section 7(a)(2) of the Act, can sometimes be counterproductive to its intended purpose on non-Federal lands when it causes private landowners to avoid taking conservation actions they might otherwise do. Thus the benefits of excluding areas that are covered by partnerships or voluntary conservation commitments can often be high.

A related benefit of our willingness to exclude, in appropriate situations, lands under active conservation management from a critical habitat designation is that it creates an incentive for the establishment of new partnerships in future conservation efforts with States, counties, local jurisdictions, conservation organizations, and private landowners. In our experience and as advised by various researchers on the subject, we can greatly strengthen the effective implementation of the Act through such partnerships to achieve conservation on non-Federal lands (Bean and Wilcove 1992, pp. 1-2; Bean 2002, pp. 419-420; Crouse *et al.* 2002, p. 270; James 2002, p. 271; Brook *et al.* 2003, pp. 8-9; Conley *et al.* 2007, p. 145). Together with our partners, we can implement conservation actions that we would be unable to accomplish otherwise. By excluding these lands, we not only preserve our current partnerships, but further encourage additional conservation actions in the future.

Even if lands are excluded from a critical habitat designation, if listed species are present and may be affected by actions with Federal involvement (including actions funded, permitted, or otherwise carried out by the Federal government), those actions will still require consultation under section 7 to review the effects of those actions under a jeopardy standard. This assessment includes effects from habitat modification regardless of whether it is designated critical habitat.

*Economic Analysis*

Ninety-eight percent (25,988 out of 26,582 ac (10,517 out of 10,757 ha)) of the critical habitat designated in this final rule occurs within critical habitat units that were designated for 83 Kauai plants (68 FR 9116, February 27, 2003), and for which a contracted economic analysis was completed. Designated 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 final rule. Montane Mesic – Section 3 is the only critical habitat unit being designated in this final rule that does not overlap previously designated critical habitat (see Table 5 for cross-reference of ecosystem section numbers with critical habitat unit numbers in the CFR). We evaluated the potential economic impacts of the proposed designation, finalized here, in an internal economic impact analysis ("Economic Impact Analysis, Proposed Listing and Critical Habitat Designation for 48 Species on the Island of Kauai, Hawaii," USFWS 2008). Due to the extensive overlap of the proposed designation with recently designated critical habitat, we used the economic analysis developed for the 2003 Kauai plants rule to inform our economic impact analysis and this final designation of critical habitat for 47 species on Kauai.

In addition, the final rule designating critical habitat for the Newcomb's snail (*Erinna newcombi*) (67 FR 54026, August 20, 2002), designated 609 ac (246 ha) under State ownership that partially overlap with three of the critical habitat areas designated in this final 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). In our economic impact analysis of the proposed designation for 47 Kauai species, we estimate a total of $3,570 in projected costs resulting from critical habitat designation could be attributable to this overlapping area, based on the contracted economic analysis that was prepared for the Newcomb's snail proposed rule (USFWS 2008, p. 12). The economic analysis developed for the Newcomb's snail final rule was also used to inform this final designation of critical habitat for 47 species on Kauai. Specific information on the previous economic analyses follows.

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 mi (26.3 km) of main stream channel in nine critical habitat units for Newcomb's snail (*Erinna newcombi*) on Kauai. The draft economic analysis covered the 10–year timeframe from 2002–2012, and identified the total section 7 consultation costs and 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, which included 12.3 mi (19.7 km) of stream channel and 4,479 ac (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 over the 10–year period, 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 as a result of economic impacts. Of the $19,500 in potential costs identified in the Newcomb's snail final critical habitat designation, in our current economic impact analysis we estimate that $3,570 could be attributable to the area overlapping this final rule(USFWS 2008, p. 12). The three Newcomb's snail critical habitat areas identified above also overlap with areas that were designated as critical habitat in the 2003 final rule for 83 Kauai plants (see below).

On May 28, 2002, we published a notice in the **Federal Register** announcing the availability of the draft economic analysis (DEA) for the proposed designation of 99,206 ac (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 characterized 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 ac (21,266 ha) as critical habitat on Kauai and 357 ac (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 final rule were excluded or modified in the final rule as a result of economic impacts.

The final economic analysis for the 2003 rule estimated that the listing of the 83 plants and the designation of 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 designated in this final rule. These projected costs were associated with section 7 consultations related to: (1) game management and project modifications; (2) National Tropical Botanical Garden lands; (3) communications facilities and project modifications; (4) water systems; and (5) FEMA disaster response activities (USFWS 2008, p. 8). However, the best available information indicates that none of these projected costs have been realized; to the best of our knowledge, to date there have been no incremental costs incurred as the result of the 2003 critical habitat designation.

The PCEs described in the 2003 Kauai plants rule and those for the 47 species for which critical habitat is designated here are similar. Because of this similarity, our economic impact analysis (USFWS 2008) did not identify any additional economic costs for the 25,988 ac (10,517 ha) of designated critical habitat that overlap 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 25,988 overlapping ac (10,517 ha) would likely be adequate to avoid adverse modification of critical habitat designated for the additional species in this final rule. Furthermore, both of the prior economic analyses used an adverse modification standard that 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, and we received no comments regarding the economic impact analysis presented in the October 21, 2008, proposed rule (73 FR 62592).

In this final rule, we are designating approximately 594 ac (240 ha) in six ecosystem areas that do not completely overlap with areas already designated as critical habitat in the 83 Kauai species and Newcomb's snail final rules described above. The remaining areas overlap with previously designated critical habitat. Of the non-overlap areas, Montane Mesic – Section 2 includes 7.8 ac (3.16 ha) classified as State Parks and Recreation lands; Montane Mesic – Section 3 includes 138.5 ac (55.8 ha) classified as State Forest Reserve lands; Montane Wet – Section 1 includes 64 ac (26 ha) classified as State Forest Reserve lands; Wet Cliff – Section 2 includes 296 ac (119.8 ha) classified as State Forest Reserve lands; Lowland Wet – Section 1 includes 65 ac (26.3) in the Limahuli Garden and Preserve, which is owned by NTBG; and Wet Cliff – Section 3 includes 23 ac (9.3 ha) 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 (e.g., 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.

In summary, the areas we are designating as critical habitat are remote, lack development potential, and overlap with existing critical habitat units by approximately 98 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). In the economic impact analysis for this designation, 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 designated in this rule. It is important to note, however, that although these possible costs were projected in the earlier economic analyses, 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 we are designating 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 2 percent (594 ac, 240 ha) of land we are designating as critical habitat in this rule that does not overlap with existing critical habitat is managed as State Parks and Recreation Land, State Forest Reserve, or is owned by private individuals. We have no section 7 consultation history in these areas and are unaware of any planned activities that would require consultation.

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 was based on the best available data, we requested 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 received no comments regarding our economic impact analysis as presented in the October 21, 2008 proposed rule (73 FR 62592).

The information provided in the previous sections applies to the following discussions of benefits of inclusion or exclusion of critical habitat.

*Areas Considered for Exclusion Under Section 4(b)(2) of the Act: Alexander and Baldwin, Inc.'s Lands in the Upper Wainiha Valley*

In making exclusions, we evaluate the benefits of designating non-Federal lands while considering the conservation benefits to the relevant species in this final rule and the physical and biological features essential to their conservation resulting from the existing management plan and underlying partnerships. As discussed in the section *Conservation Partnerships on Non-Federal Lands* above, conservation partnerships resulting in implementation of management actions that focus on enhancement or recovery as the management standard may provide as much or more benefit than consultation for adverse modification of critical habitat (the primary benefit of a designation). However, we must evaluate each potential exclusion on a case-by-case basis to determine whether the benefits of exclusion may outweigh the benefits of inclusion with regard to the conservation and recovery of the listed species in question.

In considering the benefits of including lands in a designation that are covered by a current management plan, we evaluate a number of factors to help us determine if the plan provides greater conservation benefits compared to those that would likely result from consultation on a critical habitat designation. Under section 4(b)(2) of the Act, we evaluate the effectiveness of management plans that address the enhancement or recovery of listed species when we weigh and balance the benefits of inclusion or exclusion of a particular area from critical habitat

designation. We consider the following guidelines in evaluating the management and protection provided by such plans:

(1) Whether the plan is complete and provides management and protection of the features essential to the conservation of the species for which critical habitat is being designated;

(2) Whether there is a reasonable expectation that the conservation management strategies and actions will be implemented for the foreseeable future, based on past practices, written guidance, or regulations; and

(3) Whether the plan provides conservation strategies and measures consistent with currently accepted principles of conservation biology and that there are provisions for adaptive management.

We balance the benefits of inclusion against the benefits of exclusion by considering the benefits of preserving partnerships and encouraging development of additional conservation plans in the future.

A portion of Montane Wet Section 1 (Kauai Plants Critical Habitat Unit 18–Montane Wet; *Loxops caeruleirostris* Unit 4 – Montane Wet; *Oreomystis bairdi* Unit 1 – Montane Wet; *Drosophila attigua* Unit 4 – Montane Wet, as described in the proposed rule) on private land owned by Alexander and Baldwin, Inc. (A & B) is occupied habitat for *Astelia waialealae, Keysseria erici*, *K. helenae*, and *Labordia pumila*, and unoccupied habitat for akikiki, akekee, *Drosophila sharpi*, and 14 plant species (*Chamaesyce remyi* var. *remyi, Dryopteris crinalis* var. *podosorus, Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Labordia helleri*, *Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Myrsine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynii*). This triangular-shaped area of 1,052 ac (426 ha), bordering the Wainiha Preserve, is located at the head of Wainiha Valley, abutting the Alakai plateau to the west, and the precipitous cliffs between Wainiha Valley and Lumahai Valley to the east. This area is not designated critical habitat for other species and is characterized as boggy with dwarfed native trees, shrubs, and herbs. Access to this steeply remote area is primarily by helicopter, rarely by foot, as there are no marked trails. The closest road is a four-wheel-drive-vehicle-only dirt road leading to a picnic area approximately 7.5 mi (11 km) northwest of the Mt. Waialeale summit. In 2007, A & B entered into a 10–year conservation agreement with The Nature Conservancy to create the State's third largest private nature preserve at Wainiha Valley (Wainiha Preserve) on Kauai. The 7,050 ac (2,853 ha) preserve includes one of Kauai's largest river systems, mountain cliffs, and portions of the Alakai wilderness and Mt. Waialeale summit region. The Nature Conservancy is coordinating all management actions within the Wainiha Preserve, most of which is in steep, remote areas that are accessible only by helicopter. In support of the Wainiha Preserve and the upper Wainiha Valley, which includes 1,052 ac of A & B lands included in the proposed critical habitat designation, TNC is implementing the East Alakai Protective Fencing Project Management Plan (TNC 2008), with support of the Service's Partners for Fish and Wildlife program, and is undertaking the following management actions to protect and preserve approximately 2,000 ac (809 ha) of Kauai's watershed and the species it supports (including 18 of the 44 plant species with critical habitat designated in this final rule, the akikiki, the akekee, *Drosophila sharpi*, and numerous other listed species) located within a portion of the eastern Alakai plateau between Wainiha Valley and Mt. Waialeale: (1) Construction of approximately 4.48 mi (7.2 km) of strategically placed fencing (using natural barriers and steep cliffs) to enclose approximately 595 ac (241 ha) of the Alakai Wilderness Preserve and approximately 1,405 ac (569 ha) of MacBryde Sugar Co. land (subsidiary of A & B) to exclude feral pigs (TNC 2008, p. 3); (2) remote sensing of Wainiha Valley to produce distribution maps of the highly invasive nonnative Australian tree fern (*Sphaeropteris cooperi*) and other weed species (A. Ballinger, 2008, p. 2) and (3) on-the-ground control of Australian tree fern and other nonnative highly invasive weeds in Wainiha Valley (A. Ballinger, 2008, p. 2; M. Clark, USFWS, 2009a). Construction of the fence is expected to begin in late summer 2009 and will be completed within 12 months (TNC 2008, p. 33). After the fence is constructed, management activities will include monitoring for feral pig sign and disturbance, removal of feral pigs and goats from the Alakai plateau and upper Wainiha Valley, monitoring for and removal of invasive weeds along the fence line, and monitoring and maintenance of the fence itself (TNC 2008, pp. 28, 34). In addition to the fencing project, A & B's program to remove invasive nonnative plant species, particularly the Australian tree fern, has also been supported by funding from the Service through private stewardship grants. These threat management actions are the highest priority actions identified in the management plan for this area and will create a stable ecosystem environment for future restoration activities (e.g., reintroduction of individuals of rare native species) (M. Clark, 2009b, p. 5). These management actions will further reduce the primary threats identified for the 21 Kauai species identified in this rule that occur on these lands, thus resulting in a significant conservation benefit to these species.

The Nature Conservancy also launched The Forest Recovery Project in 2007. This is a series of concentrated actions to evaluate methods for effective progress in native ecosystem preservation by focusing efforts on reducing and controlling nonnative plants and animals (TNC in Hawaii – Forest Recovery Project 2007b). Initially, research was conducted to evaluate the effectiveness of conservation fencing in preventing feral ungulate impacts to native forest ecosystems and watershed on Kauai, Maui, and Molokai, and to study animal behavior and movement patterns. The results of this work are not yet available. Other management activities, scheduled to begin in 2009, include trapping of feral pigs, and control of priority nonnative plants (Kauai Watershed Alliance (KWA) 2009).

McBryde Sugar Co., Ltd., A & B's subsidiary, is one of 10 official members of the Kauai Watershed Alliance (KWA). Established in 2003, the KWA is a voluntary partnership of most of the major public and private landowners in the forest reserve boundary, and is committed to the long term protection of Kauai's upper watershed areas (KWA 2009). The Nature Conservancy and the Service, although not official members, work closely with the members of the KWA to achieve their conservation goals. The KWA is pursuing three management programs (for ungulates, weeds, and watershed monitoring) with the aim of protecting Kauai's watershed from invasive nonnative animals, plants, and other threats (Kauai Watershed Management Plan (Plan) 2005, pp. 11, 17, 22–24). The Plan identifies the upper valley of Wainiha, portions of which we proposed as critical habitat, as a highest priority area for management actions (KWA 2005, p. 6).

The primary goal of the ungulate management program is to maintain or improve the structure and composition of the watershed's forest by intensively reducing ungulates in the highest priority management areas and managing ungulates in the other priority

areas. Feral pigs are identified as the greatest threat to wet forested areas, including portions of the upper Wainiha Valley, and are the highest ungulate management priority in the ungulate management program (KWA 2005, p. 12). The Plan identifies the four essential components of a successful ungulate management program: barrier construction using strategic fences, ungulate population reduction, barrier maintenance and inspection, and monitoring for the presence of ungulates. The construction of the east Alakai protective fence (see above), an essential component of KWA's ungulate management program, will benefit 18 of the 44 plant species with critical habitat designated in this rule, the akikiki and akekee, *Drosophila sharpi*, and numerous other listed species. Once the fence is completed management actions to control feral ungulates in the fenced area will include monitoring for and removal of feral ungulates, and fence monitoring and maintenance (TNC 2008, p. 34).

The primary goal of the weed management program is to maintain or improve the structure and composition of the watershed's forest by containing, eradicating, and excluding priority habitat-modifying weeds. The weed management priorities identified in the Plan are Australian tree fern, kahili ginger (*Hedychium gardnerianum*), strawberry guava (*Psidium cattleianum*), miconia (*Miconia calvescens*), and Koster's curse (*Clidemia hirta*). For upper Wainiha Valley, the weed management program goal is weed exclusion (by conducting surveys in 3–year intervals to detect and eradicate incipient patches of priority weeds) and prevention (KWA 2005, p. 19). In 2008, TNC, in collaboration with Dr. James Leary at the University of Hawaii, began field testing aerial treatments of Australian tree fern, and conducting on-the-ground weed surveys in Wainiha Valley (A. Ballinger, 2008, p. 2). The aerial treatments consisted of a custom fabricated aerial sprayball attached to an herbicide reservoir on the underside of a helicopter that could be directed to the growing tips of individual Australian tree ferns without any measurable overspray onto surrounding, nontarget vegetation. The results of the initial field tests were very successful and aerial control of Australian tree fern in Wainiha Valley is currently underway. As of May 15, 2009, TNC had treated 1,431 Australian tree ferns, on over more than 4,000 ac (1,619 ha) in Wainiha Valley, including the area proposed as critical habitat in the upper valley (M. Clark, 2009a). The Nature Conservancy estimates that the aerial control treatments have treated over one-third of all known Australian tree ferns in the upper valley of Wainiha, including the area proposed as critical habitat (M. Clark, 2009a). Over the past year, TNC has continued to survey for and control nonnative kahili ginger, strawberry guava, and common guava (*Psidium guajava*) in the Waianiha priority management area (M. Clark, 2009a).

The primary goal of the watershed monitoring program is to measure the efficacy of the management actions outlined in the Plan and determine if these actions are improving the hydrological and ecological integrity of the watershed. This program includes monitoring for threat abatement, vegetation, and stream turbidity (KWA 2005, p. 22). Threat abatement monitoring includes annual monitoring for presence or absence of feral pigs along transects located in the priority management areas of the KWA watershed. Weed monitoring is also a component of this program. Initially, aerial baseline surveys will be conducted to measure the effectiveness of weed management actions in the KWA watershed. Aerial surveys along selected transects will be conducted at 5 to 10 year intervals, starting in the central Alakai plateau in 2010 (KWA 2005, p. 23). In addition, field personnel will conduct ground-based weed monitoring in priority management areas of the KWA watershed, including the 1,052 ac (426 ha) of A & B land at the head of Wainiha Valley. Changes in vegetation cover indicate trends in ecosystem integrity over long periods of time. Vegetation monitoring will be conducted in permanent plots throughout KWA's priority management areas every 5 to 10 years, as well as using high-resolution aerial imagery to detect changes in canopy cover over long time periods (KWA 2005, p. 23). According to the Plan, improvements in vegetation cover and declines in ground disturbance by ungulates will result in reduced or low stream turbidity indicating the success of the feral ungulate and weed management programs and lead to improved infiltration and aquifer recharge (KWA 2005, p. 24). While there is currently no watershed-scale system to assess stream turbidity on Kauai, the University of Hawaii has received funding from the National Science Foundation to develop and deploy environmental sensors, including stream turbidity sensors, on Kauai (KWA 2005, p. 24). Currently the development of the environmental monitoring techniques is limited to the north shore of Kauai but there is a potential to expand the network of sensors to the Alakai plateau and other KWA priority management areas, including the head of Wainiha Valley (KWA 2005, p. 24).

*Benefits of Inclusion*

The benefits of including lands in critical habitat can be regulatory or educational, which can aid in promoting the recovery of species. The principal regulatory benefit of designating critical habitat in this area would be that Federal actions affecting the critical habitat of akikiki, akekee, *Astelia waialealae, Chamaesyce remyi* var. *remyi, Drosophila sharpi, Dryopteris crinalis* var. *podosorus, Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici, K. helenae*, *Labordia helleri*, *Labordia pumila, Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Myrsine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynii* would require consultation under section 7 of the Act. Consultation would ensure that a proposed Federal action does not result in the destruction or adverse modification of critical habitat. The most likely Federal nexus would be associated with Service funding for management activities to control invasive species (e.g., construction of fences to exclude ungulate access; removal of ungulates; activities to control weeds, rats, and wasps). Potential outcomes of section 7 consultations would be conservation recommendations to avoid degradation and destruction of stands of native canopy and understory plants, destruction of native arthropods, and destruction of larval host plants (i.e., *Cheirodendron* and *Tetraplasandra* spp.) of *Drosophila sharpi* when, for example, constructing a new fence or applying herbicides. However, these conservation recommendations would still be included within the KWA Plan's ungulate and weed management programs and the East Alakai Protective Fencing Project Management Plan even in the absence of critical habitat designation. Accordingly, since the recommendations resulting from any section 7 consultation with respect to critical habitat would most likely be redundant with the conservation actions already in place under current management, we believe that few additional regulatory benefits would be derived from including A & B's land in the upper Wainiha Valley within the area designated as critical habitat for akikiki, akekee, *Astelia waialealae,*

*Chamaesyce remyi* var. *remyi, Drosophila sharpi, Dryopteris crinalis* var. *podosorus, Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici, K. helenae*, *Labordia helleri*, *Labordia pumila, Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Mysine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynii* beyond those conservation benefits already being achieved through the implementation of the KWA Plan (2005) and the East Alakai Protective Fencing Project Management Plan (2008).

In addition, we conclude that few regulatory benefits would be gained from a designation of critical habitat on these lands because the consultations conducted under both the jeopardy and adverse modification standards for these 21 species would not be likely to result in materially different outcomes in this particular instance. The area is occupied by *Astelia waialealae, Keysseria erici*, *K. helenae*, and *Labordia pumila*, and unoccupied by 17 species (akekee, akikiki, *Chamaesyce remyi* var. *remyi, Drosophila sharpi, Dryopteris crinalis* var. *podosorus, Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Labordia helleri*, *Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Myrsine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynii*). The most likely Federal nexuses would be management activities funded in part through (1) the Service's Partners for Fish and Wildlife program, and the Recovery programs, and (2) the Natural Resources Conservation Service's (NRCS) Environmental Quality Incentives Program, water resources program and easement programs. These programs have historically contributed funds toward the construction of fences to exclude feral ungulates and control weeds on KWA lands on Kauai. Service funds may also be provided for new surveys and control of invasive, nonnative weeds, and rats on KWA lands. While we acknowledge that the legal standards for jeopardy and adverse modification differ, with the latter focused on effects to recovery, the outcome of consultation is likely to be the same because the actions likely to be subject to consultation would have habitat conservation as their primary objective.

There have been no section 7 consultations with Federal agencies to date for any previously listed species or designated critical habitat on A & B lands, nor any section 7 conference actions involving any of the species addressed in this final rule on their lands. We do not anticipate any consultations beyond those that would be initiated for conservation-related actions (e.g., funding for fence construction, control of nonnative plant and animal species) with us and other Federal agencies such as NRCS, and conclude that the section 7 consultation process for critical habitat would be unlikely to result in any additional protections for the 21 species for the reasons discussed above. The probability of any actions associated with activities such as development is very low, due to the extremely remote and rugged nature of this area, which is accessible only by foot or helicopter. Furthermore, we note that the low probability of any future section 7 consultations remains constant beyond the potential expiration date of the current management agreement with TNC in the Wainiha Valley. Consequently, we conclude there is little if any regulatory benefit of designating critical habitat on the 1,052 ac (426 ha) of A & B lands in upper Wainiha Valley within Montane Wet Section 1 (Kauai Plants Critical Habitat Unit 18–Montane Wet; *Loxops caeruleirostris* Unit 4 – Montane Wet; *Oreomystis bairdi* Unit 1 – Montane Wet; *Drosophila attigua* Unit 4 – Montane Wet, as described in the proposed rule).

As discussed above, a benefit of critical habitat is its potential to serve as a mechanism to educate landowners, State and local governments, and the public regarding the potential conservation value of an area, which may aid the conservation of the species by clearly delineating areas of high conservation value and by describing the PCEs and special management actions or protections needed for identified areas. Here we have attempted to contribute to the educational intent of critical habitat by publishing a map of the excluded area (Figure 7), thereby informing the public, State and local governments, and other landowners of the conservation value of the excluded area. In addition, a map identifying the excluded area will be maintained on the website of the Pacific Islands Fish and Wildlife Office (*http://www.fws.gov/pacificislands/*) to alert the public, State and local governments, and other landowners of the conservation value of this area. The PCEs for the species occupying this area and the special management required are similarly described in this final rule. In addition, the specific landowners, Alexander and Baldwin, Inc., are aware of the importance of this 1,052-ac area (426 ha), and are implementing conservation actions to benefit native species through the KWA Plan and the East Alakai Protective Fencing Project Management Plan (KWA 2005, pp. 1–29; TNC 2008, pp. 1–38; M. Clark, 2009b, pp. 5, 8). Because of this proactive approach, and due to the extremely remote location of these lands, we believe that any additional educational benefits for the public at large resulting from the designation of critical habitat on these lands would be minimal. Although the designation of critical habitat may provide benefits to the recovery of a species, in this case A & B is already committed to implementing conservation actions on their lands under the existing KWA Plan (2005) and the East Alakai Protective Fencing Project Management Plan (TNC 2008), both of which are supported by the Service. Accordingly, any additional benefits to the recovery of the 21 species beyond those already being accrued would be limited. In addition, the educational benefit of informing the public, State and local governments, and other parties as to the high conservation value of this area has largely been achieved through the publication of this final rule and the map of the excluded area.

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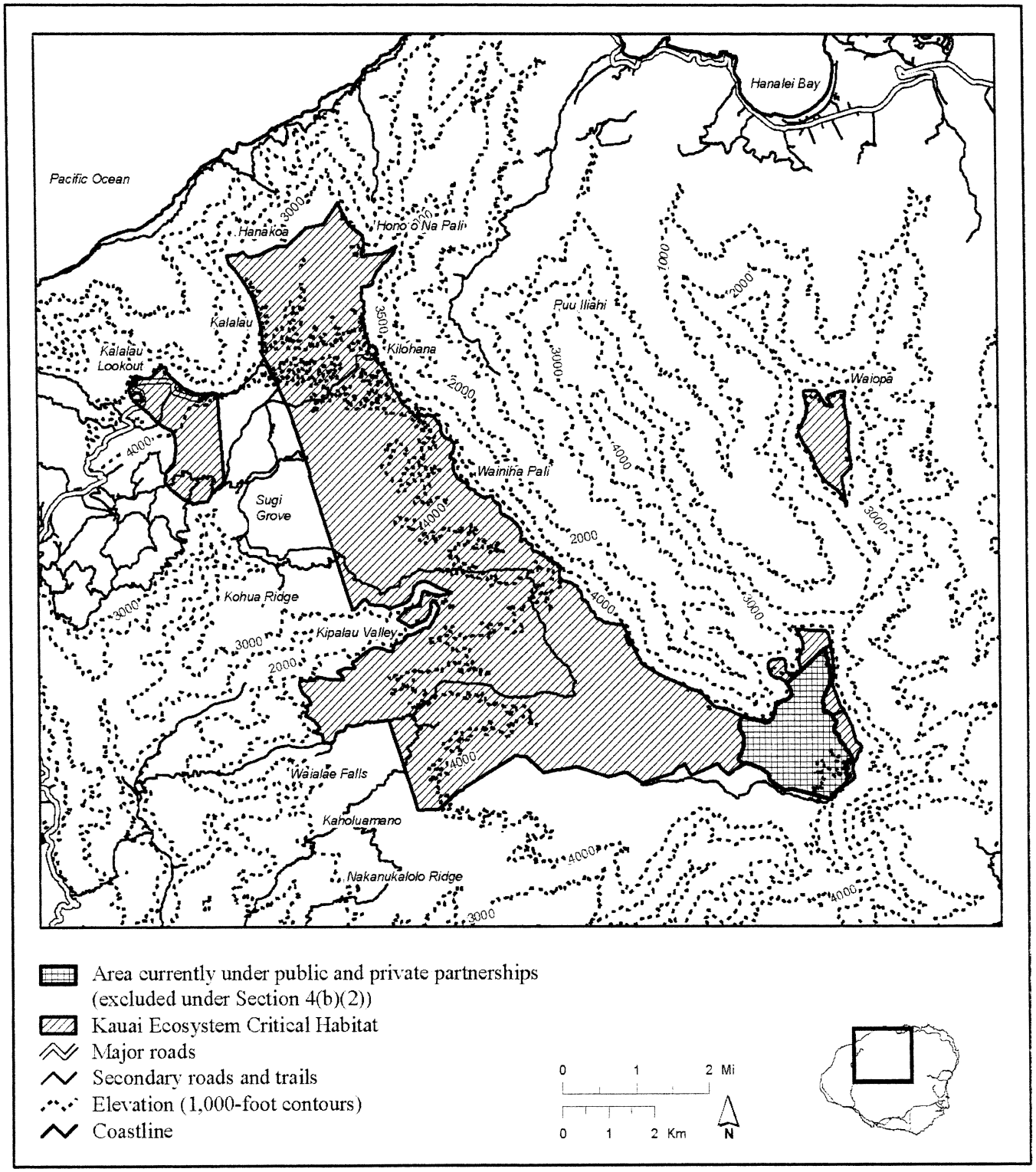


**Figure 7.** Alexander and Baldwin lands in the Wainiha Valley (cross-hatch) excluded from critical habitat designation under section 4(b)(2) of the Act.

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*Benefits of Exclusion*

Existing A & B conservation agreements with Federal and State agencies, their voluntary partnership in the KWA, their ongoing work with the Service's Partners for Fish and Wildlife program, and their conservation agreement with TNC establishing and managing the Wainiha Preserve demonstrate their commitment to prudent stewardship of their land and water resources to ensure the protection of large areas of forested watersheds for water recharge and other benefits of intact forested ecosystems. A & B's continued voluntary participation in the KWA and implementation of the KWA Plan, implementation of the East Alakai Protective Fencing Project Management Plan, and voluntary conservation agreement with TNC for management of the Wainiha Preserve will specifically benefit akekee, akikiki, *Astelia waialealae, Chamaesyce remyi* var. *remyi, Drosophila sharpi, Dryopteris crinalis* var. *podosorus, Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici, K. helenae*, *Labordia helleri*, *Labordia pumila, Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Mysine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynii* through actions that manage and reduce the primary threats to these species (feral ungulates and invasive plant species) and restore native species habitat and ecosystem function. The KWA Plan provides a significant conservation benefit to these 21 species, and we have a reasonable expectation that the strategies and measures will be effective. In response to the proposed designation of critical habitat for the 47 Kauai species, A & B informed us that the conservation management activities supported by the agreement to establish Wainiha Preserve will substantially and directly benefit endangered species and their habitat in the valley (A & B 2008, p. 1); A & B further stated that they believe the designation of critical habitat is unnecessary and will result in little if any additional benefit to the species (A & B 2008, p. 2). In addition, A & B stated that designation of critical habitat in areas where the objective of designation is already being met by voluntary landowner efforts may discourage other landowners from pursuing similar conservation agreements, since the Service is imposing a layer of federal regulation that is unnecessary to achieve the intended conservation goals, thereby resulting in an overall negative impact on species conservation (A & B 2008, p. 2). A & B went on to state that excluding such areas from designation can serve as an acknowledgement of positive contributions to conservation and provide a strong incentive to other landowners to undertake voluntary conservation efforts on their lands.

In 2002, the Service excluded from designation of critical habitat for the Newcomb's snail a 566-acre parcel of land owned by A & B in the Wainiha River Valley. This exclusion was based upon the Service's determination that designation of critical habitat would have a negative effect on the voluntary landowner conservation activities in the Valley, both ongoing and in development, including a possible future introduction of the species as an experimental population on A & B lands (67 FR 54048-54049). Specifically, A & B had informed the Service they were in the process of negotiating a voluntary conservation easement with TNC to provide more active management of the valley for watershed protection and that those negotiations, which would benefit the Newcomb's snail by protecting its habitat, could be negatively affected if critical habitat were designated on their land. The Service concluded in its 4(b)(2) analysis that the benefits of exclusion of the A & B parcel outweighed the benefits of inclusion in the critical habitat designation. The Service's conclusion was based on, among other things, A & B's current conservation activities and those in development, the need for A & B's cooperation and good will for future conservation efforts for the Newcomb's snail, and the likelihood that A & B would curtail voluntary conservation efforts if critical habitat was designated on their lands.

Subsequent events have validated the Service's determination to exclude A & B's parcel from the Newcomb's snail designation. No regulatory benefits appear to have been foregone, as there have been no projects with a federal nexus that would have triggered consultation under the adverse-modification standard had critical habitat been designated. Moreover, A & B granted TNC the conservation easement, and has continued to work proactively with the Service and its conservation partners. Native species, including 21 species covered by this final rule, are benefiting substantially from A & B's voluntary participation in the KWA and support of the KWA's management actions; A & B's establishment of the Wainiha Preserve and support of the management actions in Wainiha Valley, including the A & B lands at the head of Wainiha Valley proposed as critical habitat; and voluntary support and implementation of the East Alakai Protective Fencing Project Management Plan. The Service has actively supported all of these conservation efforts. All of these management actions are intended to reduce ungulate browsing and habitat conversion, reduce competition with nonnative weeds, and preserve overall ecosystem integrity; these actions will thus address primary threats to the species, and are consistent with the ecosystem-based approach to conservation envisioned in this final rule.

A & B has demonstrated a strong history of voluntary conservation efforts that directly benefit threatened and endangered species, both on Kauai and other Hawaiian islands. Past conservation actions by A & B and its subsidiaries have ranged from allowing access on their lands for surveys and site visits to the provision of staff and funding for active collaborative conservation partnerships. In addition to the examples specific to the Wainiha Valley described above, A& B has allowed access to survey and monitor endangered cave species in the Koloa area of Kauai, including surveys for the blind cave spider and amphipod; worked in partnership with TNC to fence Kanaele Bog in Kauai on their lands and protect the native bog community of plants and invertebrates from habitat degradation and fragmentation; has donated land and supported or participated in numerous conservation activities at or around Kealia Pond National Wildlife Refuge on Maui, which itself was established in 1992 as a perpetual conservation easement from A & B; and has actively participated in the East Maui Watershed Partnership, a collaborative multi-party organization leading the conservation of land and water resources in the east Maui mountains. Some other A & B conservation efforts include: protecting coastal habitat by assisting Kealia Pond NWR with installation of recycled fence to prevent off-road vehicles from accessing Ma'alaea flats; donating coastal land to accommodate the Kealia Coastal Boardwalk parking area and cooperation with construction of the boardwalk; allowing FWS to install a fence to benefit endangered turtles on their lands along North Kihei Road; working with the refuge, Maui County, and Kihei Canoe Club to clean up their coastal strip along North Kihei Road; and working with the refuge and local community to install boulders and concrete posts to prevent erosion and access to dunes along North Kihei Road. A & B's subsidiary HC&S assisted with

the installation of a 2000 ft water distribution line for Kealia Pond. In addition, an HC&S representative has been a member of the Mokulele Highway Beautification Committee and involved with the Maui West Nile Virus Team. A & B continues to work cooperatively with the Service and other Federal and State agencies as well as nongovernmental organizations on various conservation agreements, thus ongoing conservation partnerships with A & B have a proven conservation benefit for threatened and endangered species and other resources. Based on A & B's demonstrated commitment to conservation, under current conditions the Service has a high degree of confidence that the conservation management actions currently benefiting the 21 Kauai species on A & B lands in the Upper Wainiha Valley will continue to be implemented.

We believe that exclusion of approximately 1,052 ac (426 ha) within A & B's portion of Section 1 (Kauai Plants Critical Habitat Unit 18–Montane Wet; *Loxops caeruleirostris* Unit 4 – Montane Wet; *Oreomystis bairdi* Unit 1 – Montane Wet; *Drosophila attigua* Unit 4 – Montane Wet, as described in the proposed rule) will acknowledge A & B's conservation commitment and facilitate their continued cooperation and partnership with the Service. This area has been actively managed by the KWA since 2005 and the Wainiha Preserve was established in 2007 under a 10–year conservation agreement with TNC. Based on A & B's strong history of conservation in the islands, we expect the conservation management strategies and actions will continue to be implemented for the benefit of 21 species covered in this final rule. There is a risk that designating critical habitat on these A & B lands in the Wainiha Valley could undermine A & B's conservation partnership with the KWA and TNC, remove A & B's incentive to accept the additional time and expense of management planning, strain the positive working relationship we share, and hinder future cooperative conservation projects with A & B and other potential partners. Because the Federal government owns relatively little land in the State of Hawaii, and because large tracts of land suitable for the conservation of threatened and endangered species are often owned by private landowners, the successful recovery of listed species in Hawaii is particularly dependent upon effective working partnerships and the voluntary cooperation of non-Federal landowners. Preserving the successful conservation partnership we currently hold with A & B is likely to provide substantial conservation benefits to the 48 Kauai species, and will additionally support continued cooperative conservation efforts for the benefit of numerous listed and native species and ecosystems in other areas of the Hawaiian Islands as well.

We are unaware of any incremental economic impacts of designating critical habitat in Section 1 (Kauai Plants Critical Habitat Unit 18–Montane Wet; *Loxops caeruleirostris* Unit 4–Montane Wet; *Oreomystis bairdi* Unit 1–Montane Wet; *Drosophila attigua* Unit 4–Montane Wet, as described in the proposed rule) (USFWS 2008, pp. 18, 21). Our economic impact analysis concluded there would be no incremental costs of designation in the Wainiha Valley, since section 7 consultation costs for any conservation projects funded by the Service and others on A & B lands in this area would have occurred anyway because of the presence of listed plants in the potentially affected area (USFWS 2008, pp. 18, 21). In their comments on the proposed designation, A & B informed us that critical habitat designation on private lands can have unintended negative consequences for landowners, particularly with regard to private property rights and land values, and can serve as a disincentive for landowners to participate in voluntary conservation efforts (S. O'Keefe, A & B 2008, p. 1). This claim, that private landowners may often perceive regulatory actions by the Federal government in such a way as to have a negative impact on conservation, is supported by the best available science on this topic (e.g., Main *et al.* 1999, pp. 1264-1265; Bean 2002, pp. 2–3; Brook *et al.* 2003, pp. 1639-1648; Conley *et al.* 2007, pp. 141,144). With specific regard to land values, however, A & B provided no information demonstrating that the designation of critical habitat on Kauai has had negative impacts on land values, and we are unaware that land values have declined there or elsewhere in the State solely due to a critical habitat designation. Therefore, we have examined the economic impacts of critical habitat designation on 1,052 ac (426 ha) of A & B lands and conclude that there is likely no economic benefit to excluding these lands from critical habitat because of economic impacts. However, as described above, in an area where the preservation of partnerships is so important to accomplishing conservation (Crouse *et al.* 2002, p. 720), the potentially negative perception of critical habitat designation on private lands may serve as a real disincentive to continued cooperation with A & B or to the formation of new working partnerships with other private landowners in the islands, thus resulting in a net loss of conservation benefit.

We believe that excluding 1,052 ac (426 ha) of A & B lands at the head of Wainiha Valley from critical habitat on the basis of other considerations (e.g., other relevant impacts) will help maintain and improve our partnership relationship with this landowner by acknowledging their positive contribution to conservation on Kauai, and will result in the greatest net conservation benefit to the 21 Kauai species considered on these lands in this final rule. In addition, we believe this recognition may provide other landowners with a positive incentive to undertake voluntary conservation activities on their lands, particularly where there is no regulatory requirement to implement such actions.

*Benefits of Exclusion Outweigh the Benefits of Inclusion*

Based on the above considerations and consistent with the direction provided in section 4(b)(2) of the Act, the Service has determined that the benefits of excluding Wainiha Valley as critical habitat for the 21 Kauai species that occupy this unit outweigh the benefits of including it as critical habitat. This conclusion is based on the following factors:

1. We believe the proactive management of habitat for akekee, akikiki, *Astelia waialealae, Chamaesyce remyi* var. *remyi, Drosophila sharpi, Dryopteris crinalis* var. *podosorus, Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici, K. helenae*, *Labordia helleri*, *Labordia pumila, Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Mysine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynii* provided under KWA's Plan (2005), the East Alakai Protective Fencing Project Management Plan, and the 10–year conservation agreement with TNC for management of the Wainiha Preserve will achieve important conservation goals supported by the Service and provide significant benefits to these species. The voluntary conservation efforts taking place on A & B lands in the Wainiha Valley serve to manage and reduce the primary threats (feral ungulates and invasive plant species) to these 21 species and restore native species habitat and ecosystem function; these actions are vitally important for achieving recovery of these listed species. In the past, A & B

has cooperated with the Service, the State, and other organizations to implement voluntary conservation activities on their lands that have resulted in tangible conservation benefits. Based on their demonstrated past commitment to conservation, we believe it is reasonable to expect these positive conservation management actions to continue in the Wainiha Valley.

2. Excluding this area from critical habitat will help maintain and improve our partnership relationship with this landowner. A & B has commented that the designation of critical habitat in Wainiha Valley as originally proposed (73 FR 62592; October 21, 2008) will likely have a negative impact on ongoing and future voluntary conservation efforts by A & B, and that other private landowners may be dissuaded from entering into such voluntary agreements as well. We believe that designating critical habitat on these lands over the objections of the landowner, our proven conservation partner A & B, could create a disincentive for other landowners who might otherwise considering partnering with the Service to achieve conservation goals, but who desire to avoid possible Federal regulation under the Act. Given the importance of such cooperative partnerships in achieving the conservation and recovery of listed species in Hawaii, and considering the voluntary actions of A & B are currently contributing to the management and reduction of the primary threats to the listed species, namely feral ungulates and invasive nonnative plants, the designation of critical habitat in Wainiha Valley may result in a net loss of conservation benefit.

3. Given the current beneficial management of A & B lands in the Wainiha Valley and the likelihood that this beneficial conservation management will continue, the benefits of including the 1,052 ac (426 ha) of A & B lands as critical habitat would likely be minor. This determination is based on the fact that: (a) There have been no section 7 conference actions in the area for these 21 species since we published the October 21, 2008 proposed rule (73 FR 62592); (b) we anticipate few if any future section 7 consultations in this remote, largely inaccessible area, apart from those beneficial actions related to federal conservation funding; (c) any future Federal actions affecting listed species in this area would be subject to section 7 consultation since the area is occupied by 4 of the 21 species; (d) future Federal actions in this area are expected to be beneficial to the species; (e) we believe that we have largely achieved the educational intent of critical habitat through the publication of this final rule and mapping of the excluded area to identify its conservation value; and (f) given the extremely remote location of the area, the educational value of critical habitat in terms of informing the public or other entities of the conservation worth of this area is likely minimal.

In conclusion, we find that the designation of critical habitat on A & B lands in the upper Wainiha Valley would most likely have a net negative conservation effect on the listed species as well as on other conservation activities. The overall benefits of a critical habitat designation for the listed species would be small, and we believe there is a greater probability of positive conservation activities continuing in the Wainiha Valley without designated critical habitat than there would be with critical habitat. The landowner has stated that they are more likely to continue and increase their ongoing voluntary conservation efforts absent a critical habitat designation. They have furthermore indicated that other private landowners are unlikely to enter into similar cooperative agreements if critical habitat is designated, a supposition supported by the literature. Furthermore, we agree that designating critical habitat in this area, over the publicly-stated objections of a partner with a strong track record of consistently providing positive contributions to conservation, may well serve as a deterrent to other landowners who might otherwise consider entering into voluntary management agreements. We believe the continued implementation of the KWA's ongoing management programs and the East Alakai Protective Fencing Project Management Plan, programs actively supported by the Service due to their significant conservation benefits for numerous listed species as well as the ecosystem as a whole, will provide comparable or greater net conservation benefits than those that would result from critical habitat designation. The exclusion of these lands would accrue significant conservation benefits resulting from A & B's voluntary participation in the KWA; the conservation agreement with TNC for Wainiha Preserve; implementation of the East Alakai Protective Fencing Project Management Plan; A & B's ongoing and continued actions to monitor and control invasive species, protect and restore plant habitat, monitor native species, and monitor watershed integrity; and the maintenance of a strong working partnership between A & B and the Service in the Wainiha Valley and in other important conservation areas in the islands. In addition, we believe there is a significant conservation benefit to be gained for the 21 Kauai species that are the subject of this exclusion as well as other listed species throughout the islands by acknowledging partners who have made significant contributions to conservation, thus serving as a model and incentive for other private landowners to develop similar conservation partnerships. We, therefore, are excluding 1,052 ac (426 ha) of A & B lands in the upper Wainiha Valley that are within Section 1 (Kauai Plants Critical Habitat Unit 18 – Montane Wet; *Loxops caeruleirostris* Unit 4 – Montane Wet; *Oreomystis bairdi* Unit 1 – Montane Wet; *Drosophila attigua* Unit 4 – Montane Wet, as described in the proposed rule) from the critical habitat designation under section 4(b)(2) of the Act. We will reevaluate our determination to exclude 1,052 ac (426 ha) of A & B lands in the upper Wainiha Valley if, in the future, A & B withdraws from voluntary participation in any of the beneficial conservation actions described above, or if the ownership of this area should change.

*Exclusion Will Not Result in Extinction of the Species*

We have determined that the exclusion of A & B's portion of Section 1 (Kauai Critical Habitat Unit 18 – Montane Wet; *Loxops caeruleirostris* Unit 4 – Montane Wet; *Oreomystis bairdi* Unit 1 – Montane Wet; *Drosophila attigua* Unit 4 – Montane Wet, as described in the proposed rule) from the final designation of critical habitat will not result in the extinction of akekee, akikiki, *Astelia waialealae, Chamaesyce remyi* var. *remyi, Drosophila sharpi, Dryopteris crinalis* var. *podosorus, Dubautia kalalauensis*, *Dubautia waialealae*, *Geranium kauaiense*, *Keysseria erici, K. helenae*, *Labordia helleri*, *Labordia pumila, Lysimachia daphnoides*, *Melicope degeneri*, *Melicope puberula*, *Mysine mezii*, *Phyllostegia renovans*, *Platydesma rostrata*, *Psychotria grandiflora*, and *Tetraplasandra flynii*. A & B's voluntary participation in the KWA and support of the KWA's management actions, A & B's establishment of the Wainiha Preserve and support of the management actions in Wainiha Valley, including the A & B lands in the upper Wainiha Valley proposed as critical habitat, and voluntary support and implementation of the East Alakai Protective Fencing

Project Management Plan provide tangible conservation benefits that reduce the likelihood of extinction for these 21 species and increase these species' recovery potential. We are unaware of any threats on these lands associated with Federal actions that would require section 7 consultations. In addition, since this area is occupied by 4 of the 21 species, consultations under section 7 of the Act would be required, and any Federal actions that may affect the species would be evaluated under the jeopardy standard of section 7 of the Act. This evaluation provides assurances that the species would not become extinct as a result of exclusion of these lands from designation as critical habitat. Based on all of these considerations, we therefore conclude that excluding this area will not result in the extinction of any of the 21 species.

With regard to other protections, section 195D–4 of Hawaii Revised Statutes (endangered species and threatened species) stipulates that species determined to be endangered or threatened under the Federal Act shall be deemed endangered or threatened under the State law. Under the State law, it is unlawful, with some exceptions, to "take" such species, or to possess, sell, carry or transport them. The statutory protections for this species under State law provide additional assurances that exclusion of this area from critical habitat will not result in extinction of one or more of the 21 species in this final rule that currently occupy, or potentially could occupy, these lands.

## Required Determinations

### *Regulatory Planning and Review (Executive Order 12866)*

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*

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 substantial. 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 this 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 affect 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 critical habitat units contain significant residential, commercial, industrial, or golf-course projects; crop farming; or intensive livestock operations. Few projects are planned for locations in the designated 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 designated 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 reinitiate 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 were 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 water birds, or roosting by the endangered Hawaiian hoary bat (opeapea). 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 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 final rule, we are designating critical habitat on a total of 26,582 ac (10,757 ha) of land. Ninety-eight percent (25,988 ac (10,517 ha)) of this designated critical habitat designation is already critical habitat for one or more species, and two percent (594 ac (240 ha)) of the designation is on lands newly designated as critical habitat. However, none of the Federal actions that were subject to previous section 7 consultation are on the lands we are designating as critical habitat in this final rule. Therefore, there is no requirement to reinitiate consultation for any ongoing Federal projects.

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 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 critical habitat designation—, such as the Department of Land and Natural Resources and the State Department of Transportation, may be affected by the critical habitat designation.. However, for the purposes of the RFA, State governments are considered independent sovereigns, not small governments. Because of Federal involvement, TNC and NTBG could be affected by the 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 critical habitat designation is further evidence that this designation will not have a significant economic impact on a substantial number of small entities.

In summary, we have considered whether this designation would result in a significant economic effect on a substantial number of small entities. For the above reasons and based on currently available information, we certify that the designation of critical habitat for the 47 species will not have a significant effect on a substantial number of small entities. Federal involvement, and thus section 7 consultations, would be limited to a subset of the area designated. The most likely Federal involvement could include funding provided by NRCS and the Service for habitat restoration projects. A regulatory flexibility analysis is not required.

*Unfunded Mandates Reform Act*

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 imposes 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."

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 designating as critical habitat 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 designation of 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 designation.

*Federalism*

In accordance with E.O. 13132 (Federalism), this final 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 final 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 designated) imposes no additional restrictions to those currently in place and, therefore, has 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 are more clearly defined, and the primary constituent elements of the habitat necessary to the conservation of the species are specifically identified. This information does 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 are designating critical habitat in accordance with the provisions of the Act. This final rule uses standard property descriptions and identifies the physical and biological features essential to the conservation of the species within the designated areas to assist the public in understanding the habitat needs of each of the 47 species for which critical habitat is designated in this final 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 (NEPA)*

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)).

*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 Governments (59 FR 22951), E.O. 13175, and the Department of 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 recognized Federal tribes in the State of Hawaii, and there are no tribal lands essential for the

conservation of the 47 Kauai species for which we are designating critical habitat. Therefore, this final 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 final rule to designate critical habitat for 47 of the 48 species is not a significant regulatory action under E.O. 12866. 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 **ADDRESSES**).

*Authors*

The authors of this document are the staff members of the Pacific Islands Fish and Wildlife Office, Fish and Wildlife Service (see **FOR FURTHER INFORMATION CONTACT**).

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

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

**Regulation Promulgation**

■ Accordingly, we 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 sharpi*) 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) | *Loxops*caeruleirostris | U.S.A. (HI) | Entire | E | 765 | 17.95(b) | NA |
| * | * | * | * | * | * | * | * |
| Akikiki (honeycreeper) | *Oreomystis bairdi* | U.S.A. (HI) | Entire | E | 765 | 17.95(b) | NA |
| * | * | * | * | * | * | * | * |
| INSECTS | | | | | | | |
| * | * | * | * | * | * | * | * |
| Fly, Hawaiian picture-wing | *Drosophila sharpi* | U.S.A. (HI) | NA | E | 765 | 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 eleeleensis, Cyanea kolekoleensis, Cyanea kuhihewa, Cyrtandra oenobarba, Cyrtandra paliku, 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 scopulensis, 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* in alphabetical order under FLOWERING PLANTS; and

■ b. By adding entries for *Diellia mannii, Doryopteris 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 | | | | | | | |
| * | * | * | * | * | | * | * |
| *Astelia waialealae* | Painiu | U.S.A. (HI) | Asteliaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Canavalia napaliensis* | Awikiwiki | U.S.A. (HI) | Fabaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Chamaesyce eleanoriae* | Akoko | U.S.A. (HI) | Euphorbiaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Chamaesyce remyi* var. *kauaiensis* | Akoko | U.S.A. (HI) | Euphorbiaceae | E | 765 | 17.99(a) | NA |
| *Chamaesyce remyi* var. *remyi* | Akoko | U.S.A. (HI) | Euphorbiaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Charpentiera densiflora* | Papala | U.S.A. (HI) | Amaranathaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Cyanea dolichopoda* | Haha | U.S.A. (HI) | Campanulaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Cyanea eleeleensis* | Haha | U.S.A. (HI) | Campanulaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Cyanea kolekoleensis* | Haha | U.S.A. (HI) | Campanulaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Cyanea kuhihewa* | Haha | U.S.A. (HI) | Campanulaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Cyrtandra oenobarba* | Haiwale | U.S.A. (HI) | Gesneriaceae | E | 765 | 17.99(a) | NA |
| *Cyrtandra paliku* | Haiwale | U.S.A. (HI) | Gesneriaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Dubautia imbricata* ssp. *imbricata* | Naenae | U.S.A. (HI) | Asteraceae | E | 765 | 17.99(a) | NA |
| *Dubautia kalalauensis* | Naenae | U.S.A. (HI) | Asteraceae | E | 765 | 17.99(a) | NA |
| *Dubautia kenwoodii* | Naenae | U.S.A. (HI) | Asteraceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Dubautia plantaginea* ssp. *magnifolia* | Naenae | U.S.A. (HI) | Asteraceae | E | 765 | 17.99(a) | NA |

| Species | | Historic range | Family | Status | When listed | Critical habitat | Special rules |
|---|---|---|---|---|---|---|---|
| Scientific name | Common name | | | | | | |
| *Dubautia waialealae* | Naenae | U.S.A. (HI) | Asteraceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Geranium kauaiense* | Nohoanu | U.S.A. (HI) | Geraniaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Keysseria erici* | No common name | U.S.A. (HI) | Asteraceae | E | 765 | 17.99(a) | NA |
| *Keysseria helenae* | No common name | U.S.A. (HI) | Asteraceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Labordia helleri* | Kamakahala | U.S.A. (HI) | Loganiaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Labordia pumila* | Kamakahala | U.S.A. (HI) | Loganiaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Lysimachia daphnoides* | Lehua makanoe | U.S.A. (HI) | Myrsinaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Lysimachia iniki* | No common name | U.S.A. (HI) | Myrsinaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Lysimachia pendens* | No common name | U.S.A. (HI) | Myrsinaceae | E | 765 | 17.99(a) | NA |
| *Lysimachia scopulensis* | No common name | U.S.A. (HI) | Myrsinaceae | E | 765 | 17.99(a) | NA |
| *Lysimachia venosa* | No common name | U.S.A. (HI) | Myrsinaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Melicope degeneri* | Alani | U.S.A. (HI) | Rutaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Melicope paniculata* | Alani | U.S.A. (HI) | Rutaceae | E | 765 | 17.99(a) | NA |
| *Melicope puberula* | Alani | U.S.A. (HI) | Rutaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Myrsine knudsenii* | Kolea | U.S.A. (HI) | Myrsinaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Myrsine mezii* | Kolea | U.S.A. (HI) | Myrsinaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |
| *Phyllostegia renovans* | No common name | U.S.A. (HI) | Lamiaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | * | * | * |

| Species | | Historic range | Family | Status | When listed | Critical habitat | Special rules |
|---|---|---|---|---|---|---|---|
| Scientific name | Common name | | | | | | |
| *Pittosporum napaliense* | Hoawa | U.S.A. (HI) | Pittosporaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Platydesma rostrata* | Pilo kea lau lii | U.S.A. (HI) | Rutaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Pritchardia hardyi* | Loulu | U.S.A. (HI) | Arecaceae | E | 765 | NA | NA |
| * | * | * | * | * | | * | * |
| *Psychotria grandiflora* | Kopiko | U.S.A. (HI) | Rubiaceae | E | 765 | 17.99(a) | NA |
| *Psychotria hobdyi* | Kopiko | U.S.A. (HI) | Rubiaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Schiedea attenuata* | No common name | U.S.A. (HI) | Caryophyllaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Stenogyne kealiae* | No common name | U.S.A. (HI) | Lamiaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Tetraplasandra bisattenuata* | No common name | U.S.A. (HI) | Araliaceae | E | 765 | 17.99(a) | NA |
| *Tetraplasandra flynnii* | No common name | U.S.A. (HI) | Araliaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| FERNS AND ALLIES | | | | | | | |
| * | * | * | * | * | | * | * |
| *Diellia mannii* | No common name | U.S.A. (HI) | Aspleniaceae | E | 765 | 17.99(a) | NA |
| * | * | * | * | * | | * | * |
| *Doryopteris angelica* | No common name | U.S.A. (HI) | Pteridaceae | E | 765 | 17.99(a) | NA |
| *Dryopteris crinalis* var. *podosorus* | Palapalai aumakua | U.S.A. (HI) | Dryopteridaceae | E | 765 | 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 sharpi*)" 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 5,243 ft (914 to 1,598 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*, *Kadua, 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 5,243 ft (914 to 1,598 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.

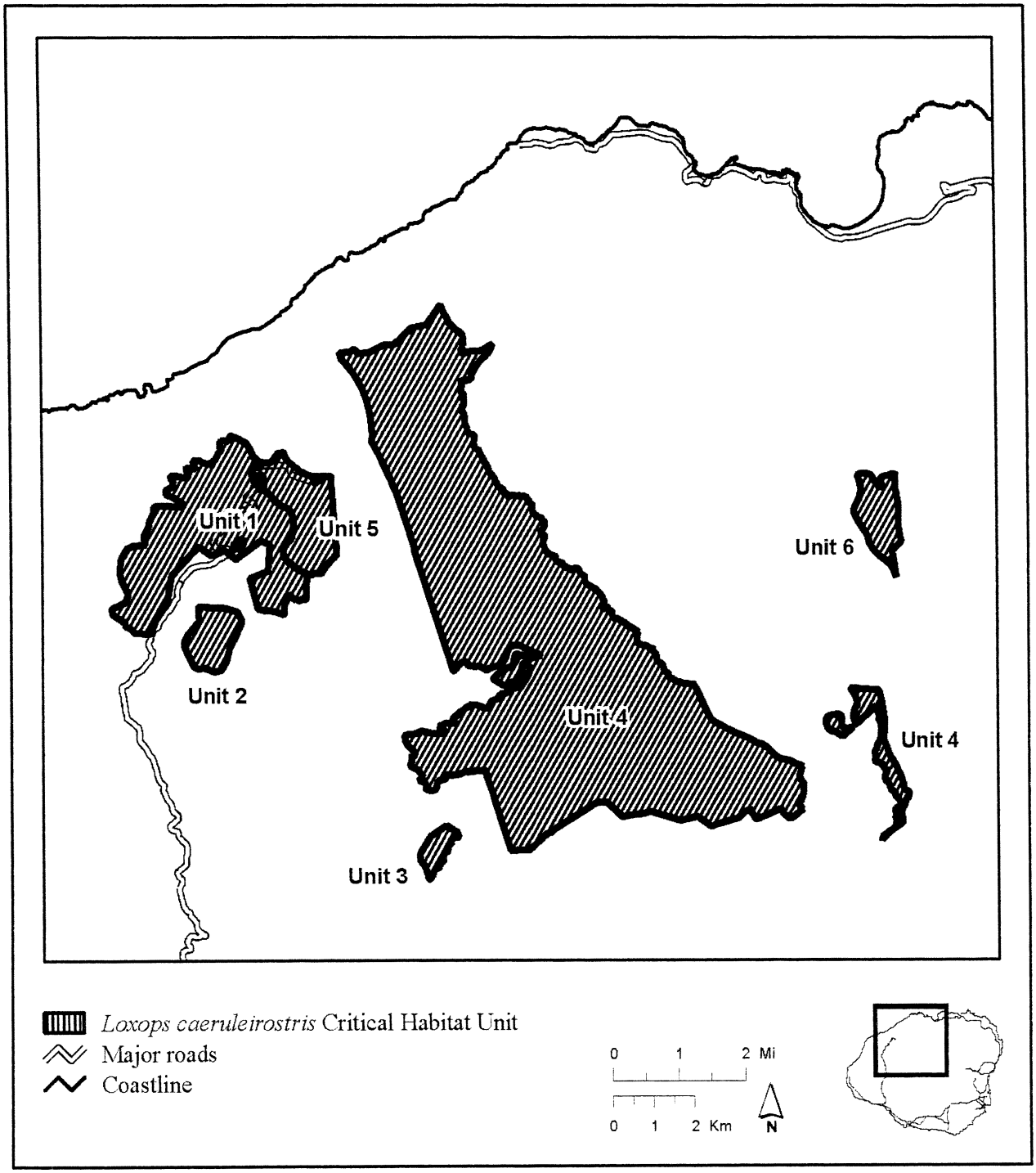
(3) Manmade features and structures, such as buildings, roads, railroads, airports, runways, other paved areas, lawns, and other urban landscaped areas, existing on the effective date of this rule do not contain one or more of the primary constituent elements.

(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**




BILLING CODE 4310–55–C

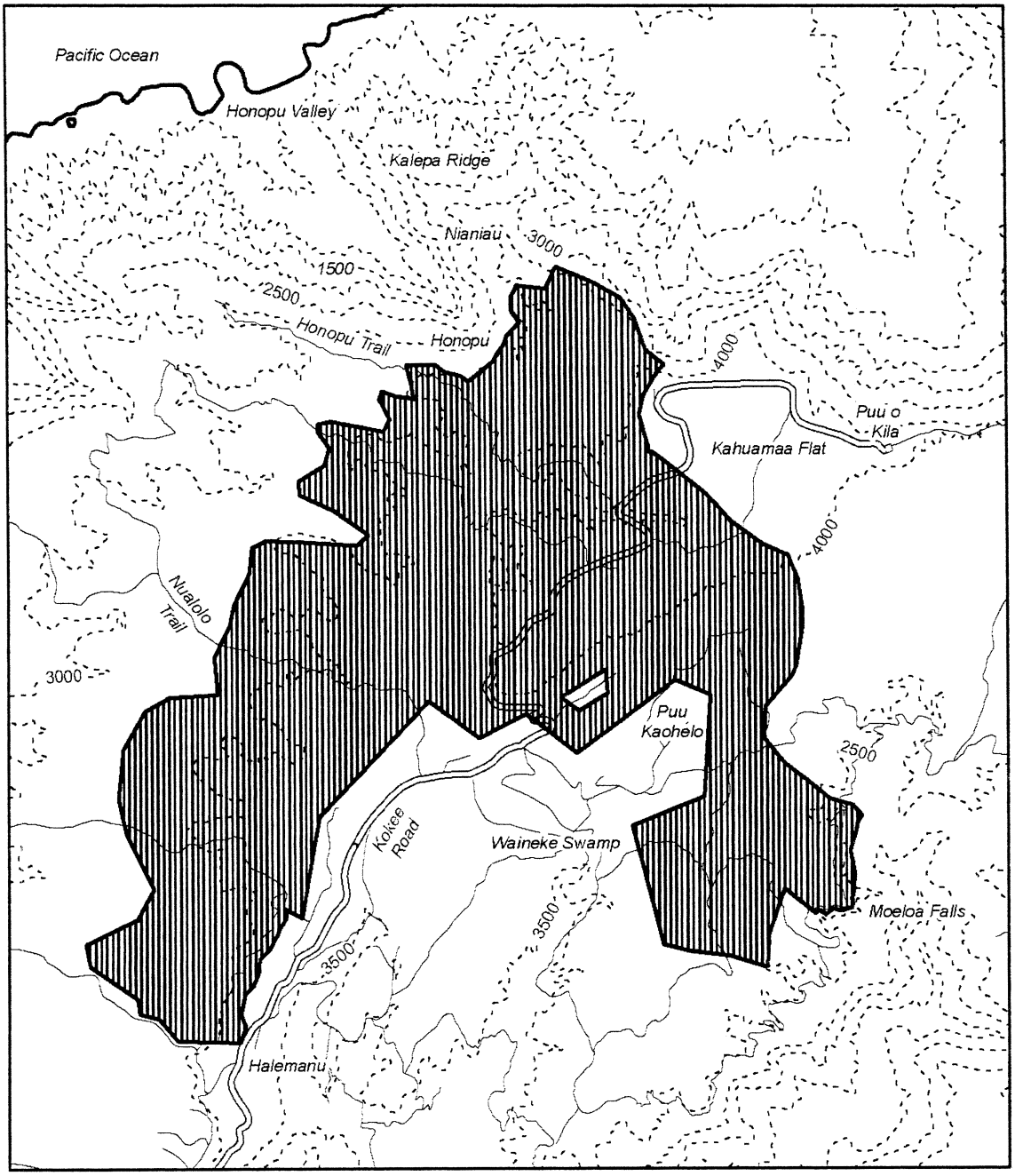
(6) Unit 1–Montane Mesic, Kauai County, Hawaii.

(i) Unit 1–Montane Mesic consists of 2,422.6 ac (980.4 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 430107, 2447429; 430242, 2447664; 430073, 2447126; 430793, 2448310; 430124, 2446907; 430393, 2447748; 430690, 2447765; 430671, 2447997; 430764, 2448188; 430886, 2448507; 430903, 2448664; 430985, 2448705; 431560, 2448675; 431414, 2448890; 430291, 2446570; 431058, 2446300; 431200, 2449070; 431362, 2449169; 431171, 2448699; 430854, 2445930; 432530, 2450196; 431391, 2449273; 431323, 2447013; 431211, 2446394; 431101, 2446447; 431112, 2446394; 431069, 2446331; 431007, 2446203; 430944, 2446145; 430902, 2445976; 430191, 2446386; 430826, 2445805; 430857, 2445727; 430824, 2445631; 430442, 2445640; 430323, 2445779; 430204, 2445809; 430191, 2445898; 429898, 2446100; 429871, 2446234; 430939, 2446061; 432796, 2450365; 432504, 2449961; 432579, 2450036; 432552, 2450080; 432551, 2450083; 432001, 2447726; 432534, 2450174; 431629, 2448739; 432565, 2450262; 432531, 2450116; 432740, 2450249; 432441, 2449848; 432808, 2450383; 432882, 2450351; 432904, 2450341; 432827, 2447751; 432932, 2447668; 433014, 2447717; 433109, 2447775; 433094, 2447922; 432560, 2450267; 431875, 2449780; 431322, 2449418; 431403, 2449436; 431727, 2449372; 431769, 2449447; 431705, 2449569; 431720, 2449620; 431805, 2449591; 431919, 2449578; 432498, 2449952; 431904, 2449665; 432486, 2449909; 432046, 2449781; 432052, 2449783; 432113, 2449740; 432217, 2449712; 432251, 2449685; 432259, 2449679; 432344, 2449744; 432419, 2449806; 431322, 2449372; 431905, 2449660; 434486, 2447126; 434073, 2448685; 434228, 2448620; 434292, 2448479; 434318, 2448298; 434279, 2447951; 434163, 2447783; 434086, 2447693; 434073, 2447500; 434623, 2446526; 434357, 2447229; 433545, 2449136; 434627, 2447088; 434686, 2447020; 434682, 2447017; 434657, 2446977; 434652, 2446933; 434612, 2446807; 434641, 2446663; 434631, 2446528; 434202, 2447345; 433399, 2449709; 431205, 2448983; 432073, 2447674; 433046, 2450280; 433196, 2450196; 433287, 2450063; 433353, 2449880; 433467, 2449787; 433429, 2449741; 433880, 2448827; 433407, 2449708; 433725, 2448994; 433401, 2449697; 433339, 2449600; 433313, 2449484; 433339, 2449381; 433368, 2449293; 433368, 2449292; 433369, 2449255; 433389, 2449256; 434254, 2447886; 433408, 2449708; 433527, 2447856; 434086, 2446095; 433862, 2446165; 433606, 2446193; 433449, 2446235; 433397, 2446440; 433257, 2446958; 433577, 2447086; 433706, 2447138; 434090, 2446098; 433562, 2447841; 432639, 2447624; 432918, 2447407; 432672, 2447598; 434620, 2446512; 432609, 2447647; 434318, 2448182; 432195, 2447587; 432136, 2447629; 432133, 2447631; 432081, 2447668; 433746, 2447766; 434500, 2446448; 432320, 2447497; 434103, 2446297; 434618, 2446459; 434582, 2446443; 434558, 2446439; 434514, 2446449; 434471, 2446422; 434457, 2446416; 434447, 2446420; 434392, 2446421; 434423, 2446441; 434416, 2446441; 434625, 2446467; 434201, 2446573; 434403, 2446435; 434628, 2446479; 434400, 2446429; 434434, 2446428; 434386, 2446429; 434533, 2446441.

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

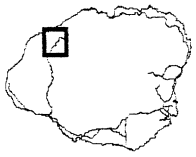
BILLING CODE 4310–55–S

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




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

0 0.25 0.5 Mi
0 0.25 0.5 Km
N

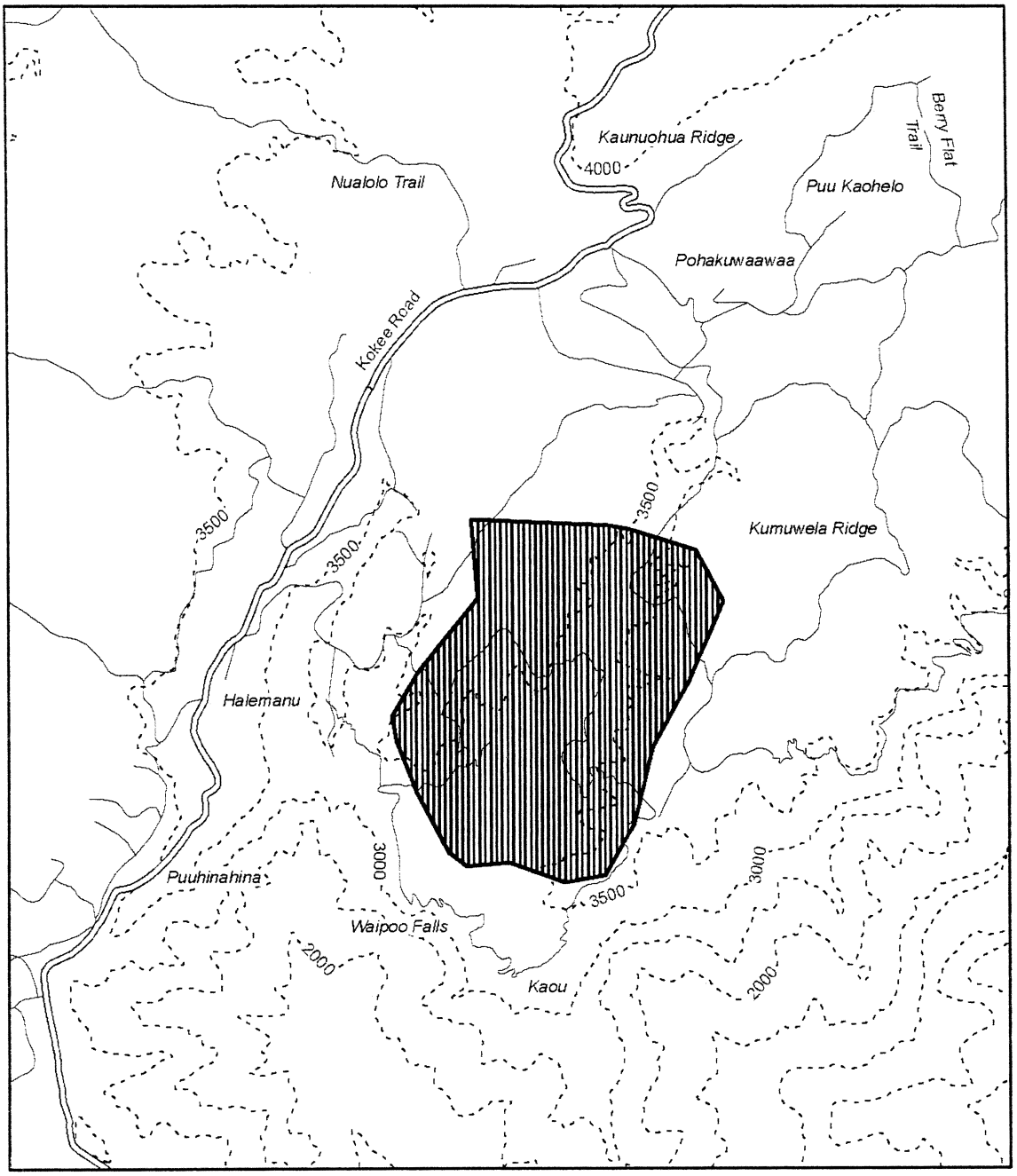


(7) Unit 2–Montane Mesic, Kauai County, Hawaii.

(i) Montane Mesic – Unit 2 consists of 375.6 ac (152.0 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 431975, 2446280; 432559, 2446255; 432659, 2446240; 432948, 2446150; 433067, 2445928; 432758, 2445304; 432001, 2445941; 431873, 2444849; 432912, 2445580; 432674, 2444970; 431626, 2445435; 431730, 2445114; 431950, 2444792; 432135, 2444807; 432377, 2444722; 432548, 2444752; 431645, 2445326; 431736, 2445617.

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

*Loxops caeruleirostris*
**Unit 2 - Montane Mesic**




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

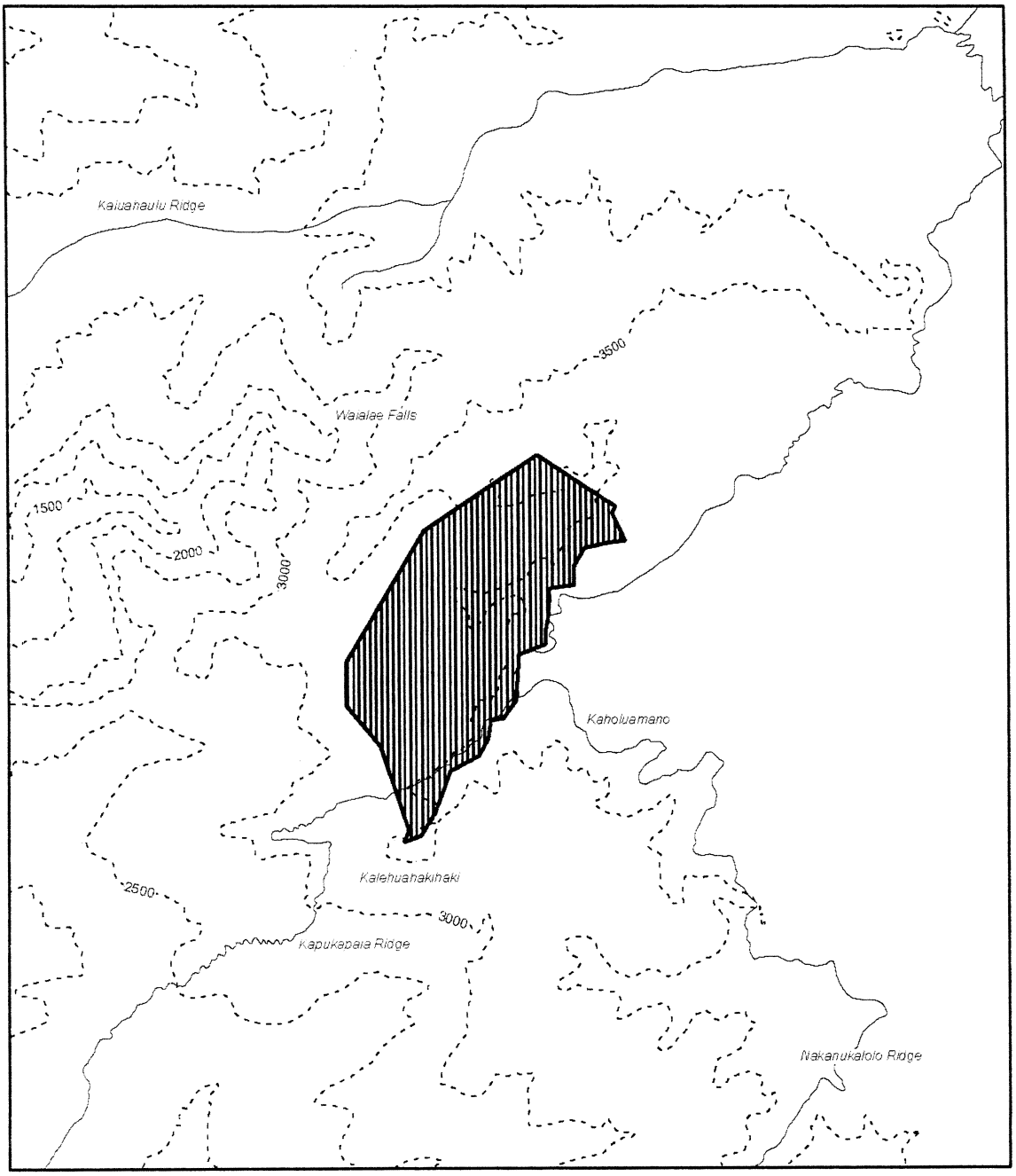
0 0.25 0.5 Mi
0 0.25 0.5 Km
N

(8) Unit 3–Montane Mesic, Kauai County, Hawaii.

(i) Unit 3–Montane Mesic consists of 138.5 ac (56.0 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 438012, 2440389; 438014, 2440437; 438023, 2440484; 438111, 2440652; 438112, 2440588; 437817, 2440071; 438028, 2440577; 437922, 2440355; 437336, 2440335; 437912, 2440201; 437827, 2440132; 437785, 2440013; 437687, 2439960; 437636, 2439819; 437870, 2440140; 437545, 2439761; 438149, 2440714; 437529, 2439721; 437987, 2441027; 437450, 2440047; 437335, 2440180; 437335, 2440329; 438159, 2440914; 438249, 2440857; 438253, 2440854; 438243, 2440830; 438287, 2440738; 437602, 2440771; 438227, 2440730; 437586, 2439743.

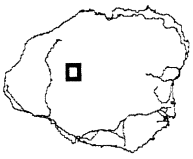
(ii) Map of Unit 3–Montane Mesic for Akekee (*Loxops caeruleirostris*) follows:

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




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

0 0.25 0.5 Mi
0 0.25 0.5 Km
N



BILLING CODE 4310–55–C

(9) Unit 4–Montane Wet, Kauai County, Hawaii.

(i) Montane Wet–Unit 1 consists of 13,055.0 ac (5,283.2 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E,N): 448638, 2440764; 448601, 2440679; 448606, 2440704; 448612, 2440722; 448615, 2440731; 448619, 2440740; 448630, 2440759; 448650, 2440769; 448600, 2440668; 448622, 2440749; 448599, 2440647; 448601, 2440652; 448678, 2440741; 448777, 2440842; 448663, 2440773; 449006, 2441012; 448764, 2440857; 449068, 2441051; 449121, 2441114; 449121, 2441114; 448887, 2440934; 448811, 2440896; 448954, 2441097; 448943, 2441063; 448943, 2441053; 448943, 2441044; 448941, 2441024; 448940, 2441006; 448918, 2440982; 448877, 2440939; 448861, 2440927; 448735, 2440829; 448837, 2440912; 448678, 2440780; 448802, 2440889; 448788, 2440878; 449115, 2442038; 448745, 2440841; 449111, 2441196; 448727, 2440820; 448720, 2440813; 448711, 2440806; 448691, 2440790; 448841, 2440914; 447374, 2443275; 449244, 2441819; 447623, 2443445; 447616, 2443588; 447603, 2443646; 447556, 2443686; 447325, 2443651; 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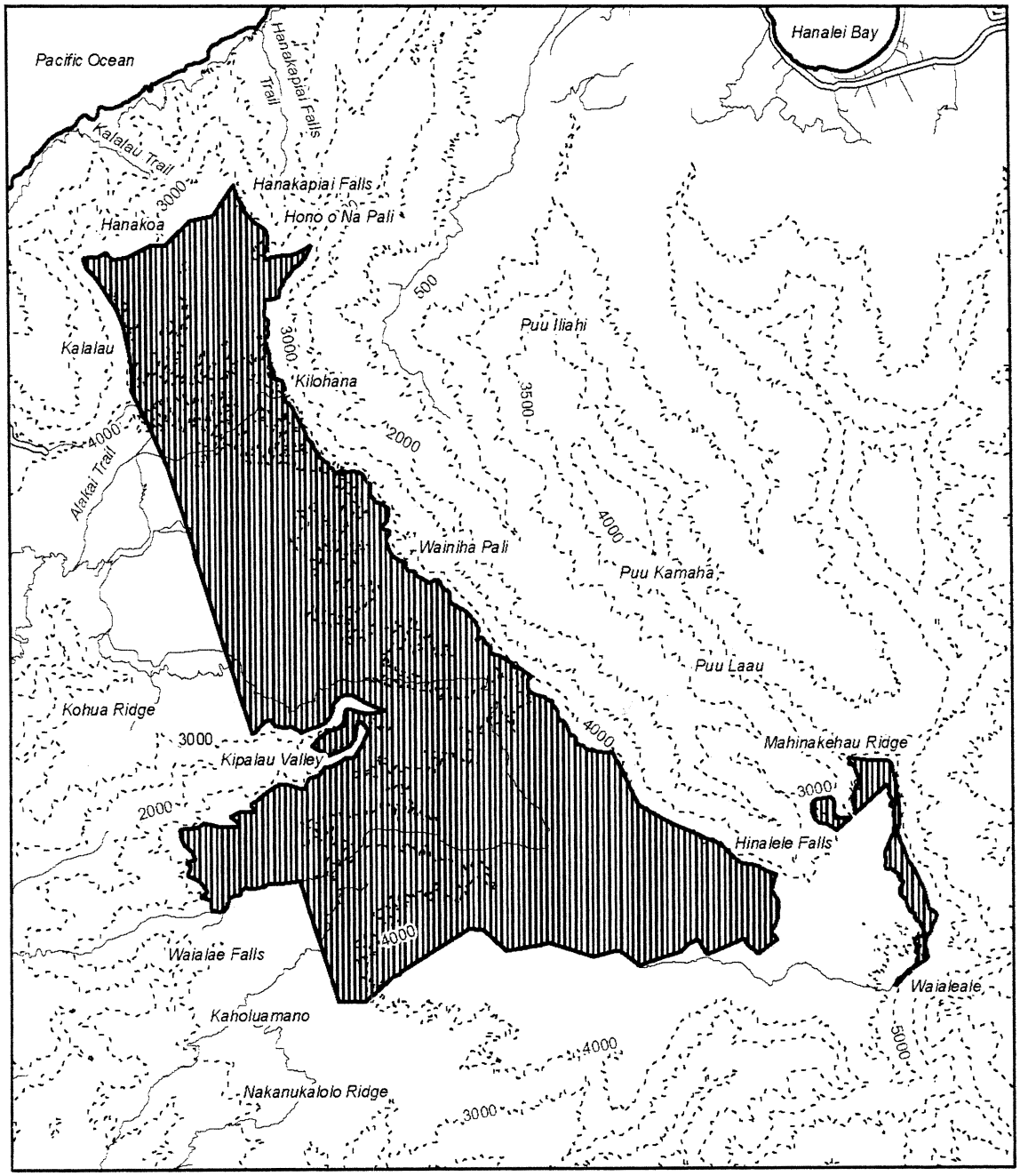
438435, 2450985; 438427, 2450964; 438919, 2449853; 439437, 2449066; 438581, 2450423; 438816, 2450028; 438717, 2450241; 438894, 2449879; 438884, 2449918; 438904, 2449863; 438831, 2450010; 438850, 2449982; 438791, 2450036; 438765, 2450051; 438744, 2450081; 438730, 2450109; 438717, 2450158; 438716, 2450162; 438713, 2450206.

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

BILLING CODE 4310–55–S

*Loxops caeruleirostris*
**Unit 4 - Montane Wet**




*Loxops caeruleirostris* - Unit 4 - Montane Wet
Major roads
Secondary roads and trails
Elevation (500-foot contours)
Coastline

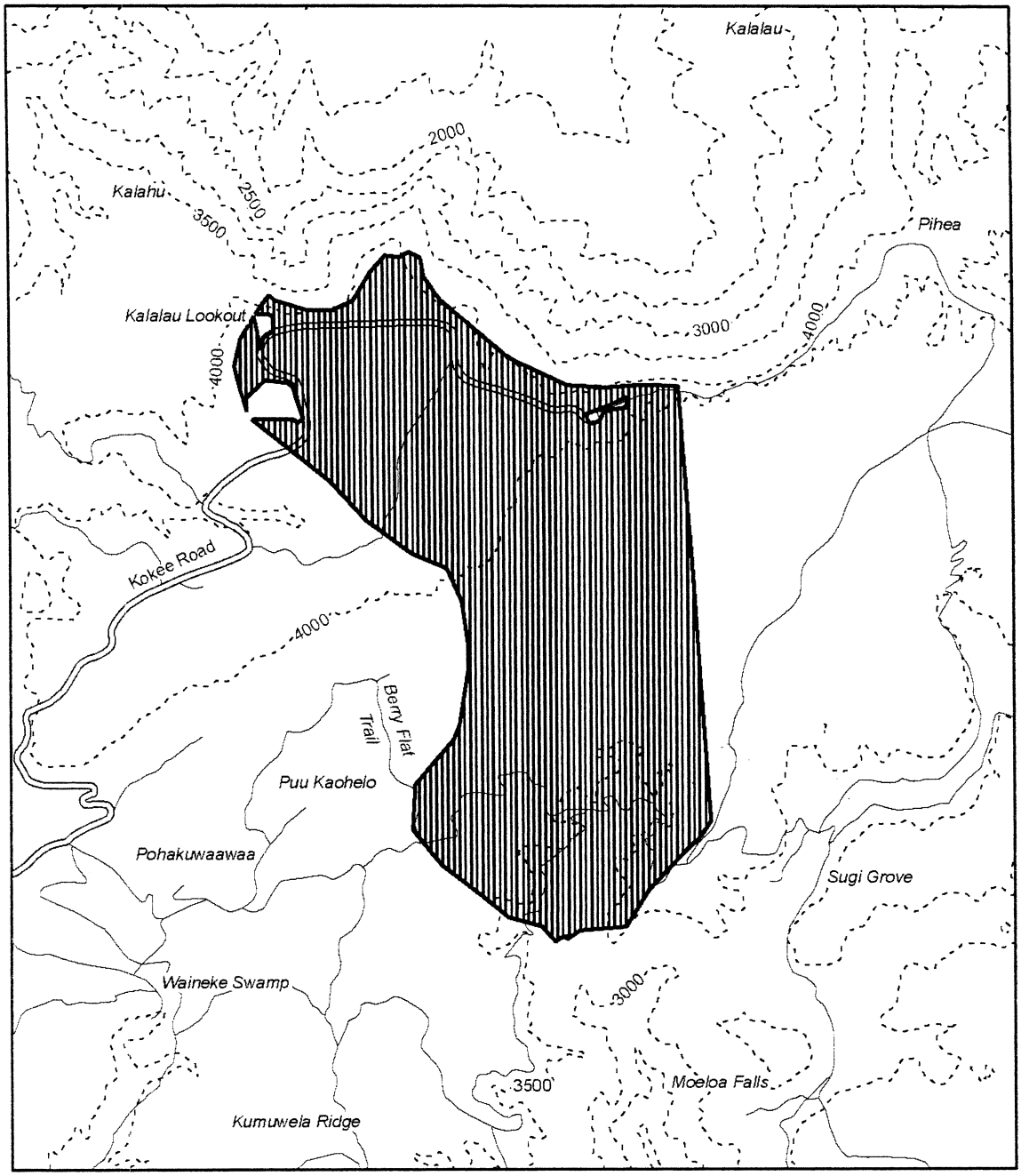
0 1 2 Mi
0 1 2 Km
N

(10) Unit 5–Montane Wet, Kauai County, Hawaii.

(i) Unit 5–Montane Wet consists of 789.9 ac (319.7 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 433436, 2449707; 433445, 2449707; 433444, 2449707; 433443, 2449707; 433458, 2449707; 433436, 2449707; 433426, 2449707; 433408, 2449708; 433429, 2449741; 433493, 2449765; 433633, 2449724; 433742, 2449724; 433467, 2449787; 433460, 2449707; 433468, 2449706; 433484, 2449694; 433414, 2449628; 433461, 2449623; 433457, 2449622; 433339, 2449600; 433440, 2449604; 433437, 2449592; 433426, 2449556; 433419, 2449599; 433831, 2449767; 434991, 2449344; 433401, 2449697; 433480, 2449629; 434938, 2449321; 433313, 2449484; 433455, 2449620; 434842, 2449253; 434839, 2449258; 434834, 2449277; 434833, 2449278; 434833, 2449278; 434833, 2449280; 434833, 2449281; 434872, 2449294; 434881, 2449297; 434884, 2449298; 435010, 2449343; 434899, 2449305; 433903, 2449882; 435011, 2449352; 435010, 2449343; 435005, 2449310; 434948, 2449300; 434908, 2449290; 434908, 2449290; 434890, 2449251; 434872, 2449246; 434848, 2449239; 434844, 2449248; 434034, 2449950; 434026, 2449951; 433969, 2449958; 434898, 2449304; 435183, 2449401; 434713, 2447038; 434738, 2447045; 434738, 2447030; 434795, 2447069; 434994, 2447085; 435093, 2447245; 435290, 2447449; 435295, 2447440; 435360, 2447538; 435282, 2448685; 435266, 2448909; 435236, 2449351; 434686, 2447020; 435232, 2449399; 435272, 2448835; 435080, 2449407; 434920, 2449394; 434752, 2449405; 434498, 2449522; 434338, 2449660; 434208, 2449767; 434141, 2449863; 434137, 2449869; 434124, 2449948; 434074, 2449972; 433461, 2449623; 433339, 2449381; 435234, 2449384; 433589, 2449323; 433725, 2448994; 433545, 2449136; 433389, 2449256; 433567, 2449260; 433588, 2449244; 433880, 2448827; 433612, 2449262; 433525, 2449415; 433567, 2449398; 433546, 2449412; 434627, 2447088; 433448, 2449426; 435236, 2449347; 433368, 2449293; 433599, 2449252; 434202, 2447345; 433367, 2449352; 434073, 2448685; 434357, 2447229; 434073, 2447500; 434086, 2447693; 434163, 2447783; 434254, 2447886; 434318, 2448182; 434318, 2448298; 434292, 2448479; 434279, 2447951; 434486, 2447126; 434228, 2448620.

(ii) Map of Unit 5–Montane Wet for Akekee (*Loxops caeruleirostris*) follows:

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



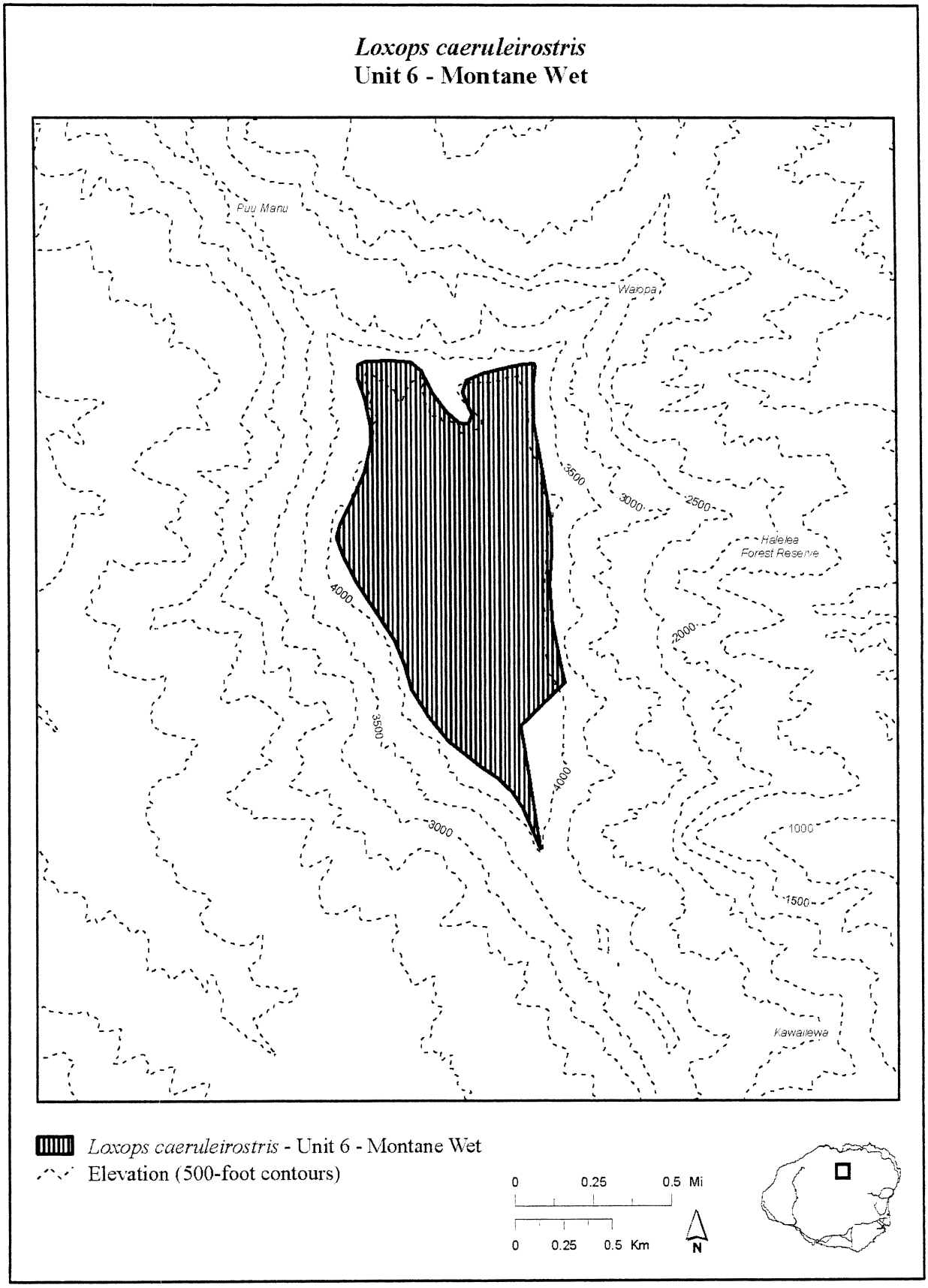

*Loxops caeruleirostris* - Unit 5 - Montane Wet
Major roads
Secondary roads and trails
Elevation (500-foot contours)

0 0.25 0.5 Mi
0 0.25 0.5 Km
N

(11) Unit 6–Montane Wet, Kauai County, Hawaii.

(i) Unit 6–Montane Wet consists of 413.5 ac (167.3 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 448516, 2447525; 447976, 2448470; 448042, 2448338; 448133, 2448200; 448235, 2448042; 448834, 2447273; 448288, 2447915; 448412, 2447653; 448669, 2447406; 447943, 2448562; 448763, 2447342; 448059, 2449434; 448321, 2447795; 447961, 2448628; 448037, 2448780; 448088, 2448897; 448122, 2449037; 448119, 2449134; 448056, 2449368; 448099, 2449454; 448242, 2449457; 448328, 2449449; 448440, 2449296; 448382, 2449406; 448887, 2447191; 448091, 2449266; 448610, 2449255; 448931, 2447092; 448511, 2449199; 448623, 2449141; 448641, 2449184; 448593, 2449298; 448613, 2449357; 448702, 2449395; 448812, 2449420; 448906, 2449440; 448959, 2449443; 448964, 2449425; 448952, 2449316; 448954, 2449143; 448881, 2447609; 448987, 2448959; 448980, 2446980; 448979, 2446983; 448577, 2449143; 448980, 2446982; 448981, 2446981; 449105, 2447827; 449087, 2447916; 449044, 2448132; 449032, 2448326; 449045, 2448506; 449040, 2448659; 449012, 2448822.

(ii) Map of Unit 6–Montane Wet for Akekee (*Loxops caeruleirostris*) follows:


*Loxops caeruleirostris*
Unit 6 - Montane Wet
Puu Manu
Waiopa
Halelea
Forest Reserve
Kawailewa
4000
3500
3000
2500
2000
1500
1000
*Loxops caeruleirostris* - Unit 6 - Montane Wet
Elevation (500-foot contours)
0
0.25
0.5 Mi
0
0.25
0.5 Km
N

Akikiki (*Oreomystis bairdi*)

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

(2) Primary constituent elements.

(i) In units 1, 2, and 3, the primary constituent elements of critical habitat for Akikiki (*Oreomystis bairdi*) are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*, *Kadua, 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 Akikiki (*Oreomystis bairdi*) are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*.

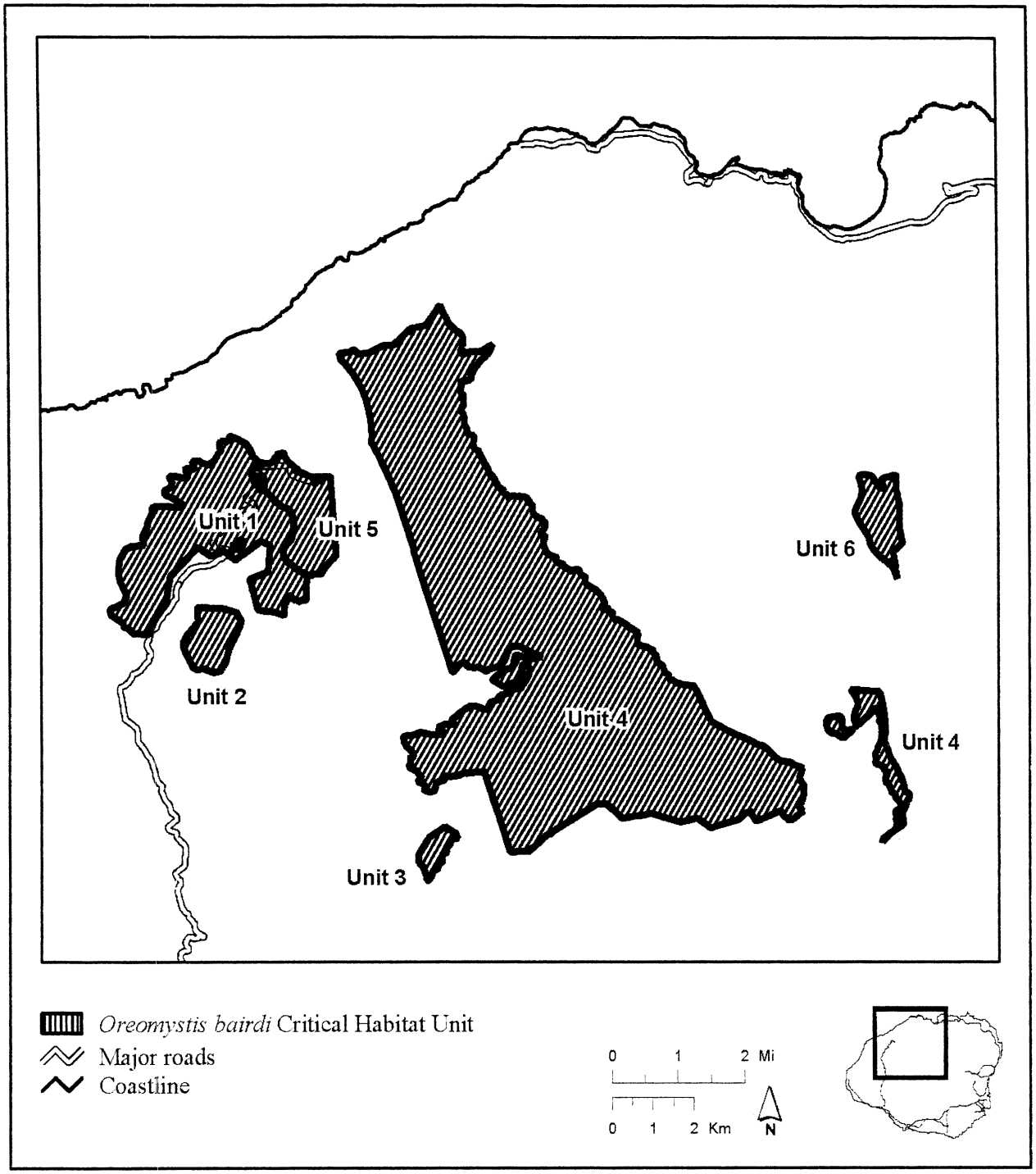
(G) Arthropod prey.

(3) Manmade features and structures, such as buildings, roads, railroads, airports, runways, other paved areas, lawns, and other urban landscaped areas, existing on the effective date of this rule do not contain one or more of the primary constituent elements.

(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 Akikiki (*Oreomystis bairdi*) follows:

**Map 1**
***Oreomystis bairdi*–Index Map**




BILLING CODE 4310–55–C

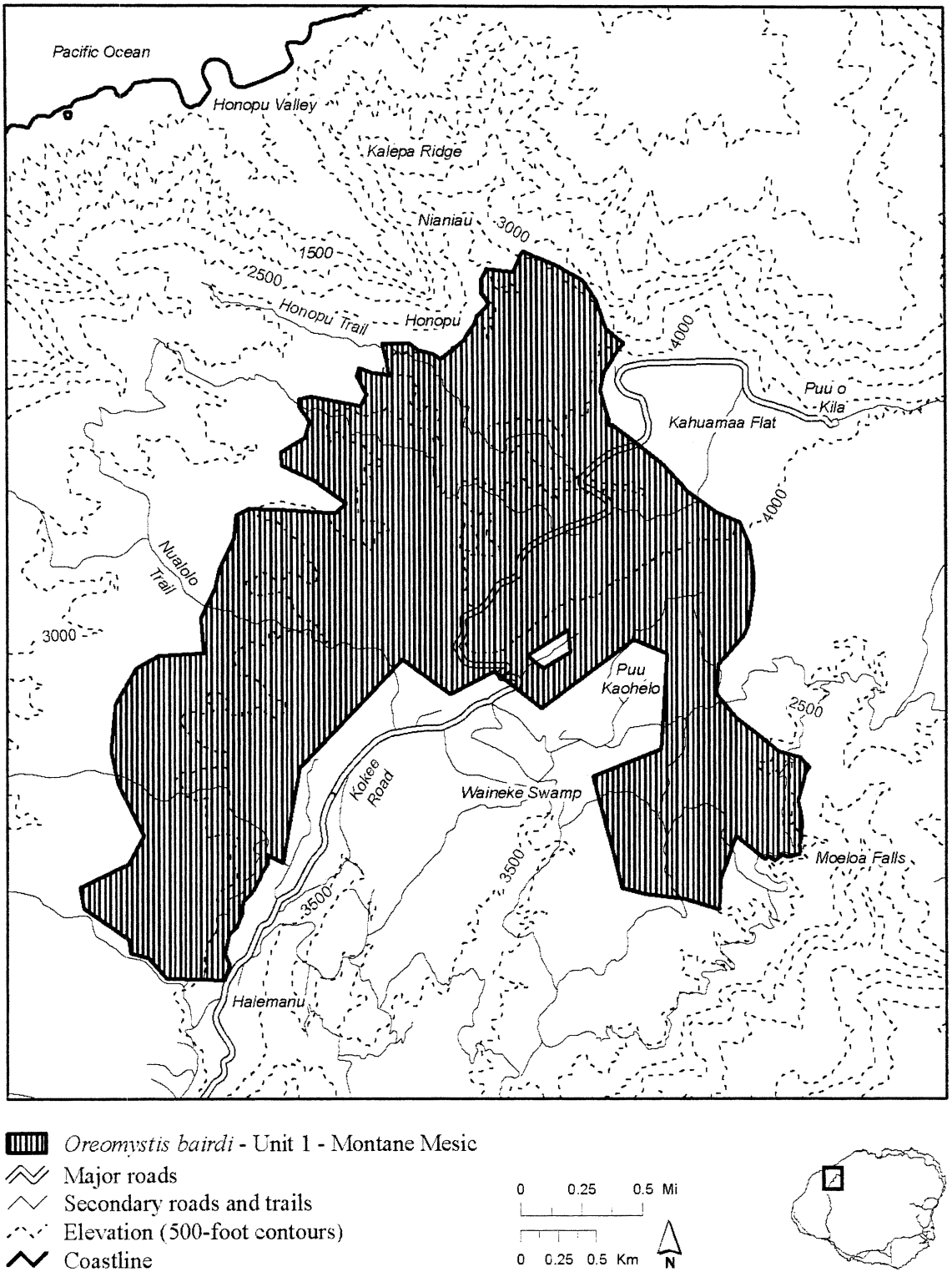
(6) Unit 1–Montane Mesic, Kauai County, Hawaii.

(i) Unit 1–Montane Mesic consists of 2,422.6 ac (980.4 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E,N): 430107, 2447429; 430242, 2447664; 430073, 2447126; 430793, 2448310; 430124, 2446907; 430393, 2447748; 430690, 2447765; 430671, 2447997; 430764, 2448188; 430886, 2448507; 430903, 2448664; 430985, 2448705; 431560, 2448675; 431414, 2448890; 430291, 2446570; 431058, 2446300; 431200, 2449070; 431362, 2449169; 431171, 2448699; 430854, 2445930; 432530, 2450196; 431391, 2449273; 431323, 2447013; 431211, 2446394; 431101, 2446447; 431112, 2446394; 431069, 2446331; 431007, 2446203; 430944, 2446145; 430902, 2445976; 430191, 2446386; 430826, 2445805; 430857, 2445727; 430824, 2445631; 430442, 2445640; 430323, 2445779; 430204, 2445809; 430191, 2445898; 429898, 2446100; 429871, 2446234; 430939, 2446061; 432796, 2450365; 432504, 2449961; 432579, 2450036; 432552, 2450080; 432551, 2450083; 432001, 2447726; 432534, 2450174; 431629, 2448739; 432565, 2450262; 432531, 2450116; 432740, 2450249; 432441, 2449848; 432808, 2450383; 432882, 2450351; 432904, 2450341; 432827, 2447751; 432932, 2447668; 433014, 2447717; 433109, 2447775; 433094, 2447922; 432560, 2450267; 431875, 2449780; 431322, 2449418; 431403, 2449436; 431727, 2449372; 431769, 2449447; 431705, 2449569; 431720, 2449620; 431805, 2449591; 431919, 2449578; 432498, 2449952; 431904, 2449665; 432486, 2449909; 432046, 2449781; 432052, 2449783; 432113, 2449740; 432217, 2449712; 432251, 2449685; 432259, 2449679; 432344, 2449744; 432419, 2449806; 431322, 2449372; 431905, 2449660; 434486, 2447126; 434073, 2448685; 434228, 2448620; 434292, 2448479; 434318, 2448298; 434279, 2447951; 434163, 2447783; 434086, 2447693; 434073, 2447500; 434623, 2446526; 434357, 2447229; 433545, 2449136; 434627, 2447088; 434686, 2447020; 434682, 2447017; 434657, 2446977; 434652, 2446933; 434612, 2446807; 434641, 2446663; 434631, 2446528; 434202, 2447345; 433399, 2449709; 431205, 2448983; 432073, 2447674; 433046, 2450280; 433196, 2450196; 433287, 2450063; 433353, 2449880; 433467, 2449787; 433429, 2449741; 433880, 2448827; 433407, 2449708; 433725, 2448994; 433401, 2449697; 433339, 2449600; 433313, 2449484; 433339, 2449381; 433368, 2449293; 433368, 2449292; 433369, 2449255; 433389, 2449256; 434254, 2447886; 433408, 2449708; 433527, 2447856; 434086, 2446095; 433862, 2446165; 433606, 2446193; 433449, 2446235; 433397, 2446440; 433257, 2446958; 433577, 2447086; 433706, 2447138; 434090, 2446098; 433562, 2447841; 432639, 2447624; 432918, 2447407; 432672, 2447598; 434620, 2446512; 432609, 2447647; 434318, 2448182; 432195, 2447587; 432136, 2447629; 432133, 2447631; 432081, 2447668; 433746, 2447766; 434500, 2446448; 432320, 2447497; 434103, 2446297; 434618, 2446459; 434582, 2446443; 434558, 2446439; 434514, 2446449; 434471, 2446422; 434457, 2446416; 434447, 2446420; 434392, 2446421; 434423, 2446441; 434416, 2446441; 434625, 2446467; 434201, 2446573; 434403, 2446435; 434628, 2446479; 434400, 2446429; 434434, 2446428; 434386, 2446429; 434533, 2446441.

(ii) Map of Unit 1–Montane Mesic for Akikiki (*Oreomystis bairdi*) follows:

BILLING CODE 4310–55–S

*Oreomystis bairdi*
**Unit 1 - Montane Mesic**

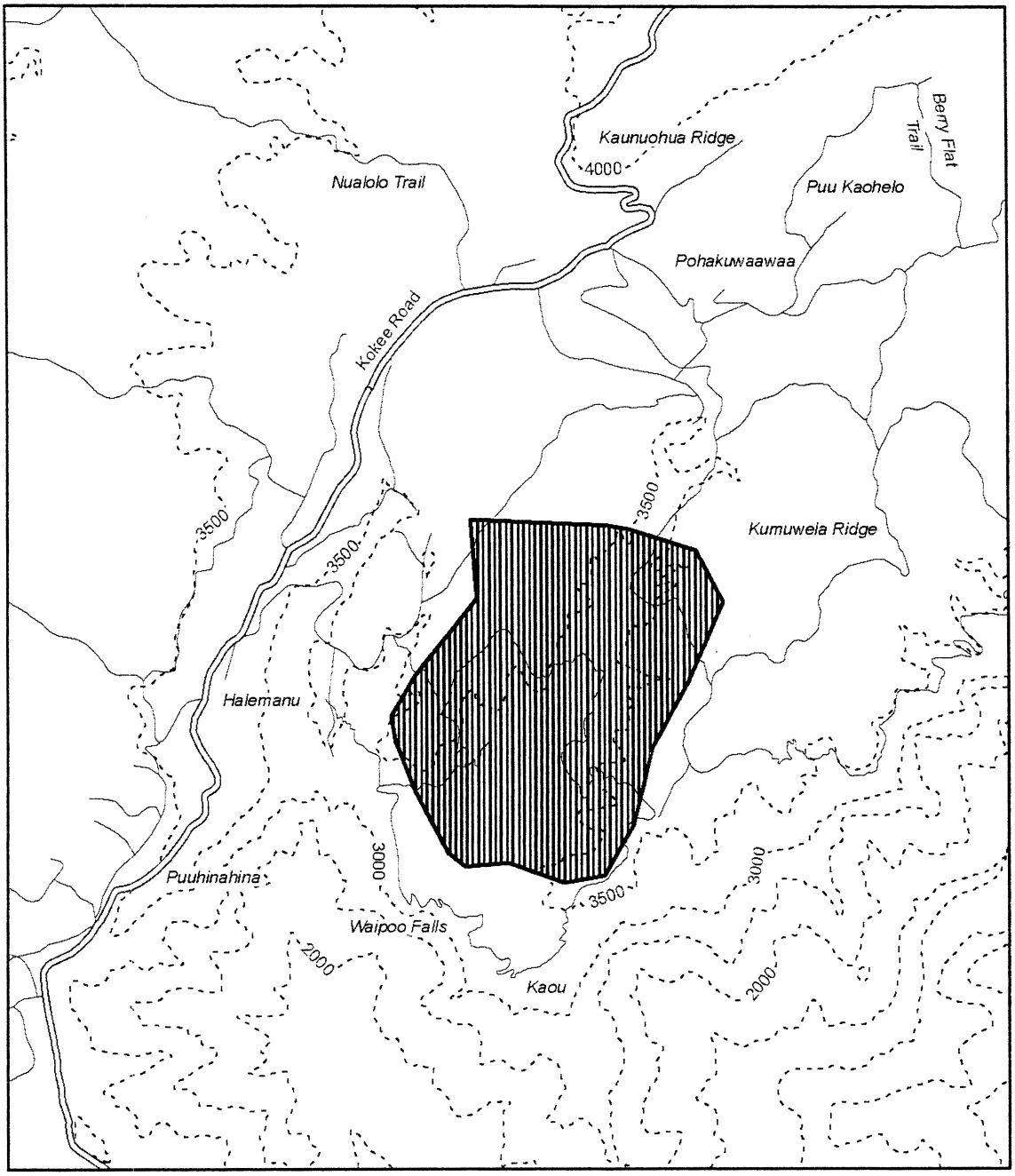


(7) Unit 2–Montane Mesic, Kauai County, Hawaii.

(i) Unit 2–Montane Mesic consists of 375.6 ac (152.0 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 431975, 2446280; 432559, 2446255; 432659, 2446240; 432948, 2446150; 433067, 2445928; 432758, 2445304; 432001, 2445941; 431873, 2444849; 432912, 2445580; 432674, 2444970; 431626, 2445435; 431730, 2445114; 431950, 2444792; 432135, 2444807; 432377, 2444722; 432548, 2444752; 431645, 2445326; 431736, 2445617.

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

*Oreomystis bairdi*
**Unit 2 - Montane Mesic**




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

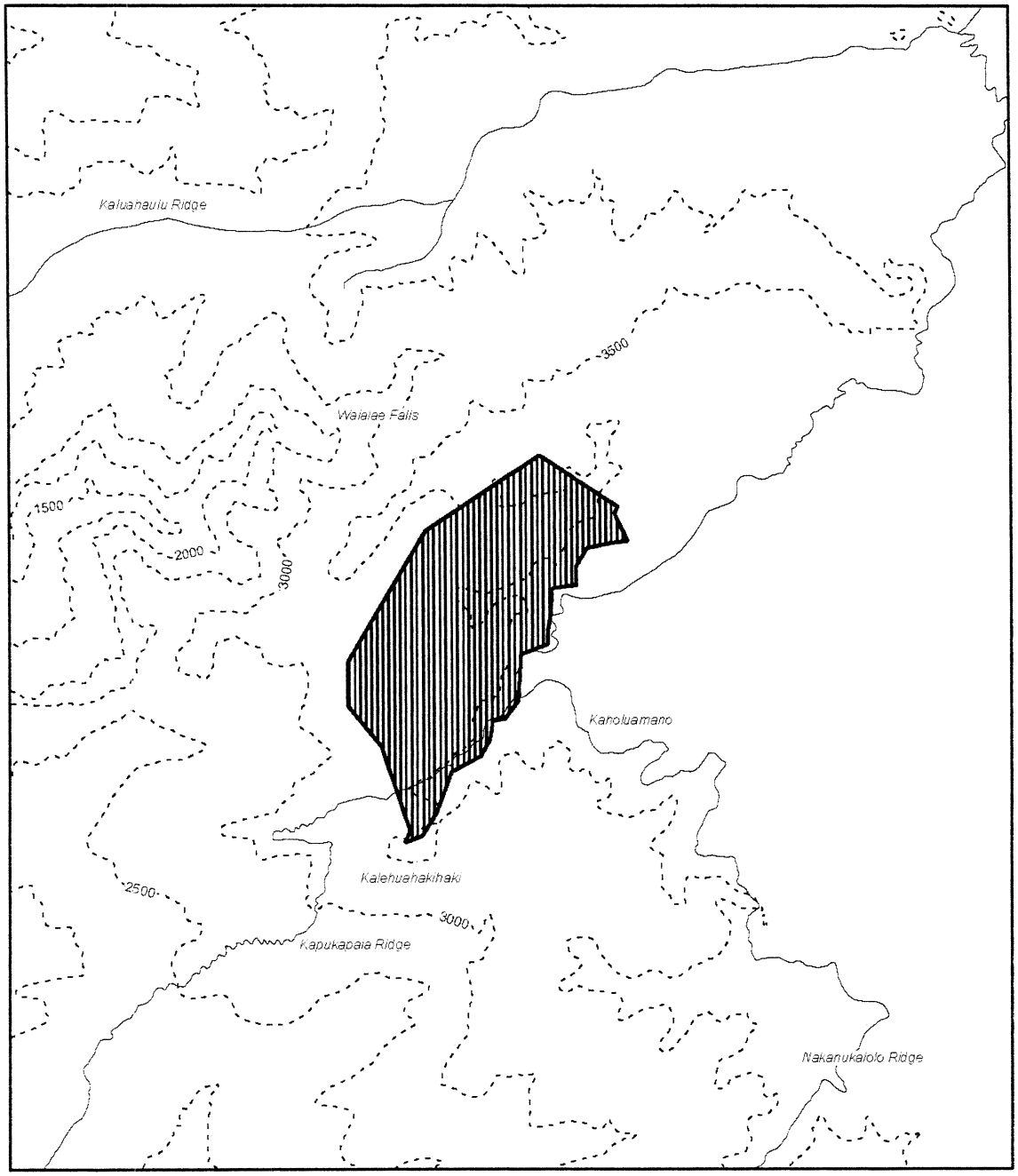
0 0.25 0.5 Mi
0 0.25 0.5 Km
N

(8) Unit 3–Montane Mesic, Kauai County, Hawaii.

(i) Unit 3–Montane Mesic consists of 138.5 ac (56.0 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 438012, 2440389; 438014, 2440437; 438023, 2440484; 438111, 2440652; 438112, 2440588; 437817, 2440071; 438028, 2440577; 437922, 2440355; 437336, 2440335; 437912, 2440201; 437827, 2440132; 437785, 2440013; 437687, 2439960; 437636, 2439819; 437870, 2440140; 437545, 2439761; 438149, 2440714; 437529, 2439721; 437987, 2441027; 437450, 2440047; 437335, 2440180; 437335, 2440329; 438159, 2440914; 438249, 2440857; 438253, 2440854; 438243, 2440830; 438287, 2440738; 437602, 2440771; 438227, 2440730; 437586, 2439743.

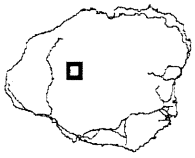
(ii) Map of Unit 3–Montane Mesic for Akikiki (*Oreomystis bairdi*) follows:

*Oreomystis bairdi*
**Unit 3 - Montane Mesic**




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

0 0.25 0.5 Mi
0 0.25 0.5 Km
N



BILLING CODE 4310–55–C

(9) Unit 4–Montane Wet, Kauai County, Hawaii.

(i) Unit 4–Montane Wet consists of 13,055.0 ac (5,283.2 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 448638, 2440764; 448601, 2440679; 448606, 2440704; 448612, 2440722; 448615, 2440731; 448619, 2440740; 448630, 2440759; 448650, 2440769; 448600, 2440668; 448622, 2440749; 448599, 2440647; 448601, 2440652; 448678, 2440741; 448777, 2440842; 448663, 2440773; 449006, 2441012; 448764, 2440857; 449068, 2441051; 449121, 2441114; 449121, 2441114; 448887, 2440934; 448811, 2440896; 448954, 2441097; 448943, 2441063; 448943, 2441053; 448943, 2441044; 448941, 2441024; 448940, 2441006; 448918, 2440982; 448877, 2440939; 448861, 2440927; 448735, 2440829; 448837, 2440912; 448678, 2440780; 448802, 2440889; 448788, 2440878; 449115, 2442038; 448745, 2440841; 449111, 2441196; 448727, 2440820; 448720, 2440813; 448711, 2440806; 448691, 2440790; 448841, 2440914; 447374, 2443275; 449244, 2441819; 447623, 2443445; 447616, 2443588; 447603, 2443646; 447556, 2443686; 447325, 2443651; 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440969, 2447210; 440740, 2447346; 440888, 2447250; 440873, 2447265; 440865, 2447286; 440858, 2447311; 440842, 2447328; 441172, 2447190; 441039, 2447168; 438599, 2451708; 438434, 2451069; 438440, 2451600; 438425, 2451652; 438429, 2451670; 438442, 2451682; 438419, 2451509; 438529, 2451692; 438410, 2451464; 438657, 2451738; 439516, 2448971; 438675, 2451766; 440125, 2448578; 438680, 2451858; 438715, 2451908; 438484, 2451690; 438467, 2451228; 438455, 2451089; 438463, 2451098; 438475, 2451113; 438484, 2451141; 438486, 2451163; 438435, 2451571; 438472, 2451209; 438888, 2452163; 438472, 2451261; 438481, 2451287; 438485, 2451346; 438478, 2451359; 438454, 2451380; 438422, 2451414; 438481, 2451188; 448609, 2443974; 438669, 2452384; 438605, 2452379; 438540, 2452374; 438510, 2452340; 438449, 2452330; 438761, 2452013; 438490, 2452605; 438816, 2452396; 448591, 2444072; 448566, 2444172; 448548, 2444233; 448510, 2444279; 448464, 2444284; 448299, 2444289; 438431, 2452414; 439138, 2452428; 438670, 2451754; 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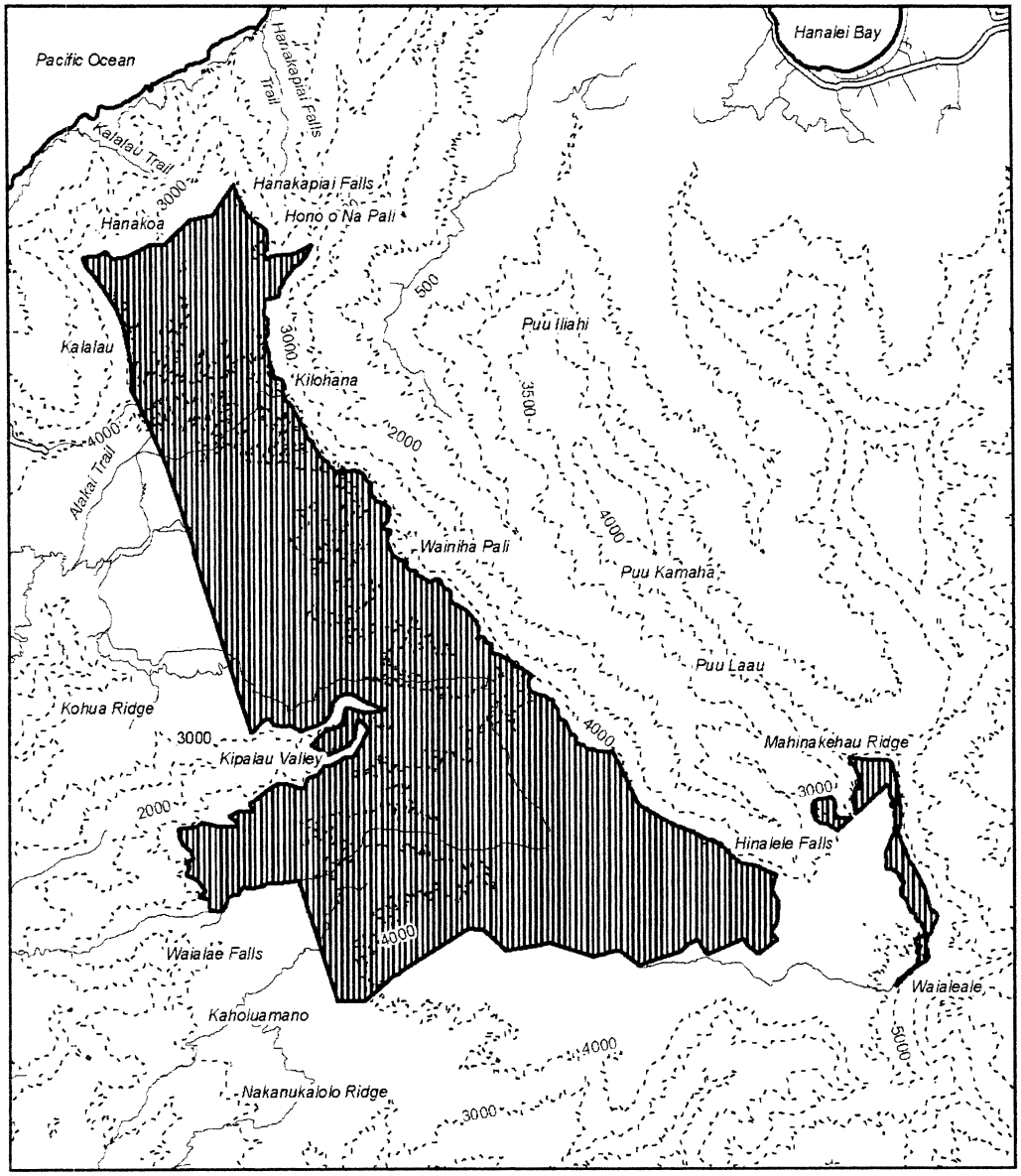
438435, 2450985; 438427, 2450964; 438919, 2449853; 439437, 2449066; 438581, 2450423; 438816, 2450028; 438717, 2450241; 438894, 2449879; 438884, 2449918; 438904, 2449863; 438831, 2450010; 438850, 2449982; 438791, 2450036; 438765, 2450051; 438744, 2450081; 438730, 2450109; 438717, 2450158; 438716, 2450162; 438713, 2450206.

(ii) Map of Unit 4–Montane Wet for Akikiki (*Oreomystis bairdi*) follows:

BILLING CODE 4310–55–S

***Oreomystis bairdi***
**Unit 4 - Montane Wet**




*Oreomystis bairdi* - Unit 4 - Montane Wet
Major roads
Secondary roads and trails
Elevation (500-foot contours)
Coastline

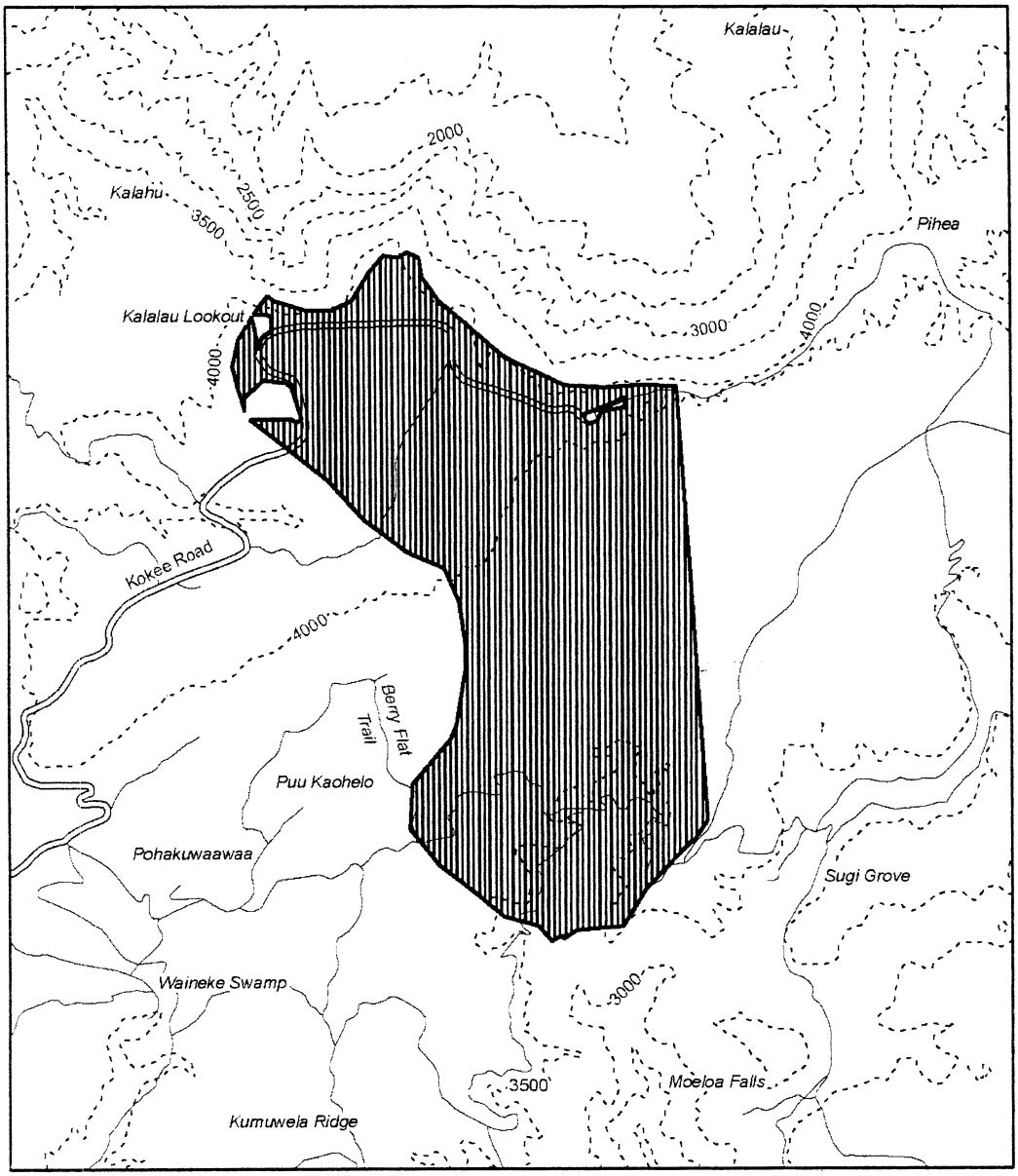
0 1 2 Mi
0 1 2 Km
N

(10) Unit 5–Montane Wet, Kauai County, Hawaii.

(i) Unit 5–Montane Wet consists of 789.9 ac (319.7 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 433436, 2449707; 433445, 2449707; 433444, 2449707; 433443, 2449707; 433458, 2449707; 433436, 2449707; 433426, 2449707; 433408, 2449708; 433429, 2449741; 433493, 2449765; 433633, 2449724; 433742, 2449724; 433467, 2449787; 433460, 2449707; 433468, 2449706; 433484, 2449694; 433414, 2449628; 433461, 2449623; 433457, 2449622; 433339, 2449600; 433440, 2449604; 433437, 2449592; 433426, 2449556; 433419, 2449599; 433831, 2449767; 434991, 2449344; 433401, 2449697; 433480, 2449629; 434938, 2449321; 433313, 2449484; 433455, 2449620; 434842, 2449253; 434839, 2449258; 434834, 2449277; 434833, 2449278; 434833, 2449278; 434833, 2449280; 434833, 2449281; 434872, 2449294; 434881, 2449297; 434884, 2449298; 435010, 2449343; 434899, 2449305; 433903, 2449882; 435011, 2449352; 435010, 2449343; 435005, 2449310; 434948, 2449300; 434908, 2449290; 434908, 2449290; 434890, 2449251; 434872, 2449246; 434848, 2449239; 434844, 2449248; 434034, 2449950; 434026, 2449951; 433969, 2449958; 434898, 2449304; 435183, 2449401; 434713, 2447038; 434738, 2447045; 434738, 2447030; 434795, 2447069; 434994, 2447085; 435093, 2447245; 435290, 2447449; 435295, 2447440; 435360, 2447538; 435282, 2448685; 435266, 2448909; 435236, 2449351; 434686, 2447020; 435232, 2449399; 435272, 2448835; 435080, 2449407; 434920, 2449394; 434752, 2449405; 434498, 2449522; 434338, 2449660; 434208, 2449767; 434141, 2449863; 434137, 2449869; 434124, 2449948; 434074, 2449972; 433461, 2449623; 433339, 2449381; 435234, 2449384; 433589, 2449323; 433725, 2448994; 433545, 2449136; 433389, 2449256; 433567, 2449260; 433588, 2449244; 433880, 2448827; 433612, 2449262; 433525, 2449415; 433567, 2449398; 433546, 2449412; 434627, 2447088; 433448, 2449426; 435236, 2449347; 433368, 2449293; 433599, 2449252; 434202, 2447345; 433367, 2449352; 434073, 2448685; 434357, 2447229; 434073, 2447500; 434086, 2447693; 434163, 2447783; 434254, 2447886; 434318, 2448182; 434318, 2448298; 434292, 2448479; 434279, 2447951; 434486, 2447126; 434228, 2448620.

(ii) Map of Unit 5–Montane Wet for Akikiki (*Oreomystis bairdi*) follows:

***Oreomystis bairdi***
**Unit 5 - Montane Wet**




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

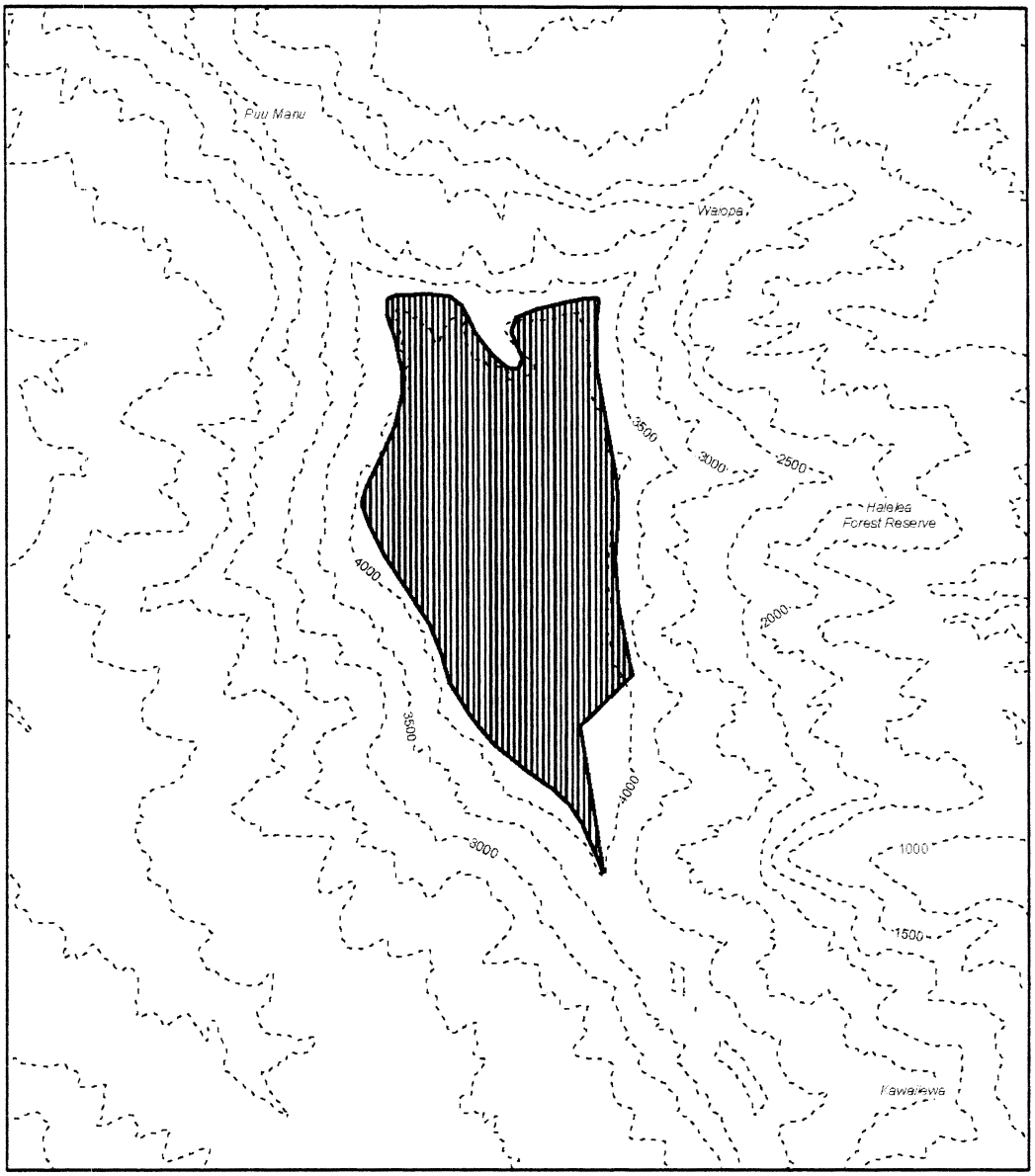
0 0.25 0.5 Mi
0 0.25 0.5 Km
N

(11) Unit 6–Montane Wet, Kauai County, Hawaii.

(i) Unit 6–Montane Wet consists of 413.5 ac (167.3 ha) and includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 448516, 2447525; 447976, 2448470; 448042, 2448338; 448133, 2448200; 448235, 2448042; 448834, 2447273; 448288, 2447915; 448412, 2447653; 448669, 2447406; 447943, 2448562; 448763, 2447342; 448059, 2449434; 448321, 2447795; 447961, 2448628; 448037, 2448780; 448088, 2448897; 448122, 2449037; 448119, 2449134; 448056, 2449368; 448099, 2449454; 448242, 2449457; 448328, 2449449; 448440, 2449296; 448382, 2449406; 448887, 2447191; 448091, 2449266; 448610, 2449255; 448931, 2447092; 448511, 2449199; 448623, 2449141; 448641, 2449184; 448593, 2449298; 448613, 2449357; 448702, 2449395; 448812, 2449420; 448906, 2449440; 448959, 2449443; 448964, 2449425; 448952, 2449316; 448954, 2449143; 448881, 2447609; 448987, 2448959; 448980, 2446980; 448979, 2446983; 448577, 2449143; 448980, 2446982; 448981, 2446981; 449105, 2447827; 449087, 2447916; 449044, 2448132; 449032, 2448326; 449045, 2448506; 449040, 2448659; 449012, 2448822.

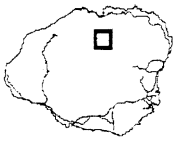
(ii) Map of Unit 6–Montane Wet for Akikiki (*Oreomystis bairdi*) follows:

***Oreomystis bairdi***
**Unit 6 - Montane Wet**




*Oreomystis bairdi* - Unit 6 - Montane Wet
Elevation (500-foot contours)

0 0.25 0.5 Mi
0 0.25 0.5 Km
N



* * * * *

(i) Insects.

* * * * *

Hawaiian picture-wing fly (*Drosophila sharpi*)

(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 sharpi*) are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*, *Kadua, Ilex*, *Myoporum, Myrsine*.

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

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

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

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*.

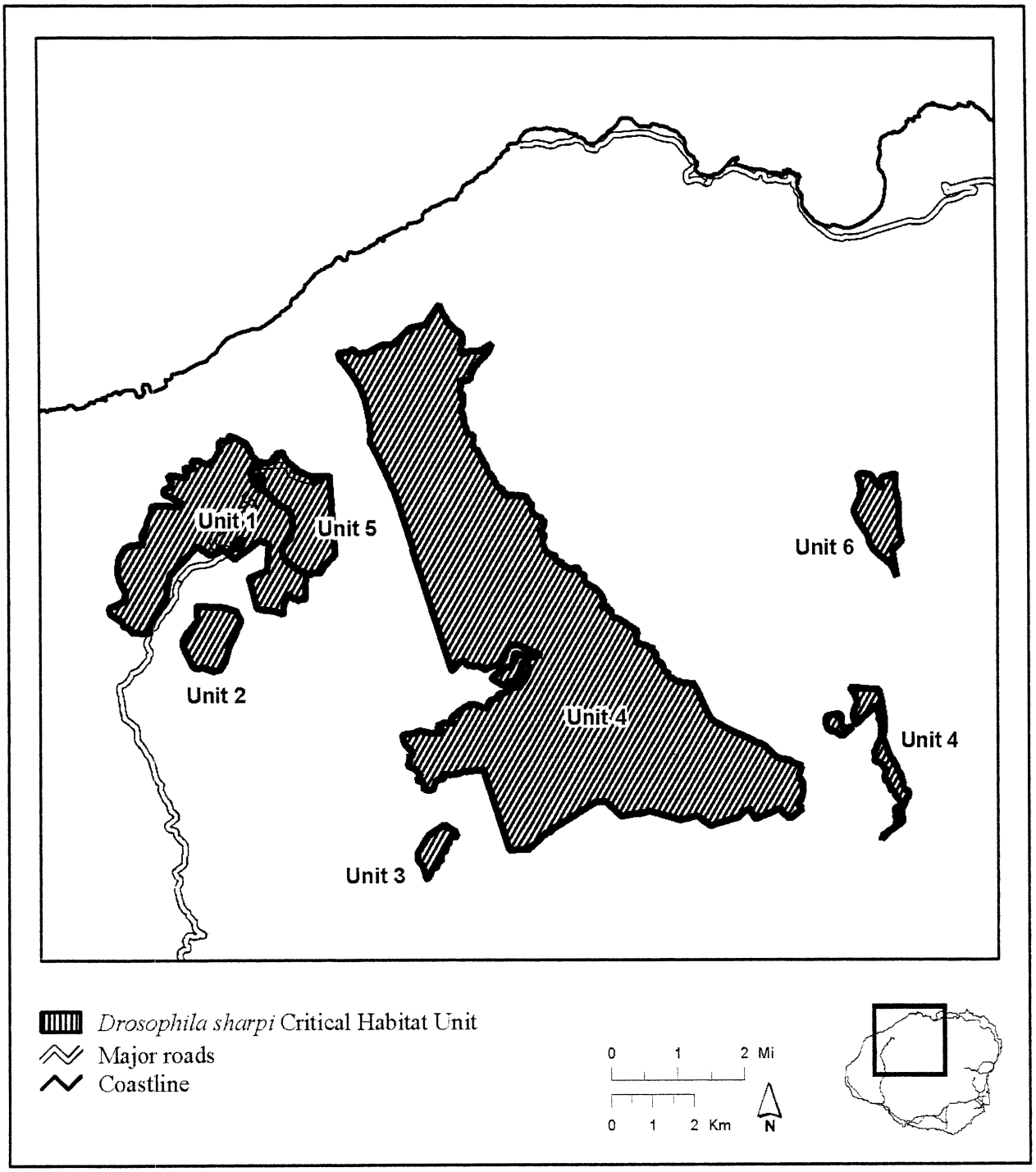
(G) Larval host plants (*Cheirodendron* sp., *Tetraplasandra* sp.).

(3) Manmade features and structures, such as buildings, roads, railroads, airports, runways, other paved areas, lawns, and other urban landscaped areas, existing on the effective date of this rule do not contain one or more of the primary constituent elements.

(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 sharpi*) follows:

**Map 1**
***Drosophila sharpi*–Index Map**



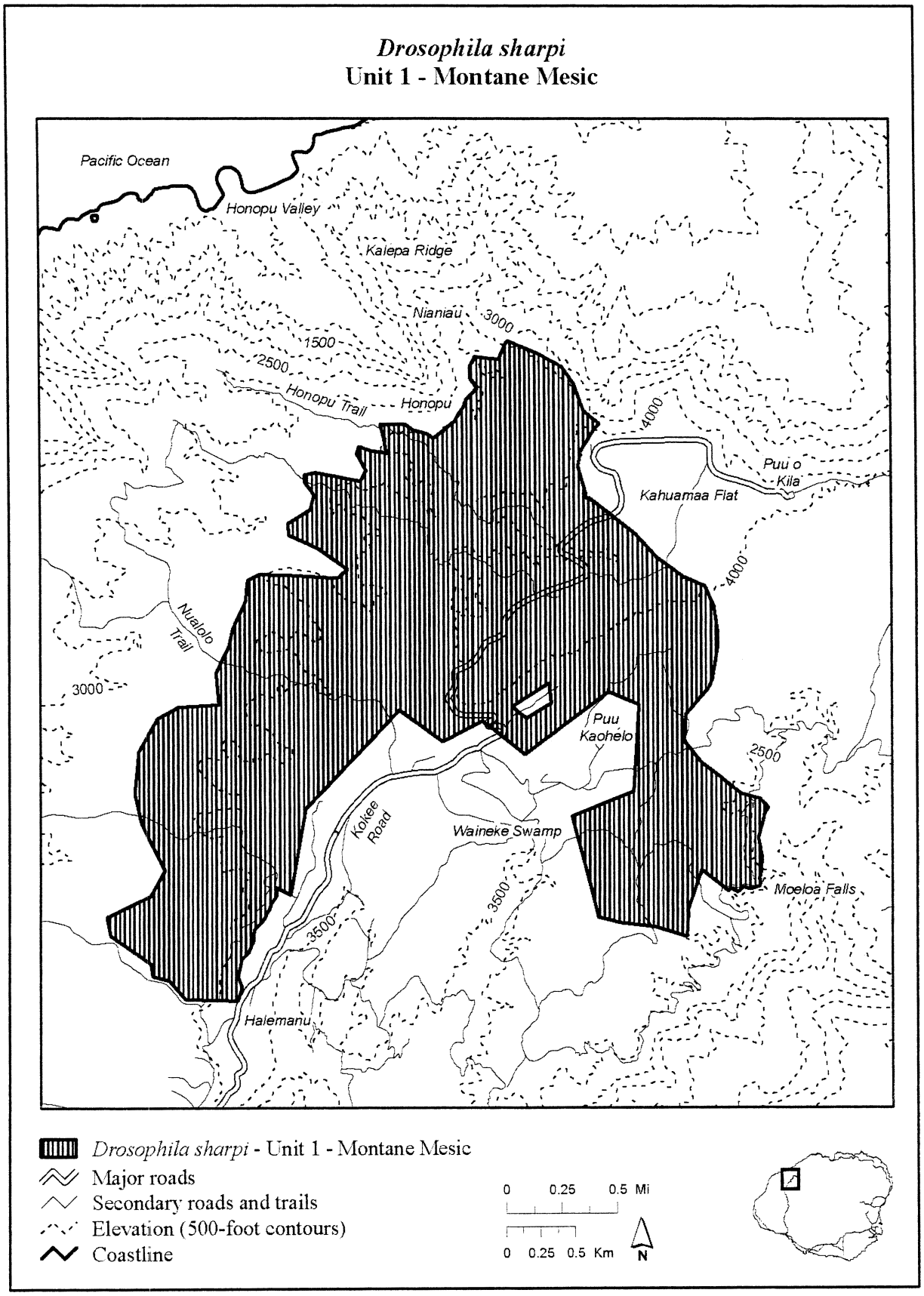

BILLING CODE 4310–55–C

(6) Unit 1–Montane Mesic, Kauai County, Hawaii.

(i) Unit 1–Montane Mesic consists of 2,422.6 ac (980.4 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 430107, 2447429; 430242, 2447664; 430073, 2447126; 430793, 2448310; 430124, 2446907; 430393, 2447748; 430690, 2447765; 430671, 2447997; 430764, 2448188; 430886, 2448507; 430903, 2448664; 430985, 2448705; 431560, 2448675; 431414, 2448890; 430291, 2446570; 431058, 2446300; 431200, 2449070; 431362, 2449169; 431171, 2448699; 430854, 2445930; 432530, 2450196; 431391, 2449273; 431323, 2447013; 431211, 2446394; 431101, 2446447; 431112, 2446394; 431069, 2446331; 431007, 2446203; 430944, 2446145; 430902, 2445976; 430191, 2446386; 430826, 2445805; 430857, 2445727; 430824, 2445631; 430442, 2445640; 430323, 2445779; 430204, 2445809; 430191, 2445898; 429898, 2446100; 429871, 2446234; 430939, 2446061; 432796, 2450365; 432504, 2449961; 432579, 2450036; 432552, 2450080; 432551, 2450083; 432001, 2447726; 432534, 2450174; 431629, 2448739; 432565, 2450262; 432531, 2450116; 432740, 2450249; 432441, 2449848; 432808, 2450383; 432882, 2450351; 432904, 2450341; 432827, 2447751; 432932, 2447668; 433014, 2447717; 433109, 2447775; 433094, 2447922; 432560, 2450267; 431875, 2449780; 431322, 2449418; 431403, 2449436; 431727, 2449372; 431769, 2449447; 431705, 2449569; 431720, 2449620; 431805, 2449591; 431919, 2449578; 432498, 2449952; 431904, 2449665; 432486, 2449909; 432046, 2449781; 432052, 2449783; 432113, 2449740; 432217, 2449712; 432251, 2449685; 432259, 2449679; 432344, 2449744; 432419, 2449806; 431322, 2449372; 431905, 2449660; 434486, 2447126; 434073, 2448685; 434228, 2448620; 434292, 2448479; 434318, 2448298; 434279, 2447951; 434163, 2447783; 434086, 2447693; 434073, 2447500; 434623, 2446526; 434357, 2447229; 433545, 2449136; 434627, 2447088; 434686, 2447020; 434682, 2447017; 434657, 2446977; 434652, 2446933; 434612, 2446807; 434641, 2446663; 434631, 2446528; 434202, 2447345; 433399, 2449709; 431205, 2448983; 432073, 2447674; 433046, 2450280; 433196, 2450196; 433287, 2450063; 433353, 2449880; 433467, 2449787; 433429, 2449741; 433880, 2448827; 433407, 2449708; 433725, 2448994; 433401, 2449697; 433339, 2449600; 433313, 2449484; 433339, 2449381; 433368, 2449293; 433368, 2449292; 433369, 2449255; 433389, 2449256; 434254, 2447886; 433408, 2449708; 433527, 2447856; 434086, 2446095; 433862, 2446165; 433606, 2446193; 433449, 2446235; 433397, 2446440; 433257, 2446958; 433577, 2447086; 433706, 2447138; 434090, 2446098; 433562, 2447841; 432639, 2447624; 432918, 2447407; 432672, 2447598; 434620, 2446512; 432609, 2447647; 434318, 2448182; 432195, 2447587; 432136, 2447629; 432133, 2447631; 432081, 2447668; 433746, 2447766; 434500, 2446448; 432320, 2447497; 434103, 2446297; 434618, 2446459; 434582, 2446443; 434558, 2446439; 434514, 2446449; 434471, 2446422; 434457, 2446416; 434447, 2446420; 434392, 2446421; 434423, 2446441; 434416, 2446441; 434625, 2446467; 434201, 2446573; 434403, 2446435; 434628, 2446479; 434400, 2446429; 434434, 2446428; 434386, 2446429; 434533, 2446441.

(ii) Map of Unit 1–Montane Mesic for Hawaiian picture-wing fly (*Drosophila sharpi*) follows:

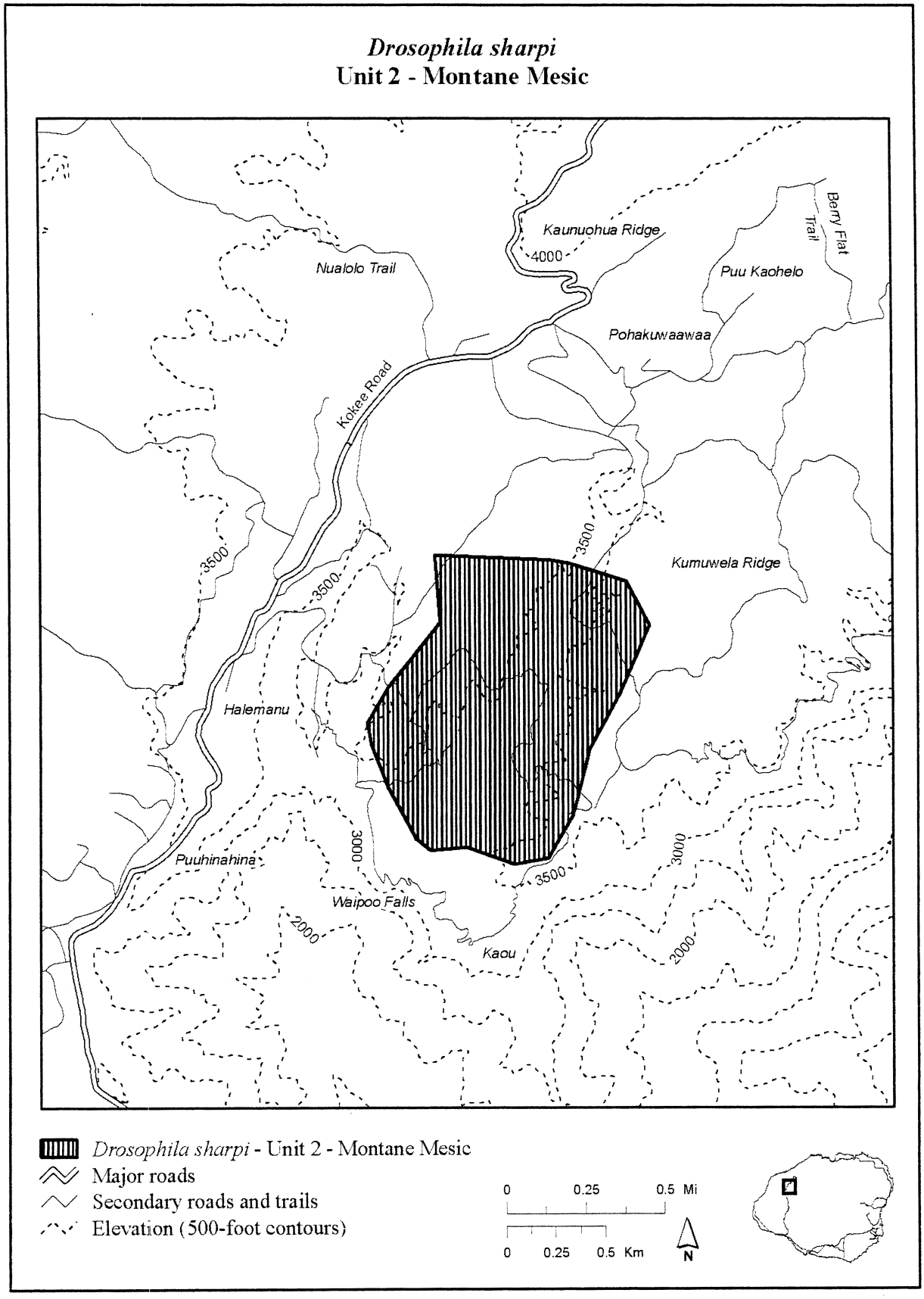
BILLING CODE 4310–55–S


*Drosophila sharpi*
Unit 1 - Montane Mesic
Pacific Ocean
Honopu Valley
Kalepa Ridge
Nianiau
3000
1500
2500
Honopu Trail
Honopu
4000
Puu o Kila
Kahuamaa Flat
4000
Nualolo Trail
3000
Puu Kaohelo
2500
Kokee Road
Waineke Swamp
3500
3500
Moeloa Falls
Halemanu
*Drosophila sharpi* - Unit 1 - Montane Mesic
Major roads
Secondary roads and trails
Elevation (500-foot contours)
Coastline
0 0.25 0.5 Mi
0 0.25 0.5 Km
N

(7) Unit 2–Montane Mesic, Kauai County, Hawaii.

(i) Unit 2–Montane Mesic consists of 375.6 ac (152.0 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 431975, 2446280; 432559, 2446255; 432659, 2446240; 432948, 2446150; 433067, 2445928; 432758, 2445304; 432001, 2445941; 431873, 2444849; 432912, 2445580; 432674, 2444970; 431626, 2445435; 431730, 2445114; 431950, 2444792; 432135, 2444807; 432377, 2444722; 432548, 2444752; 431645, 2445326; 431736, 2445617.

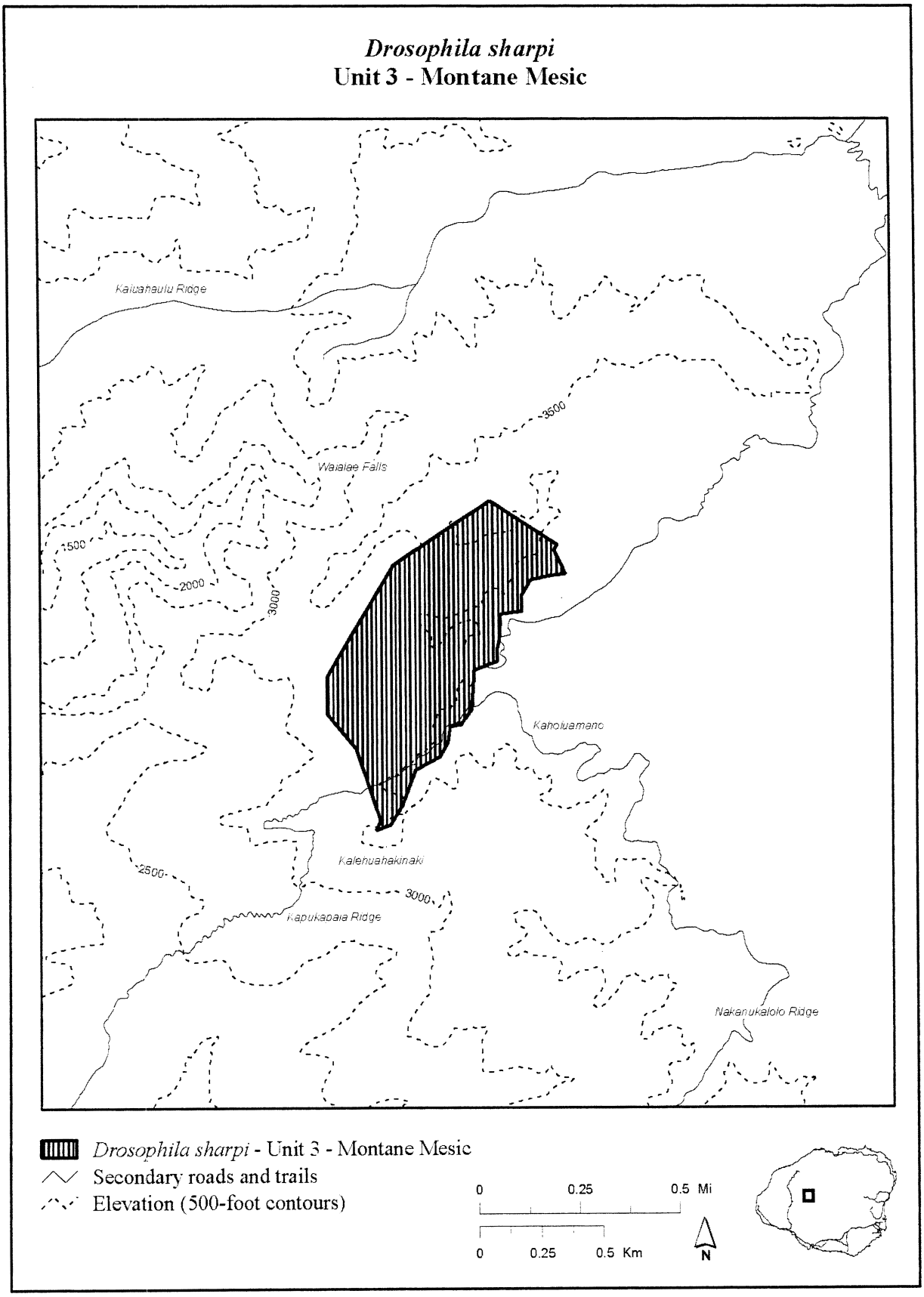
(ii) Map of Unit 2–Montane Mesic for Hawaiian picture-wing fly (*Drosophila sharpi*) follows:


*Drosophila sharpi*
Unit 2 - Montane Mesic
Kaunuohua Ridge
4000
Nualolo Trail
Berry Flat Trail
Puu Kaohelo
Pohakuwaawaa
Kokee Road
3500
3500
3500
3500
Kumuwela Ridge
Halemanu
3000
3000
Puuhinahina
Waipoo Falls
2000
2000
Kaou
*Drosophila sharpi* - Unit 2 - Montane Mesic
Major roads
Secondary roads and trails
Elevation (500-foot contours)
0 0.25 0.5 Mi
0 0.25 0.5 Km
N

(8) Unit 3–Montane Mesic, Kauai County, Hawaii.

(i) Unit 3–Montane Mesic consists of 138.5 ac (56.0 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 438012, 2440389; 438014, 2440437; 438023, 2440484; 438111, 2440652; 438112, 2440588; 437817, 2440071; 438028, 2440577; 437922, 2440355; 437336, 2440335; 437912, 2440201; 437827, 2440132; 437785, 2440013; 437687, 2439960; 437636, 2439819; 437870, 2440140; 437545, 2439761; 438149, 2440714; 437529, 2439721; 437987, 2441027; 437450, 2440047; 437335, 2440180; 437335, 2440329; 438159, 2440914; 438249, 2440857; 438253, 2440854; 438243, 2440830; 438287, 2440738; 437602, 2440771; 438227, 2440730; 437586, 2439743.

(ii) Map of Unit 3–Montane Mesic for Hawaiian picture-wing fly (*Drosophila sharpi*) follows:




BILLING CODE 4310–031–C

(9) Unit 4–Montane Wet, Kauai County, Hawaii.

(i) Unit 4–Montane Wet consists of 13,055.0 ac (5,283.2 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 448638, 2440764; 448601, 2440679; 448606, 2440704; 448612, 2440722; 448615, 2440731; 448619, 2440740; 448630, 2440759; 448650, 2440769; 448600, 2440668; 448622, 2440749; 448599, 2440647; 448601, 2440652; 448678, 2440741; 448777, 2440842; 448663, 2440773; 449006, 2441012; 448764, 2440857; 449068, 2441051; 449121, 2441114; 449121, 2441114; 448887, 2440934; 448811, 2440896; 448954, 2441097; 448943, 2441063; 448943, 2441053; 448943, 2441044; 448941, 2441024; 448940, 2441006; 448918, 2440982; 448877, 2440939; 448861, 2440927; 448735, 2440829; 448837, 2440912; 448678, 2440780; 448802, 2440889; 448788, 2440878; 449115, 2442038; 448745, 2440841; 449111, 2441196; 448727, 2440820; 448720, 2440813; 448711, 2440806; 448691, 2440790; 448841, 2440914; 447374, 2443275; 449244, 2441819; 447623, 2443445; 447616, 2443588; 447603, 2443646; 447556, 2443686; 447325, 2443651; 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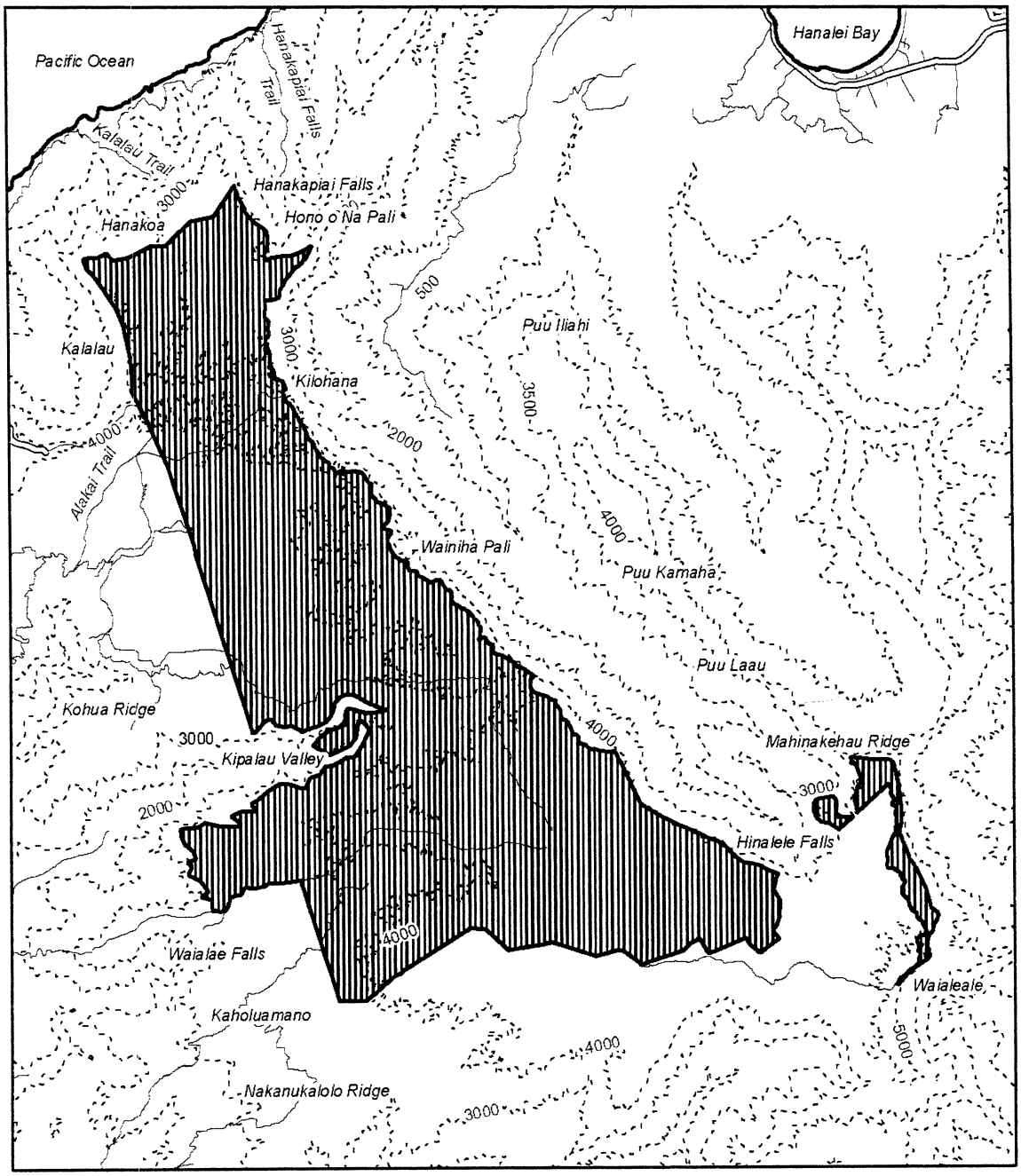
440969, 2447210; 440740, 2447346; 440888, 2447250; 440873, 2447265; 440865, 2447286; 440858, 2447311; 440842, 2447328; 441172, 2447190; 441039, 2447168; 438599, 2451708; 438434, 2451069; 438440, 2451600; 438425, 2451652; 438429, 2451670; 438442, 2451682; 438419, 2451509; 438529, 2451692; 438410, 2451464; 438657, 2451738; 439516, 2448971; 438675, 2451766; 440125, 2448578; 438680, 2451858; 438715, 2451908; 438484, 2451690; 438467, 2451228; 438455, 2451089; 438463, 2451098; 438475, 2451113; 438484, 2451141; 438486, 2451163; 438435, 2451571; 438472, 2451209; 438888, 2452163; 438472, 2451261; 438481, 2451287; 438485, 2451346; 438478, 2451359; 438454, 2451380; 438422, 2451414; 438481, 2451188; 448609, 2443974; 438669, 2452384; 438605, 2452379; 438540, 2452374; 438510, 2452340; 438449, 2452330; 438761, 2452013; 438490, 2452605; 438816, 2452396; 448591, 2444072; 448566, 2444172; 448548, 2444233; 448510, 2444279; 448464, 2444284; 448299, 2444289; 438431, 2452414; 439138, 2452428; 438670, 2451754; 438936, 2452213; 438977, 2452232; 438979, 2452233; 439031, 2452285; 439037, 2452297; 438716, 2452393; 439083, 2452342; 438779, 2452391; 439171, 2452514; 439201, 2452565; 439114, 2452513; 438954, 2452430; 438851, 2452395; 438833, 2452090; 439061, 2452327; 439044, 2449631; 438944, 2449813; 439167, 2449414; 439146, 2449435; 439114, 2449463; 439102, 2449480; 439220, 2449318; 439065, 2449586; 439230, 2449287; 439037, 2449642; 439025, 2449671; 439016, 2449687; 438999, 2449702; 438974, 2449738; 438965, 2449767; 439076, 2449548; 439382, 2449107; 439508, 2448984; 439451, 2449000; 439437, 2449023; 438680, 2451783; 439433, 2449078; 439200, 2449362; 439399, 2449097; 439421, 2449088; 439361, 2449126; 439330, 2449145; 439307, 2449169; 439277, 2449220; 439260, 2449242; 439244, 2449261; 438425, 2451047; 438554, 2450559; 438737, 2450311; 438736, 2450325; 438731, 2450342; 438715, 2450373; 438690, 2450392; 438621, 2450415; 438732, 2450286; 438578, 2450438; 438501, 2450796; 438488, 2450686; 438472, 2450910; 438435, 2450985; 438427, 2450964; 438919, 2449853; 439437, 2449066; 438581, 2450423; 438816, 2450028; 438717, 2450241; 438894, 2449879; 438884, 2449918; 438904, 2449863; 438831, 2450010; 438850, 2449982; 438791, 2450036; 438765, 2450051; 438744, 2450081; 438730, 2450109; 438717, 2450158; 438716, 2450162; 438713, 2450206.

(ii) Map of Unit 4–Montane Wet for Hawaiian picture-wing fly (*Drosophila sharpi*) follows:

BILLING CODE 4310–55–S

*Drosophila sharpi*
**Unit 4 - Montane Wet**



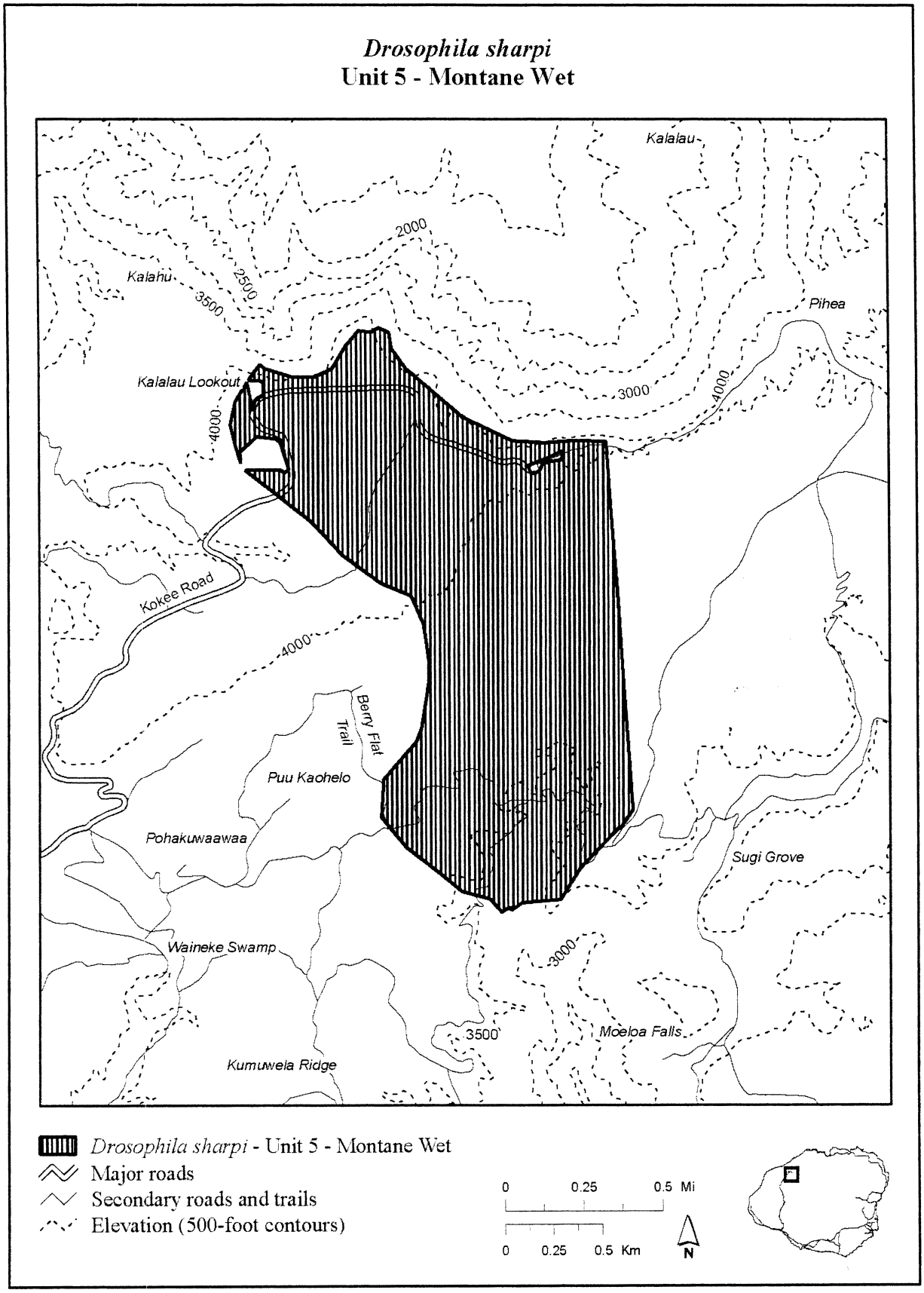

*Drosophila sharpi* - Unit 4 - Montane Wet
Major roads
Secondary roads and trails
Elevation (500-foot contours)
Coastline

0 1 2 Mi
0 1 2 Km
N

(10) Unit 5–Montane Wet, Kauai County, Hawaii.

(i) Unit 5–Montane Wet consists of 789.9 ac (319.7 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 433436, 2449707; 433445, 2449707; 433444, 2449707; 433443, 2449707; 433458, 2449707; 433436, 2449707; 433426, 2449707; 433408, 2449708; 433429, 2449741; 433493, 2449765; 433633, 2449724; 433742, 2449724; 433467, 2449787; 433460, 2449707; 433468, 2449706; 433484, 2449694; 433414, 2449628; 433461, 2449623; 433457, 2449622; 433339, 2449600; 433440, 2449604; 433437, 2449592; 433426, 2449556; 433419, 2449599; 433831, 2449767; 434991, 2449344; 433401, 2449697; 433480, 2449629; 434938, 2449321; 433313, 2449484; 433455, 2449620; 434842, 2449253; 434839, 2449258; 434834, 2449277; 434833, 2449278; 434833, 2449278; 434833, 2449280; 434833, 2449281; 434872, 2449294; 434881, 2449297; 434884, 2449298; 435010, 2449343; 434899, 2449305; 433903, 2449882; 435011, 2449352; 435010, 2449343; 435005, 2449310; 434948, 2449300; 434908, 2449290; 434908, 2449290; 434890, 2449251; 434872, 2449246; 434848, 2449239; 434844, 2449248; 434034, 2449950; 434026, 2449951; 433969, 2449958; 434898, 2449304; 435183, 2449401; 434713, 2447038; 434738, 2447045; 434738, 2447030; 434795, 2447069; 434994, 2447085; 435093, 2447245; 435290, 2447449; 435295, 2447440; 435360, 2447538; 435282, 2448685; 435266, 2448909; 435236, 2449351; 434686, 2447020; 435232, 2449399; 435272, 2448835; 435080, 2449407; 434920, 2449394; 434752, 2449405; 434498, 2449522; 434338, 2449660; 434208, 2449767; 434141, 2449863; 434137, 2449869; 434124, 2449948; 434074, 2449972; 433461, 2449623; 433339, 2449381; 435234, 2449384; 433589, 2449323; 433725, 2448994; 433545, 2449136; 433389, 2449256; 433567, 2449260; 433588, 2449244; 433880, 2448827; 433612, 2449262; 433525, 2449415; 433567, 2449398; 433546, 2449412; 434627, 2447088; 433448, 2449426; 435236, 2449347; 433368, 2449293; 433599, 2449252; 434202, 2447345; 433367, 2449352; 434073, 2448685; 434357, 2447229; 434073, 2447500; 434086, 2447693; 434163, 2447783; 434254, 2447886; 434318, 2448182; 434318, 2448298; 434292, 2448479; 434279, 2447951; 434486, 2447126; 434228, 2448620.

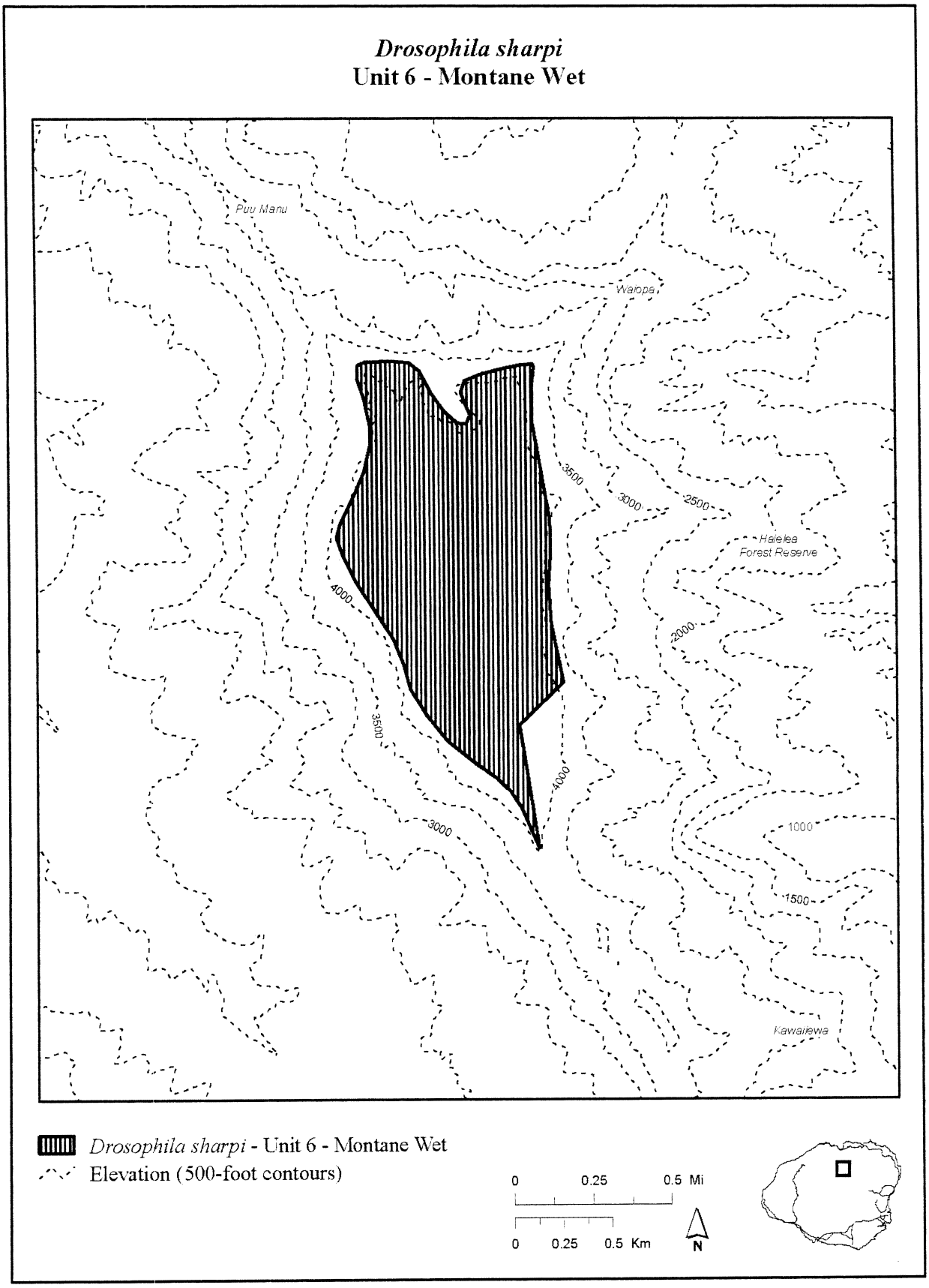
(ii) Map of Unit 5–Montane Wet for Hawaiian picture-wing fly (*Drosophila sharpi*) follows:


*Drosophila sharpi*
Unit 5 - Montane Wet
Kalalau
2000
Kalahu
2500
3500
Pihea
Kalalau Lookout
4000
3000
4000
Kokee Road
4000
Berry Flat Trail
Puu Kaohelo
Pohakuwaawaa
Sugi Grove
Waineke Swamp
3000
3500
Moeloa Falls
Kumuwela Ridge
*Drosophila sharpi* - Unit 5 - Montane Wet
Major roads
Secondary roads and trails
Elevation (500-foot contours)
0 0.25 0.5 Mi
0 0.25 0.5 Km
N

(11) Unit 6–Montane Wet, Kauai County, Hawaii.

(i) Unit 6–Montane Wet consists of 413.5 ac (167.3 ha) and includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 448516, 2447525; 447976, 2448470; 448042, 2448338; 448133, 2448200; 448235, 2448042; 448834, 2447273; 448288, 2447915; 448412, 2447653; 448669, 2447406; 447943, 2448562; 448763, 2447342; 448059, 2449434; 448321, 2447795; 447961, 2448628; 448037, 2448780; 448088, 2448897; 448122, 2449037; 448119, 2449134; 448056, 2449368; 448099, 2449454; 448242, 2449457; 448328, 2449449; 448440, 2449296; 448382, 2449406; 448887, 2447191; 448091, 2449266; 448610, 2449255; 448931, 2447092; 448511, 2449199; 448623, 2449141; 448641, 2449184; 448593, 2449298; 448613, 2449357; 448702, 2449395; 448812, 2449420; 448906, 2449440; 448959, 2449443; 448964, 2449425; 448952, 2449316; 448954, 2449143; 448881, 2447609; 448987, 2448959; 448980, 2446980; 448979, 2446983; 448577, 2449143; 448980, 2446982; 448981, 2446981; 449105, 2447827; 449087, 2447916; 449044, 2448132; 449032, 2448326; 449045, 2448506; 449040, 2448659; 449012, 2448822.

(ii) Map of Unit 6–Montane Wet for Hawaiian picture-wing fly (*Drosophila sharpi*) follows:




BILLING CODE 4310–55–C

* * * * *

■ 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)(ccxxxiv);

■ 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)(ccxxxiv) 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)(ccxxxviii);

■ 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)(ccxlvi);

■ 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)(ccxlvi) 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)(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)(lxxxi) 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)(ciii) through (a)(1)(cclxxii) as paragraphs (a)(1)(civ) through (a)(1)(cclxxiii);

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

■ ww. By redesignating newly designated paragraphs (a)(1)(cxiii) through (a)(1)(cclxxix) as paragraphs (a)(1)(cxvii) through (a)(1)(cclxxxiii);

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

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

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

■ aaa. By redesignating newly designated paragraphs (a)(1)(cxxxiii) through (a)(1)(cclxxxiv) as paragraphs (a)(1)(cxxxiv) through (a)(1)(cclxxxv);

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

■ ccc. By redesignating newly designated paragraphs (a)(1)(cxxxv) through (a)(1)(cclxxxv) as paragraphs (a)(1)(cxxxvii) through (a)(1)(cclxxxvii);

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

■ eee. By redesignating newly designated paragraphs (a)(1)(cxl) through (a)(1)(cclxxxvii) as paragraphs (a)(1)(cxlix) through (a)(1)(ccxcvi);

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

■ ggg. By redesignating newly designated paragraphs (a)(1)(cl) through (a)(1)(ccxcvi) as paragraphs (a)(1)(cliv) through (a)(1)(ccc);

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

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

(a)(1)(ccc) as paragraphs (a)(1)(clxvi) through (a)(1)(ccciii);

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

■ kkk. By redesignating newly designated paragraphs (a)(1)(clxxii) through (a)(1)(ccciii) as paragraphs (a)(1)(clxxiii) through (a)(1)(ccciv);

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

■ mmm. By redesignating newly designated paragraphs (a)(1)(clxxvi) through (a)(1)(ccciv) as paragraphs (a)(1)(clxxxi) through (a)(1)(cccix);

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

■ ooo. By redesignating newly designated paragraphs (a)(1)(clxxxiv) through (a)(1)(cccix) as paragraphs (a)(1)(clxxxvi) through (a)(1)(cccxi);

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

■ qqq. By redesignating newly designated paragraphs (a)(1)(cxcix) through (a)(1)(cccxi) as paragraphs (a)(1)(cc) through (a)(1)(cccxii);

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

■ sss. By redesignating newly designated paragraphs (a)(1)(ccxvi) through (a)(1)(cccxii) as paragraphs (a)(1)(ccxviii) through (a)(1)(cccxiv);

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

■ uuu. By redesignating newly designated paragraphs (a)(1)(ccxxii) through (a)(1)(cccxiv) as paragraphs (a)(1)(ccxxvi) through (a)(1)(cccxviii);

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

■ www. By redesignating newly designated paragraphs (a)(1)(ccxxix) through (a)(1)(cccxviii) as paragraphs (a)(1)(ccxxx) through (a)(1)(cccxix);

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

■ yyy. By redesignating newly designated paragraphs (a)(1)(ccxxxv) through (a)(1)(cccxix) as paragraphs (a)(1)(ccxl) through (a)(1)(cccxxiv);

■ zzz. By adding new paragraphs (a)(1)(ccxxxv), (a)(1)(ccxxxvi), (a)(1)(ccxxxvii), (a)(1)(ccxxxviii), and (a)(1)(ccxxxix) to read as set forth below;

■ aaaa. By redesignating newly designated paragraphs (a)(1)(ccxli) through (a)(1)(cccxxiv) as paragraphs (a)(1)(ccxlii) through (a)(1)(cccxxv);

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

■ cccc. By redesignating newly designated paragraphs (a)(1)(ccxlviii) through (a)(1)(cccxxv) as paragraphs (a)(1)(ccli) through (a)(1)(cccxxviii);

■ dddd. By adding new paragraphs (a)(1)(ccxlviii), (a)(1)(ccxlix), and (a)(1)(ccl) to read as set forth below;

■ eeee. By redesignating newly designated paragraphs (a)(1)(ccliii) through (a)(1)(cccxxviii) as paragraphs (a)(1)(ccliv) through (a)(1)(cccxxix);

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

■ gggg. By redesignating newly designated paragraphs (a)(1)(cclviii) through (a)(1)(cccxxix) as paragraphs (a)(1)(cclx) through (a)(1)(cccxxxi);

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

■ iiii. By redesignating newly designated paragraphs (a)(1)(cclxvi) through (a)(1)(cccxxxi) as paragraphs (a)(1)(cclxviii) through (a)(1)(cccxxxiii);

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

■ kkkk. By redesignating newly designated paragraphs (a)(1)(cclxxii) through (a)(1)(cccxxxiii) as paragraphs (a)(1)(cclxxiii) through (a)(1)(cccxxxiv);

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

■ mmmm. By redesignating newly designated paragraphs (a)(1)(cclxxvii) through (a)(1)(cccxxxiv) as paragraphs (a)(1)(cclxxxii) through (a)(1)(cccxxxix);

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

■ oooo. By redesignating newly designated paragraphs (a)(1)(ccxc) through (a)(1)(cccxxxix) as paragraphs (a)(1)(ccxciii) through (a)(1)(cccxlii);

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

■ qqqq. By redesignating newly designated paragraphs (a)(1)(cccix) through (a)(1)(cccxlii) as paragraphs (a)(1)(cccx) through (a)(1)(cccxliii);

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

■ ssss By redesignating newly designated paragraphs (a)(1)(cccxxix) through (a)(1)(cccxliii) as paragraphs (a)(1)(cccxxxvii) through (a)(1)(cccli);

■ tttt By adding new paragraphs (a)(1)(cccxxix), (a)(1)(cccxxx), (a)(1)(cccxxxi), (a)(1)(cccxxxii), (a)(1)(cccxxxiii), (a)(1)(cccxxxiv), (a)(1)(cccxxxv), and (a)(1)(cccxxxvi) to read as set forth below;

■ uuuu. By redesignating newly designated paragraph (a)(1)(cccli) as paragraph (a)(1)(cdlix);

■ vvvv. By adding new paragraphs (a)(1)(cccli), (a)(1)(ccclii), (a)(1)(ccccliii), (a)(1)(ccccliv), (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), (a)(1)(ccclxvi), (a)(1)(ccclxvii), (a)(1)(ccclxviii), (a)(1)(ccclxix), (a)(1)(ccclxx), (a)(1)(ccclxxi), (a)(1)(ccclxxii), (a)(1)(ccclxxiii), (a)(1)(ccclxxiv), (a)(1)(ccclxxv), (a)(1)(ccclxxvi), (a)(1)(ccclxxvii), (a)(1)(ccclxxviii), (a)(1)(ccclxxix), (a)(1)(ccclxxx), (a)(1)(ccclxxxi), (a)(1)(ccclxxxii), (a)(1)(ccclxxxiii), (a)(1)(ccclxxxiv), (a)(1)(ccclxxxv), (a)(1)(ccclxxxvi), (a)(1)(ccclxxxvii), (a)(1)(ccclxxxviii), (a)(1)(ccclxxxix), (a)(1)(cccxc), (a)(1)(cccxci), (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), (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)(cdxl), (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)(cdl), (a)(1)(cdli), (a)(1)(cdlii), (a)(1)(cdliii), (a)(1)(cdliv), (a)(1)(cdlv), (a)(1)(cdlvi), (a)(1)(cdlvii), and (a)(1)(cdlviii), to read as set forth below;

■ wwww. By amending the table at newly designated paragraph (a)(1)(cdlix) 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 10–*Tetraplasandra flynnii*–b
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 bisattenuata*–d
Kauai 11–*Tetraplasandra flynnii*–c
Kauai 11–*Tetraplasandra flynnii*–d
Kauai 11–*Tetraplasandra flynnii*–e
Kauai 18–*Chamaesyce remyi* var. *kauaiensis*–f
Kauai 18–*Chamaesyce remyi* var. *remyi*–k
Kauai 18–*Cyanea dolichopoda*–d
Kauai 18–*Cyrtandra oenobarba*–f
Kauai 18–*Cyrtandra paliku*–d
Kauai 18–*Dubautia plantaginea* ssp. *magnifolia*–d
Kauai 18–*Lysimachia iniki*–d
Kauai 18–*Lysimachia pendens*–d
Kauai 18–*Lysimachia venosa*–d
Kauai 18–*Platydesma rostrata*–k
Kauai 19–*Chamaesyce remyi* var. *kauaiensis*–g
Kauai 19–*Chamaesyce remyi* var. *remyi*–l
Kauai 19–*Cyanea dolichopoda*–e
Kauai 19–*Cyrtandra oenobarba*–g
Kauai 19–*Cyrtandra paliku*–e
Kauai 19–*Dubautia plantaginea* ssp. *magnifolia*–e
Kauai 19–*Lysimachia iniki*–e
Kauai 19–*Lysimachia pendens*–e
Kauai 19–*Lysimachia venosa*–e
Kauai 19–*Platydesma rostrata*–l
Kauai 20–*Chamaesyce remyi* var. *kauaiensis*–h
Kauai 20–*Chamaesyce remyi* var. *remyi*–m
Kauai 20–*Charpentiera densiflora*–e
Kauai 20–*Cyanea eleeleensis*–c
Kauai 20–*Cyanea kolekoleensis*–c
Kauai 20–*Cyanea kuhihewa*–c
Kauai 20–*Cyrtandra oenobarba*–h
Kauai 20–*Dubautia imbricata* ssp. *imbricata*–c
Kauai 20–*Labordia helleri*–h
Kauai 20–*Melicope paniculata*–c
Kauai 20–*Melicope puberula*–e
Kauai 20–*Phyllostegia renovans*–e
Kauai 20–*Platydesma rostrata*–m
Kauai 20–*Stenogyne kealiae*–e
Kauai 20–*Tetraplasandra bisattenuata*–e
Kauai 20–*Tetraplasandra flynnii*–f
Kauai 21–*Chamaesyce remyi* var. *remyi*–n
Kauai 21–*Diellia mannii*–b
Kauai 21–*Labordia helleri*–i
Kauai 21–*Myrsine knudsenii*–b
Kauai 21–*Myrsine mezii*–d
Kauai 21–*Platydesma rostrata*–n
Kauai 21–*Psychotria grandiflora*–d
Kauai 21–*Stenogyne kealiae*–f
Kauai 21–*Tetraplasandra flynnii*–g
Kauai 22–*Chamaesyce remyi* var. *remyi*–o
Kauai 22–*Diellia mannii*–c
Kauai 22–*Labordia helleri*–j
Kauai 22–*Myrsine knudsenii*–c
Kauai 22–*Myrsine mezii*–e

Kauai 22–*Platydesma rostrata*–o
Kauai 22–*Psychotria grandiflora*–e
Kauai 22–*Stenogyne kealiae*–g
Kauai 22–*Tetraplasandra flynnii*–h
Kauai 23–*Astelia waialealae*–c
Kauai 23–*Chamaesyce remyi* var. *remyi*–p
Kauai 23–*Dryopteris crinalis* var. *podosorus*–c
Kauai 23–*Dubautia kalalauensis*–c
Kauai 23–*Dubautia waialealae*–c
Kauai 23–*Geranium kauaiense*–c
Kauai 23–*Keysseria erici*–c
Kauai 23–*Keysseria helenae*–c
Kauai 23–*Labordia helleri*–k
Kauai 23–*Labordia pumila*–c
Kauai 23–*Lysimachia daphnoides*–c
Kauai 23–*Melicope degeneri*–c
Kauai 23–*Melicope puberula*–f
Kauai 23–*Myrsine mezii*–f
Kauai 23–*Phyllostegia renovans*–f
Kauai 23–*Platydesma rostrata*–p
Kauai 23–*Psychotria grandiflora*–f
Kauai 23–*Tetraplasandra flynnii*–i
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*–j
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*–k

■ xxxx. By amending paragraph (b) as follows:

■ i. In paragraph (b)(1), by adding "Family Amaranathaceae", "Family Asteliaceae", 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 Amaranathaceae: *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 eleeleensis*
Family Campanulaceae: *Cyanea kolekoleensis*
Family Campanulaceae: *Cyanea kuhihewa*
Family Caryophyllaceae: *Schiedea attenuata*
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 hobdyi*
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:

BILLING CODE 4310–55–S

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

BILLING CODE 4310–55–C

* * * * *

(vi) Kauai 4–*Chamaesyce remyi* var. *kauaiensis*–a

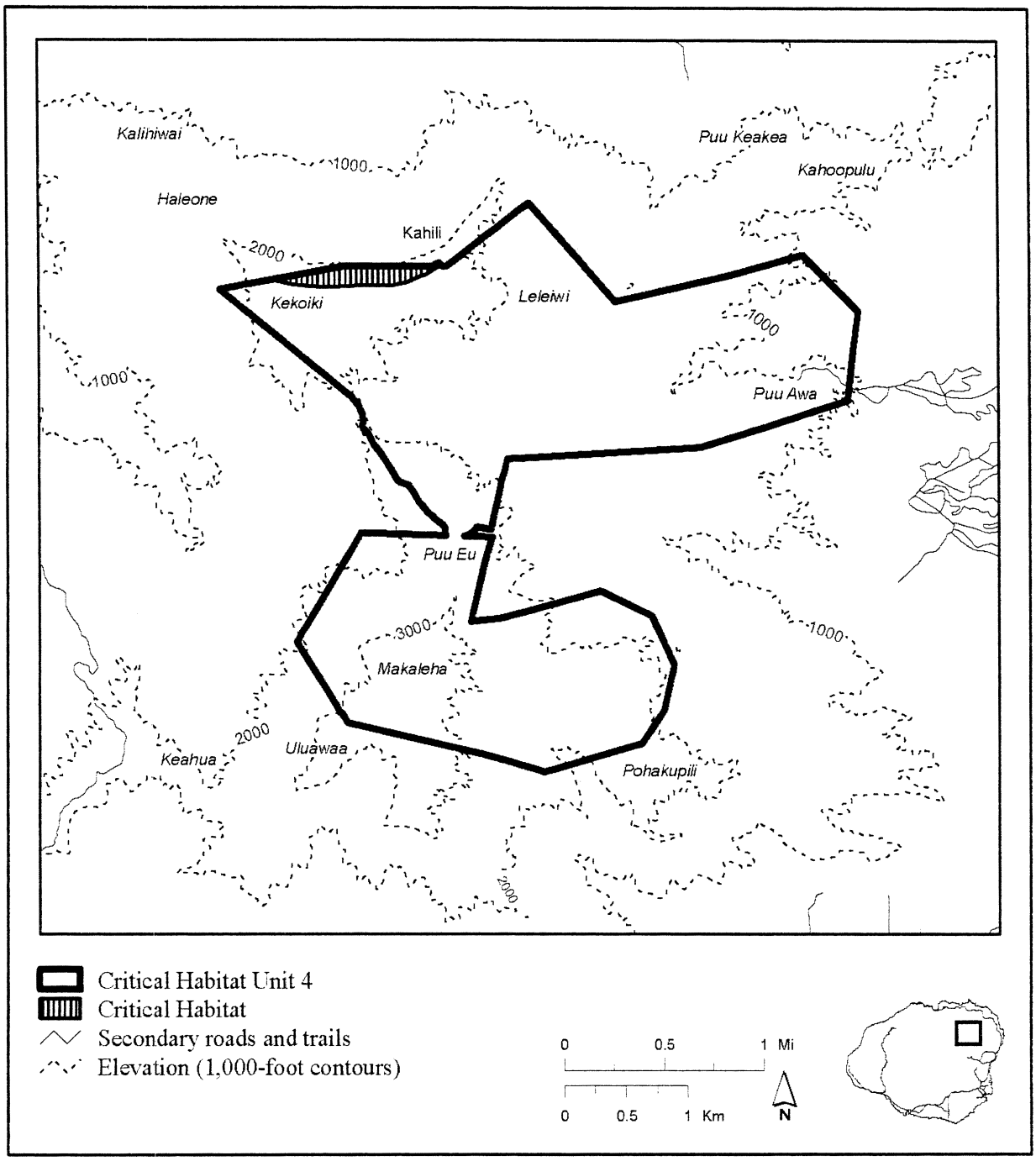
(A) This is a unit of the Wet Cliff ecosystem and consists of 38 ac (15.4 ha). This unit includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 457610, 2449548; 457661, 2449558; 457661, 2449558; 457651, 2449568; 457646, 2449571; 457637, 2449567; 457631, 2449564; 457621, 2449558; 457618, 2449556; 457613, 2449551; 457611, 2449549; 457144, 2449549; 457144, 2449549; 456901, 2449549; 457285, 2449395; 457635, 2449536; 457541, 2449482; 457611, 2449549; 457388, 2449419; 456313, 2449442; 457278, 2449394; 457141, 2449391; 456345, 2449426; 456848, 2449384; 456731, 2449379; 456589, 2449387; 456467, 2449400; 456999, 2449392; 457474, 2449457. 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:

## Map 5a

**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**

## Wet Cliff




BILLING CODE 4310–55–C

(vii) Kauai 4–*Chamaesyce remyi* var. *remyi*–a

(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

(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

(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

(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

(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

(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

(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

(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

(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 (37 ac; 15 ha)

(A) This is a unit of the Lowland Mesic ecosystem and consists of 37 ac (15 ha). This unit includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 458130, 2424804; 458259, 2424774; 458356, 2424758; 458478, 2424743; 458570, 2424730; 458648, 2424694; 458648, 2424470; 458666, 2424580; 458010, 2424827; 458671, 2424648; 458429, 2424488; 458620, 2424409; 458620, 2424409; 457920, 2424829; 458513, 2424437; 458579, 2424401; 458340, 2424534; 458241, 2424577; 458160, 2424631; 458068, 2424690; 458000, 2424733; 457959, 2424769. 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).

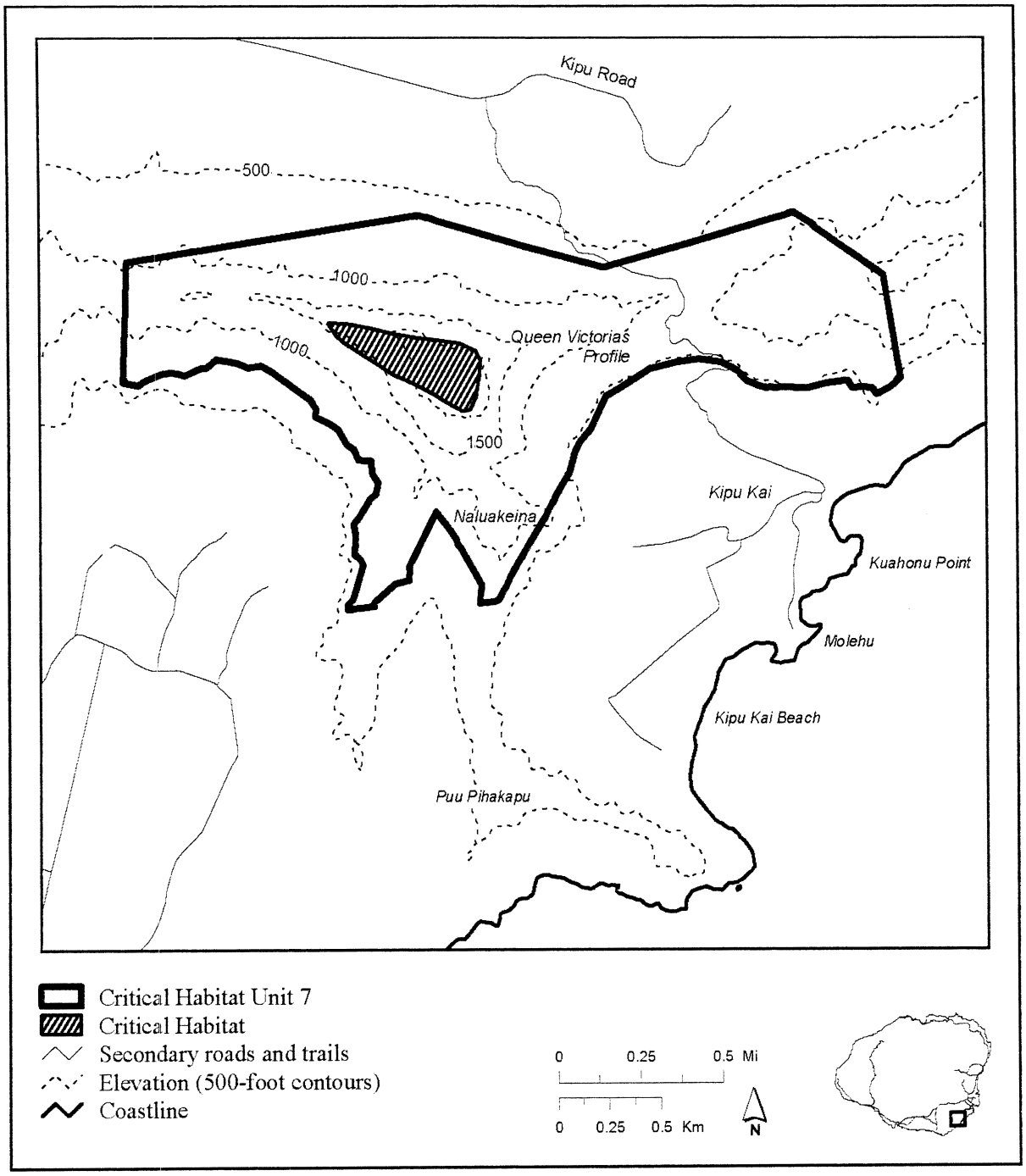
(B) Note: Map 23a follows:

BILLING CODE 4310–55–S

## 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




BILLING CODE 4310–55–C

(xxxv) Kauai 7–*Chamaesyce eleanoriae*–a

(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

(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

(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

(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

(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

(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

(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

(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

(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

(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

(A) This is a unit of the Montane Wet ecosystem and consists of 99 ac (40 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 449000, 2441660; 449004, 2441650; 449006, 2441639; 448995, 2441668; 449009, 2441625; 449012, 2441616; 449030, 2441595; 448925, 2441722; 449037, 2441588; 449017, 2441611; 448986, 2441677; 448972, 2441689; 448957, 2441700; 449043, 2441578; 448933, 2441715; 449060, 2441481; 448915, 2441738; 448913, 2441753; 448914, 2441760; 448913, 2441774; 448915, 2441796; 448910, 2441807; 448900, 2441814; 448939, 2441710; 448964, 2441441; 448677, 2442140; 448892, 2441817; 448916, 2441369; 448918, 2441381; 448922, 2441392; 448930, 2441400; 448936, 2441403; 448940, 2441404; 448945, 2441411; 449065, 2441502; 448952, 2441427; 449046, 2441569; 448971, 2441443; 449003, 2441449; 449032, 2441461; 449040, 2441466; 449049, 2441471; 449053, 2441472; 449064, 2441492; 449066, 2441511; 449061, 2441528; 449050, 2441561; 448948, 2441420; 448764, 2442029; 448684, 2442157; 448675, 2442123; 448677, 2442115; 448683, 2442101; 448694, 2442089; 448710, 2442077; 448718, 2442069; 448723, 2442061; 448728, 2442058; 448736, 2442055; 448682, 2442148; 448755, 2442041; 448917, 2441357; 448768, 2442019; 448773, 2442013; 448777, 2442002; 448781, 2441990; 448787, 2441967; 448789, 2441938; 448803, 2441914; 448813, 2441900; 448814, 2441894; 448817, 2441884; 448746, 2442051; 448707, 2442267; 448884, 2441820; 448877, 2441825; 448850, 2441844; 448840, 2441852; 448697, 2442342; 448711, 2442341; 448721, 2442331; 448724, 2442320; 448723, 2442309; 448722, 2442303; 448944, 2441075; 448712, 2442283; 448890, 2441818; 448706, 2442257; 448705, 2442250; 448699, 2442238; 448692, 2442233; 448684, 2442226; 448678, 2442221; 448673, 2442209; 448671, 2442202; 448674, 2442187; 448680, 2442169; 448718, 2442295; 448601, 2440652; 448638, 2440764; 449173, 2441529; 449106, 2441435; 449078, 2441297; 449111, 2441196; 449121, 2441114; 449121, 2441114; 449068, 2441051; 449006, 2441012; 448887, 2440934; 449249, 2441697; 448678, 2440741; 449275, 2441773; 448601, 2440652; 448599, 2440647; 448600, 2440668; 448601, 2440679; 448606, 2440704; 448612, 2440722; 448615, 2440731; 448619, 2440740; 448622, 2440749; 448954, 2441097; 448777, 2440842; 448640, 2442451; 448682, 2442350; 448677, 2442356; 448673, 2442365; 448671, 2442369; 448665, 2442379; 448657, 2442387; 448648, 2442399; 448643, 2442410; 448642, 2442419; 448642, 2442430; 449201, 2441638; 448831, 2441859; 448650, 2440769; 448637, 2442455; 448880, 2442563; 448917, 2442504; 448983, 2442384; 449024, 2442290; 449064, 2442221; 449090, 2442135; 449115, 2442038; 449148, 2441893; 449244, 2441819; 448642, 2442440; 448940, 2441238; 448630, 2440759; 448969, 2441116; 448971, 2441119; 448972, 2441136; 448973, 2441143; 448972, 2441150; 448967, 2441159; 448961, 2441163; 448949, 2441170; 448941, 2441177; 448820, 2441871; 448934, 2441230; 448948, 2441084; 448944, 2441250; 448946, 2441259; 448948, 2441264; 448948, 2441273; 448948, 2441281; 448944, 2441291; 448935, 2441302; 448928, 2441313; 448925, 2441322; 448920, 2441333; 448930, 2441194; 448837, 2440912; 448663, 2440773; 448678, 2440780; 448691, 2440790; 448711, 2440806; 448720, 2440813; 448727, 2440820; 448735, 2440829; 448745, 2440841; 448764, 2440857; 448788, 2440878; 448964, 2441109; 448811, 2440896; 448919, 2441341; 448841, 2440914; 448861, 2440927; 448877, 2440939; 448918, 2440982; 448940, 2441006; 448941, 2441024; 448943, 2441044; 448943, 2441053; 448943, 2441063; 448926, 2441212; 448802, 2440889; 448933, 2441184. 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)(lxxxi), (a)(1)(lxxxiii), (a)(1)(lxxxvi), (a)(1)(lxxxvii), (a)(1)(lxxxviii), (a)(1)(xci), (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).

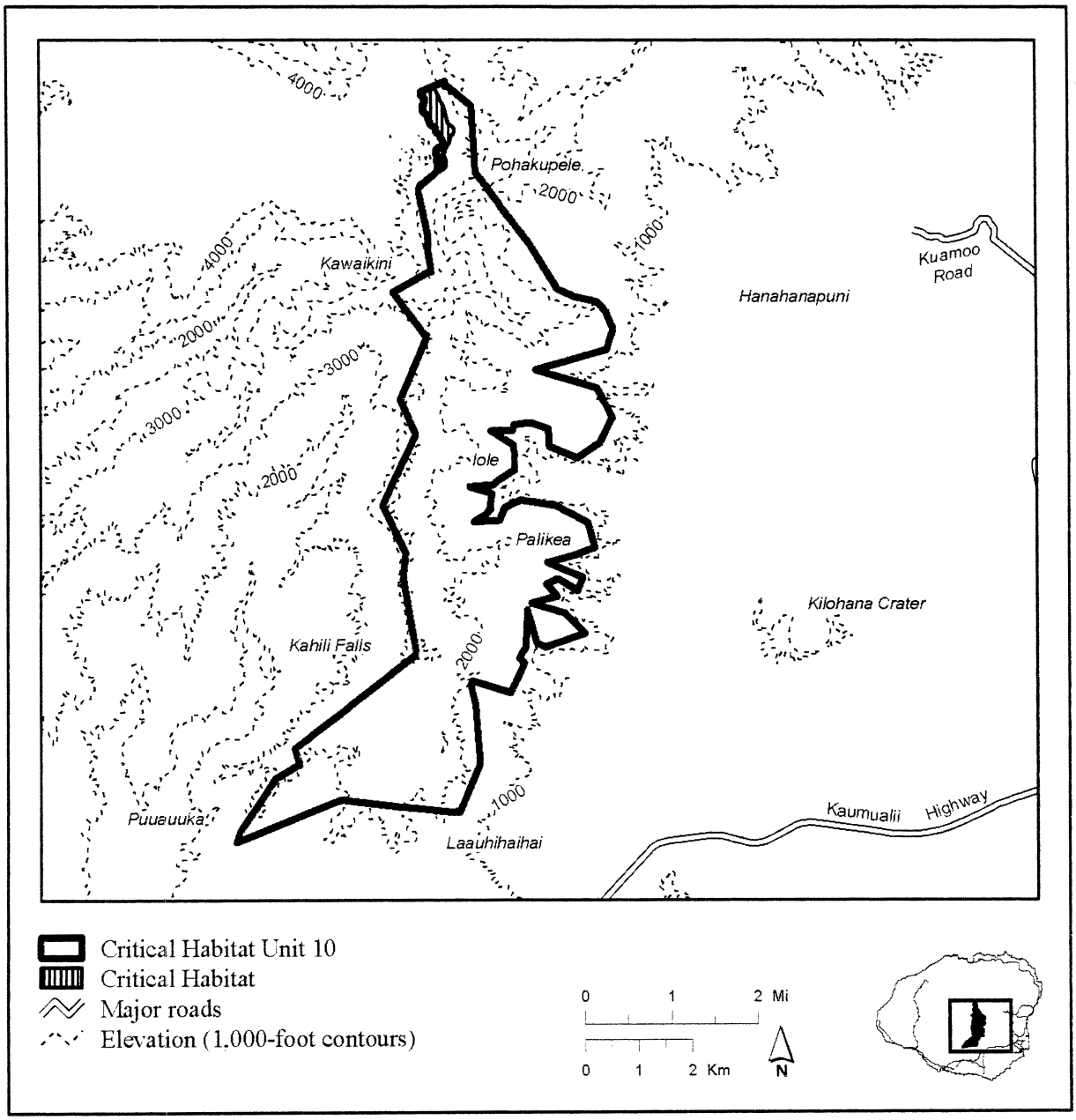
(B) Note: Map 35a follows:

BILLING CODE 4310–55–S

## 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




BILLING CODE 4310–55–C

* * * * *

(lix) Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–b

(A) This is a unit of the Lowland Wet ecosystem and consists of 2,330 ac (943 ha). 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, Kauai 10–*Tetraplasandra bisattenuata*–b, and Kauai 10–*Tetraplasandra flynii*–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), (a)(1)(cxiv), and (a)(1)(cxvi), respectively, of this section).

(1) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 450218, 2439675; 451901, 2438605; 451485, 2438695; 451170, 2438845; 450653, 2439686; 450094, 2440396; 450101, 2440409; 450009, 2440531; 450060, 2439401; 450044, 2439436; 450080, 2439502; 450121, 2439558; 450313, 2437467; 450187, 2439652; 452012, 2438334; 450243, 2439684; 450236, 2439581; 450179, 2439451; 450144, 2439400; 450116, 2439393; 450060, 2439401; 450009, 2440531; 449922, 2440494; 449797, 2440464; 449675, 2440467; 450154, 2439614; 451319, 2437948; 450466, 2437546; 450580, 2437507; 450757, 2437431; 450948, 2437416; 451043, 2437429; 451072, 2437437; 451101, 2437491; 451108, 2437503; 451138, 2437581; 451245, 2437644; 451275, 2437714; 452023, 2438472; 451205, 2437885; 452004, 2438389; 451411, 2437910; 451488, 2437910; 451579, 2437997; 451593, 2438098; 451654, 2438137; 451738, 2438169; 451822, 2438170; 451898, 2438217; 451952, 2438225; 451982, 2438287; 449326, 2440266; 451228, 2437792; 450799, 2438248; 449502, 2440462; 450261, 2439193; 450390, 2438961; 450492, 2438803; 450601, 2438722; 450715, 2438722; 450776, 2438704; 450786, 2438622; 450835, 2438510; 450888, 2438416; 450949, 2438380; 450103, 2439293; 450921, 2438291; 450098, 2439272; 450704, 2438180; 450742, 2438065; 450785, 2437968; 450701, 2437933; 450657, 2437930; 450554, 2437925; 450467, 2437958; 450381, 2437976; 450256, 2438015; 450165, 2438076; 448286, 2436668; 451002, 2438334; 449748, 2439830; 450248, 2439634; 449295, 2440144; 449323, 2440106; 449435, 2440131; 449639, 2440133; 449771, 2440087; 449931, 2440046; 450041, 2440031; 450084, 2440003; 450061, 2439947; 449964, 2439881; 450172, 2439295; 449758, 2439861; 449402, 2440381; 449760, 2439660; 449816, 2439481; 449861, 2439257; 449886, 2439054; 449944, 2438939; 449945, 2438937; 450092, 2438827; 450179, 2438817; 450222, 2438885; 450189, 2439030; 450136, 2439186; 449852, 2439858; 449221, 2436668; 449007, 2436513; 449328, 2436406; 449213, 2436403; 449145, 2436465; 449130, 2436544; 449158, 2436572; 449514, 2436395; 449231, 2436635; 449615, 2436301; 449188, 2436712; 449145, 2436768; 449110, 2436794; 449120, 2436671; 449102, 2436620; 449079, 2436605; 450823, 2436692; 449219, 2436602; 449927, 2436216; 450785, 2436606; 450862, 2436552; 450878, 2436459; 450894, 2436334; 450928, 2436285; 450659, 2436369; 449414, 2436418; 450332, 2436229; 449008, 2436511; 449924, 2436215; 449870, 2436206; 449812, 2436172; 449765, 2436128; 449727, 2436090; 449689, 2436186; 449683, 2436195; 450351, 2436329; 448790, 2437520; 449020, 2436554; 448912, 2438027; 448953, 2437948; 448991, 2437897; 449024, 2437853; 448994, 2437683; 448926, 2438111; 448920, 2437538; 449012, 2438179; 448665, 2437510; 448596, 2437431; 448540, 2437294; 448517, 2437230; 448459, 2437218; 448428, 2437261; 448226, 2436801; 450205, 2439505; 449412, 2438461; 448436, 2436335; 450010, 2438158; 449905, 2438254; 449811, 2438272; 449689, 2438311; 449567, 2438395; 448910, 2438029; 449445, 2438454; 449027, 2437802; 449303, 2438449; 449280, 2438423; 449234, 2438327; 449198, 2438248; 449146, 2438227; 449117, 2438215; 449027, 2438184; 449506, 2438446; 450506, 2437164; 450691, 2436909; 450656, 2436941; 450515, 2437040; 450407, 2437210; 450299, 2437233; 448983, 2437578; 450584, 2437009.

(2) This unit includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 448864, 2430994; 448915, 2431294; 448870, 2430976; 448747, 2431927; 448866, 2430965; 448877, 2431143; 448890, 2431196; 448902, 2431222; 448896, 2431533; 448792, 2431836; 448857, 2431685; 448875, 2431636; 448879, 2431616; 448879, 2431586; 448904, 2431254; 448883, 2431556; 448907, 2431280; 448580, 2432096; 448909, 2431441; 448926, 2431397; 448922, 2431378; 448920, 2431356; 448871, 2430833; 448858, 2431071; 449196, 2430298; 448319, 2429275; 449002, 2429203; 448999, 2429252; 449004, 2429384; 449017, 2429491; 449053, 2429598; 449076, 2429644; 449139, 2429727; 449175, 2429758; 449262, 2429801; 449318, 2429811; 449326, 2430025; 449290, 2430091; 448866, 2430960; 448995, 2430341; 448858, 2431041; 448902, 2430792; 448947, 2430723; 448983, 2430644; 448991, 2430617; 449290, 2430208; 449026, 2430433; 449260, 2430300; 448959, 2430257; 448970, 2430209; 449020, 2430214; 449086, 2430250; 449107, 2430262; 448869, 2430883; 449011, 2430547; 447154, 2430979; 448122, 2430928; 446849, 2430738; 446921, 2430739; 446961, 2430832; 448892, 2431475; 446996, 2430939; 448686, 2432011; 446996, 2430939; 447214, 2431052; 447347, 2431063; 447367, 2431032; 447520, 2431054; 447836, 2431129; 447989, 2431010; 447038, 2430959; 447800, 2431556; 448534, 2432102; 448512, 2432103; 448509, 2432100; 448291, 2431933; 448077, 2431769; 446723, 2430729; 447808, 2431563; 447073, 2430978; 447681, 2431465; 447305, 2431176; 448877, 2431143; 447222, 2431112; 448868, 2431103; 447039, 2430972; 448011, 2431718; 447907, 2429318; 448615, 2432078; 448288, 2429278; 448283, 2429271; 448109, 2429291; 446993, 2430912; 448055, 2429303; 448174, 2430856; 447613, 2429349; 447532, 2429359; 447492, 2429364; 447530, 2429461; 447517, 2429602; 447489, 2429733; 447465, 2429924; 448370, 2430494; 448055, 2429297; 447481, 2430092; 448175, 2430731; 448297, 2430722; 448369, 2430567; 448340, 2430390; 448312, 2430325; 447855, 2430195; 447580, 2430191; 448297, 2430660; 447684, 2430223; 448070, 2430056; 448138, 2430060; 448199, 2430119; 448260, 2430203.

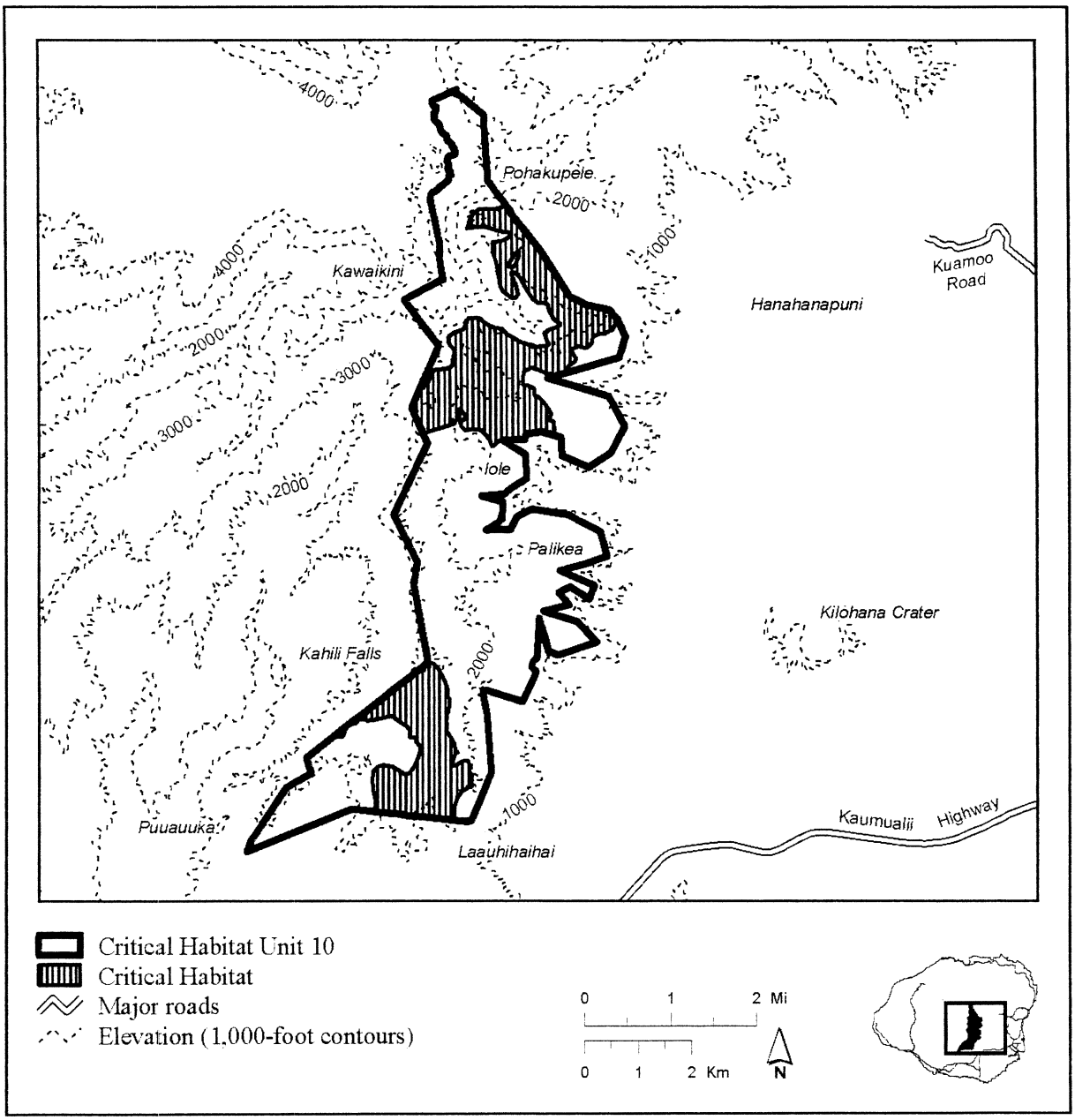
(B) Note: Map 36a follows:

BILLING CODE 4310–55–S

## 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, Kauai 10–*Tetraplasandra flynnii*–b**

### Lowland Wet



(lx) Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–c

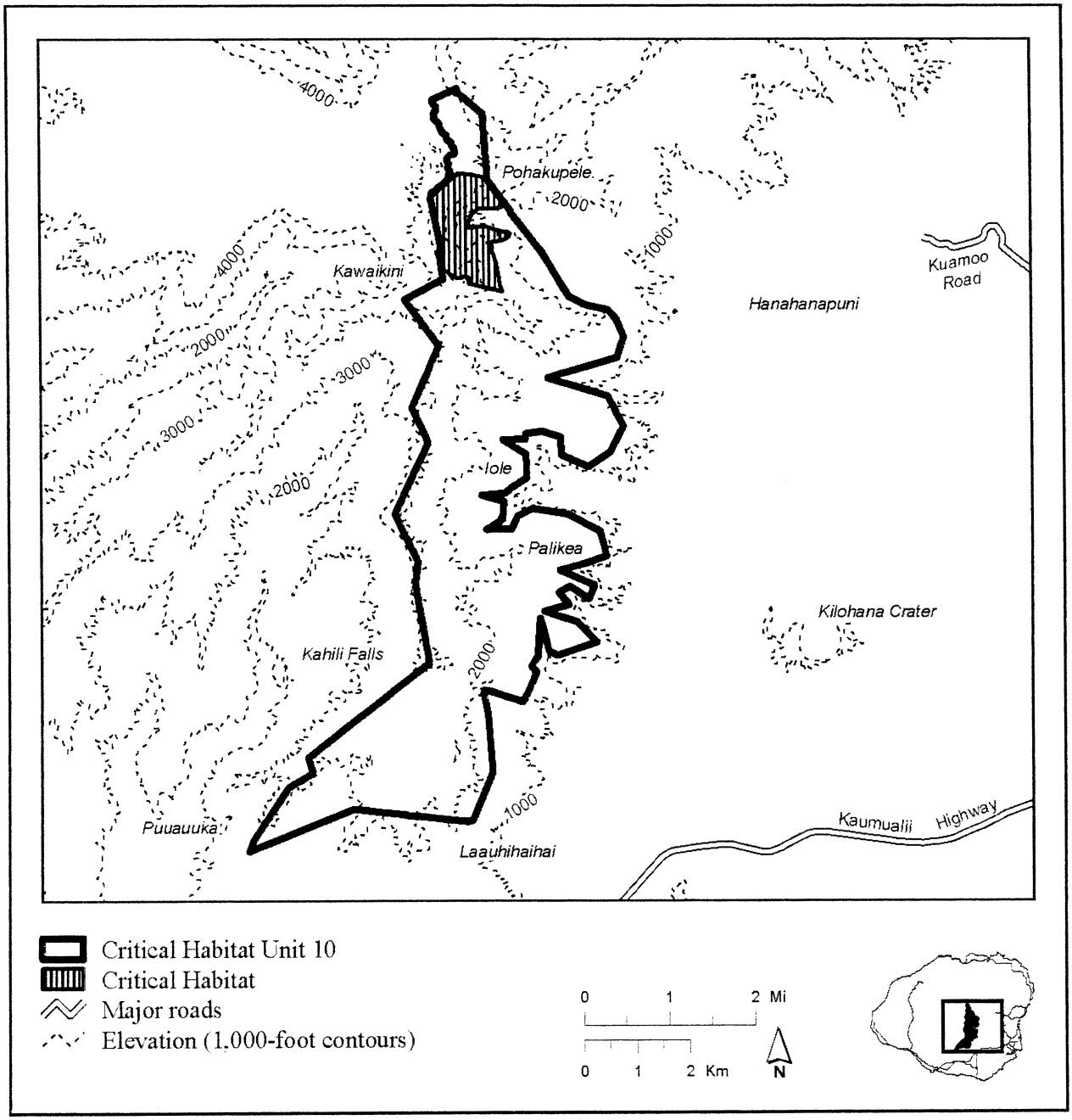
(A) This is a unit of the Wet Cliff ecosystem and consists of 489 ac (198 ha). This unit includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 449326, 2440266; 449663, 2440988; 449861, 2440726; 449771, 2440087; 449639, 2440133; 449435, 2440131; 449323, 2440106; 449295, 2440144; 449931, 2440046; 449402, 2440381; 449502, 2440462; 449675, 2440467; 449797, 2440464; 449922, 2440494; 450009, 2440531; 449861, 2440726; 449663, 2440988; 449758, 2439861; 449987, 2440561; 450084, 2440003; 449943, 2438939; 448756, 2439586; 448792, 2439355; 448831, 2439328; 448887, 2439317; 448953, 2439254; 449067, 2439195; 448605, 2440582; 449760, 2439660; 448605, 2440585; 449964, 2439881; 449245, 2439220; 449852, 2439858; 449748, 2439830; 449816, 2439481; 449861, 2439257; 449886, 2439054; 449944, 2438939; 449177, 2439197; 448777, 2440842; 449662, 2441006; 449661, 2441029; 449533, 2441052; 449396, 2441083; 449396, 2441083; 449121, 2441114; 449068, 2441051; 448770, 2439804; 448887, 2440934; 450061, 2439947; 448678, 2440741; 448601, 2440652; 448599, 2440647; 448599, 2440637; 448600, 2440627; 448601, 2440618; 448603, 2440603; 448604, 2440594; 449006, 2441012; 449309, 2439083; 449311, 2439179; 450041, 2440031. 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




BILLING CODE 4310–55–C

(lxi) Kauai 10–*Chamaesyce remyi* var. *remyi*–c

(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

(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

(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

(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

(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

(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

(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

(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.

* * * * *

(lxxiii) Kauai 10–*Cyrtandra oenobarba*–b

(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

(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

(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

(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

(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

(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

(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.

(lxxxi) Kauai 10–*Dubautia waialealae*–a

(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

(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.

* * * * *

(lxxxvi) Kauai 10–*Keysseria erici*–a

(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

(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

(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

(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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(xci) Kauai 10–*Labordia pumila*–a

(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.

* * * * *

(xciii) Kauai 10–*Lysimachia daphnoides*–a

(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.

* * * * *

(xcv) Kauai 10–*Lysimachia iniki*–b

(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

(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

(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

(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

(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

(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

(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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(ciii) Kauai 10–*Myrsine mezii*–a

(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

(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

(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.

* * * * *

(cviii) Kauai 10–*Platydesma rostrata*–c

(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

(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

(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

(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.

* * * * *

(cxiii) Kauai 10–*Stenogyne kealiae*–a

(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

(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

(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.

(cxvi) Kauai 10–*Tetraplasandra flynnii*–b

(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.

* * * * *

(cxxx) Kauai 11—*Astelia waialealae*—b

(A) This is a unit of the Montane Wet ecosystem and consists of 14,096 ac (5,704 ha). 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 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, and Kauai 11–*Tetraplasandra flynnii*–c (see paragraphs (a)(1)(cxlii), (a)(1)(clxxvii), (a)(1)(clxxix), (a)(1)(clxxxv), (a)(1)(cxcix), (a)(1)(ccxvi), (a)(1)(ccxvii), (a)(1)(ccxxii), (a)(1)(ccxxix), (a)(1)(ccxxxv), (a)(1)(ccxli), (a)(1)(ccxlix), (a)(1)(cclviii), (a)(1)(cclxvi), (a)(1)(cclxxvii), (a)(1)(ccxc), and (a)(1)(cccxxxiv), respectively, of this section).

(1) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 441848, 2446265; 441620, 2446723; 442005, 2446171; 441982, 2446194; 441963, 2446219; 441943, 2446256; 441929, 2446268; 441897, 2446273; 441879, 2446263; 441852, 2446219; 442039, 2446165; 441834, 2446230; 442059, 2446159; 441855, 2446295; 441856, 2446328; 441868, 2446401; 441864, 2446424; 441847, 2446451; 441836, 2446475; 441829, 2446501; 441829, 2446505; 441674, 2446682; 440599, 2447501; 441838, 2446221; 442317, 2445917; 442501, 2445803; 442492, 2445803; 442467, 2445799; 442448, 2445805; 442444, 2445807; 442435, 2445813; 442430, 2445827; 442430, 2445830; 442428, 2445851; 442019, 2446165; 445907, 2442657; 441584, 2446741; 442273, 2445945; 442261, 2445949; 442202, 2445986; 442175, 2445995; 442100, 2446007; 442082, 2446029; 442072, 2446052; 442067, 2446082; 442073, 2446121; 442071, 2446146; 442381, 2445882; 440800, 2447339; 441648, 2446705; 441083, 2447147; 441058, 2447153; 441039, 2447168; 440969, 2447210; 440941, 2447230; 440888, 2447250; 440873, 2447265; 440865, 2447286; 441113, 2447170; 440842, 2447328; 441133, 2447183; 440740, 2447346; 440722, 2447354; 440710, 2447368; 440699, 2447389; 440693, 2447407; 440695, 2447430; 440703, 2447452; 440703, 2447461; 440693, 2447475; 443497, 2444548; 440858, 2447311; 441373, 2447026; 441549, 2446752; 441532, 2446763; 441521, 2446777; 441476, 2446797; 441455, 2446804; 441434, 2446820; 441405, 2446869; 441402, 2446899; 441403, 2446972; 441095, 2447154; 441398, 2446997; 442710, 2445647; 441363, 2447030; 441317, 2447043; 441283, 2447083; 441268, 2447104; 441240, 2447171; 441231, 2447186; 441219, 2447195; 441201, 2447195; 441172, 2447190; 441148, 2447188; 441399, 2446995; 443193, 2444946; 442711, 2445664; 443294, 2444870; 443290, 2444876; 443281, 2444890; 443271, 2444898; 443260, 2444907; 443252, 2444914; 443240, 2444927; 443234, 2444932; 443307, 2444833; 443196, 2444944; 443309, 2444829; 443177, 2444962; 443175, 2444965; 443163, 2444984; 443158, 2444995; 443156, 2445003; 443153, 2445020; 443153, 2445040; 443152, 2445059; 443150, 2445078; 443144, 2445096; 443215, 2444938; 443403, 2444695; 443483, 2444551; 443478, 2444555; 443464, 2444570; 443459, 2444579; 443452, 2444591; 443447, 2444608; 443444, 2444627; 443443, 2444647; 443440, 2444655; 443301, 2444851; 443423, 2444686; 443122, 2445132; 443385, 2444699; 443373, 2444702; 443366, 2444706; 443352, 2444721;

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(2) This unit includes land bounded by the following UTM Zone 4, NAD 83 coordinates (E, N): 433880, 2448827; 434279, 2447951; 434073, 2448685; 434228, 2448620; 434292, 2448479; 433725, 2448994; 434318, 2448298; 434357, 2447229; 434202, 2447345; 434086, 2447693; 434254, 2447886; 433546, 2449412; 434073, 2447500; 434163, 2447783; 434318, 2448182; 433545, 2449136; 433389, 2449256; 433567, 2449260; 433588, 2449244; 433599, 2449252; 433612, 2449262; 433567, 2449398; 433525, 2449415; 433448, 2449426; 434486, 2447126; 434498, 2449522; 433367, 2449352; 433339, 2449381; 433368, 2449293; 433589, 2449323; 435236, 2449347; 433313, 2449484; 434899, 2449305; 434074, 2449972; 434124, 2449948; 434137, 2449869; 434141, 2449863; 434208, 2449767; 434338, 2449660; 434752, 2449405; 435080, 2449407; 435183, 2449401; 435232, 2449399; 434920, 2449394; 435236, 2449351; 434627, 2447088; 435266, 2448909; 435272, 2448835; 435282, 2448685; 435360, 2447538; 435295, 2447440; 435290, 2447449; 435093, 2447245; 434994, 2447085; 434795, 2447069; 434738, 2447030; 434738, 2447045; 434713, 2447038; 434686, 2447020; 435234, 2449384; 434884, 2449298; 434026, 2449951; 434034, 2449950; 434074, 2449972; 434844, 2449248; 434848, 2449239; 434872, 2449246; 434890, 2449251; 434908, 2449290; 434908, 2449290; 434948, 2449300; 435005, 2449310; 435010, 2449343; 433969, 2449958; 434898, 2449304; 435010, 2449343; 434881, 2449297; 434872, 2449294; 434833, 2449281; 434833, 2449280; 434833, 2449278; 434833, 2449278; 434834, 2449277; 434839, 2449258; 434842, 2449253; 434844, 2449248; 433339, 2449600; 434991, 2449344; 434938, 2449321; 433440, 2449604; 433460, 2449707; 433468, 2449706; 433484, 2449694; 433419, 2449599; 433461, 2449623; 433458, 2449707; 433455, 2449620; 433480, 2449629; 433437, 2449592; 433426, 2449556; 433903, 2449882; 435011, 2449352; 433401, 2449697; 433414, 2449628; 433457, 2449622; 433493, 2449765; 433831, 2449767; 433742, 2449724; 433461, 2449623; 433633, 2449724; 433467, 2449787; 433429, 2449741; 433408, 2449708; 433436, 2449707; 433436, 2449707; 433443, 2449707; 433444, 2449707; 433426, 2449707; 433445, 2449707.

(3) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 448881, 2447609; 449040, 2448659; 449045, 2448506; 449032, 2448326; 449044, 2448132; 449087, 2447916; 448981, 2446981; 448979, 2446983; 448980, 2446982; 448980, 2446980; 449012, 2448822; 449105, 2447827; 448702, 2449395; 448235, 2448042; 448931, 2447092; 448577, 2449143; 448641, 2449184; 448610, 2449255; 448623, 2449141; 448613, 2449357; 448987, 2448959; 448812, 2449420; 448906, 2449440; 448959, 2449443; 448964, 2449425; 448952, 2449316; 448954, 2449143; 448593, 2449298; 448511, 2449199; 448321, 2447795; 448887, 2447191; 448577, 2449143; 448440, 2449296; 448382, 2449406; 448328, 2449449; 448242, 2449457; 448099, 2449454; 448059, 2449434; 448056, 2449368; 448091, 2449266; 448119, 2449134; 448122, 2449037; 448288, 2447915; 448834, 2447273; 448763, 2447342; 448088, 2448897; 448412, 2447653; 448669, 2447406; 448133, 2448200; 448042, 2448338; 447976, 2448470;

447943, 2448562; 447961, 2448628; 448037, 2448780; 448516, 2447525.

(4) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 447249, 2443451; 447247, 2443586; 447295, 2443639; 447325, 2443651; 447556, 2443686; 447603, 2443646; 447616, 2443588; 447631, 2443389; 447645, 2443143; 447623, 2443445; 447287, 2443339; 447374, 2443275; 447631, 2443389; 447636, 2443160; 447645, 2443146; 447894, 2443371; 447865, 2443358; 447712, 2443351; 447481, 2443262.

(5) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 448470, 2443889; 448141, 2444294; 448479, 2443895; 448470, 2443888; 447864, 2444277; 448479, 2443895; 448609, 2443974; 448591, 2444072; 448566, 2444172; 448548, 2444233; 448510, 2444279; 448464, 2444284; 448299, 2444289; 447925, 2444320; 447843, 2444325; 448458, 2443882; 447942, 2444178; 448003, 2444015; 448008, 2443903; 447967, 2443867; 447932, 2443750; 447904, 2443646; 447921, 2443582; 447949, 2443460; 447939, 2443412; 447996, 2444312.

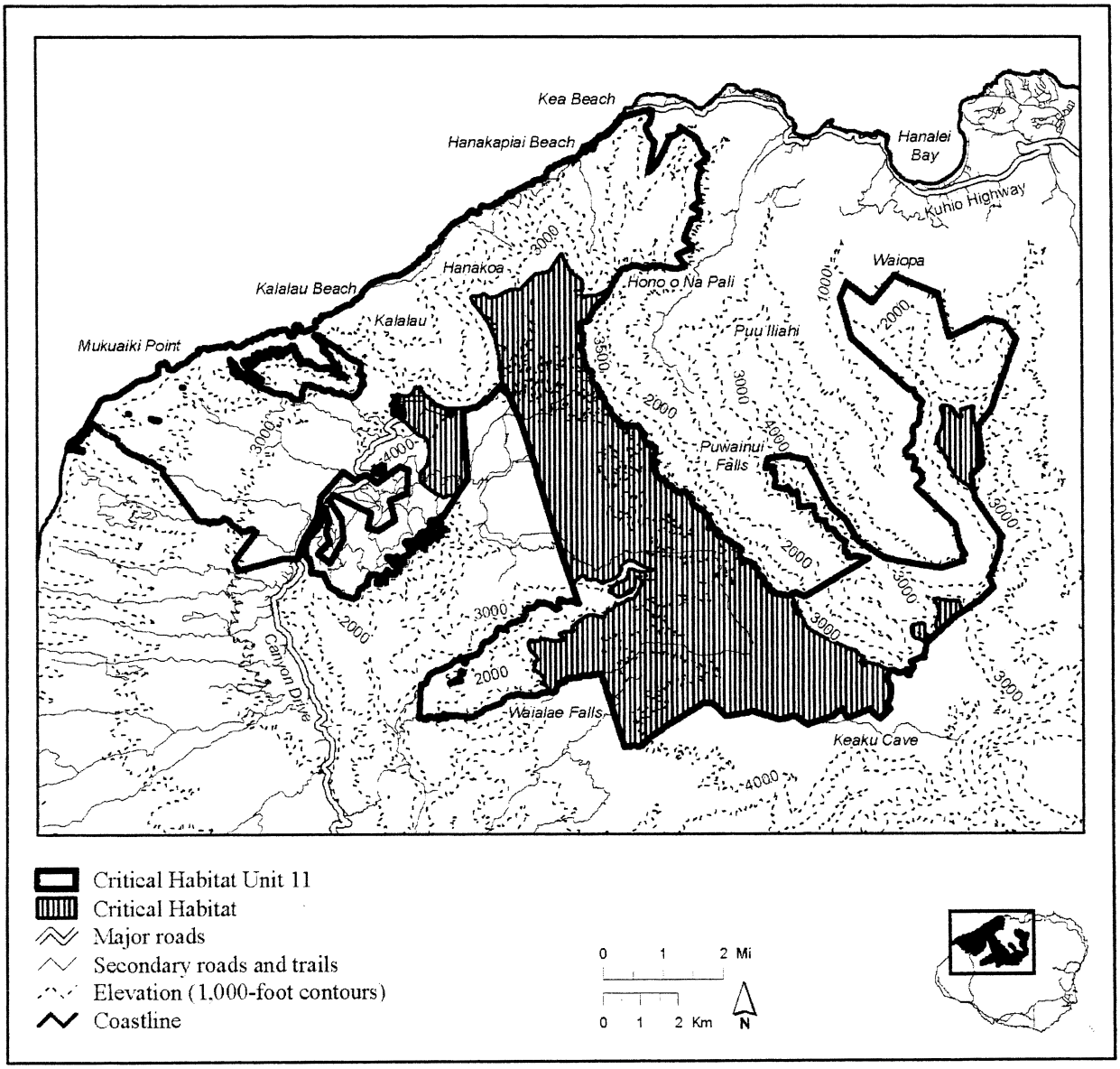
(B) Note: Map 64a follows:

BILLING CODE 4310–55–S

## 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*–c**

### Montane Wet




BILLING CODE 4310–55–C

* * * * *

(cxxxiii) Kauai 11–*Canavalia napaliensis*–b

(A) This is a unit of the Lowland Mesic ecosystem and consists of 2,590 ac (1,048 ha). 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–*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, and Kauai 11–*Tetraplasandra bisattenuata*–c (see paragraphs (a)(1)(cxxxv), (a)(1)(cxliii), (a)(1)(cxlvii), (a)(1)(clxxvi), (a)(1)(clxxx), (a)(1)(ccxxiii), (a)(1)(cclxxii), (a)(1)(cclxxviii), (a)(1)(ccxcii), and (a)(1)(cccxxxii), respectively, of this section).

(1) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 429310, 2448345; 429679, 2448361; 427873, 2448495; 429992, 2448363; 428727, 2448356; 428429, 2448252; 428229, 2448295; 428072, 2448380; 429040, 2448343; 427702, 2448480; 427616, 2448566; 427957, 2448626; 428640, 2448616; 428497, 2448745; 430177, 2448336; 429127, 2448025; 428184, 2448758; 427985, 2448814; 428413, 2448542; 429801, 2448080; 430583, 2449736; 428239, 2449004; 428246, 2447831; 428459, 2447934; 428558, 2447963; 428771, 2448066; 428927, 2448067; 429511, 2447984; 429626, 2447973; 430131, 2448232; 429914, 2448112; 429866, 2448131; 430049, 2448165; 430037, 2448217; 430042, 2448265; 430059, 2448285; 430092, 2448290; 430115, 2448276; 429340, 2447983; 430819, 2449646; 430408, 2449802; 430410, 2449802; 430405, 2449796; 428032, 2447946; 430527, 2449754; 427907, 2446845; 430635, 2449693; 430471, 2449787; 430720, 2449646; 430340, 2449778; 430899, 2449674; 430918, 2449717; 430904, 2449834; 430927, 2449905; 430948, 2449965; 431049, 2449934; 431249, 2449791; 430696, 2449656; 430016, 2449884; 429093, 2448894; 428893, 2449066; 428991, 2449270; 429489, 2449345; 429872, 2449507; 430071, 2449494; 430041, 2449682; 430392, 2449798; 430004, 2449889; 430365, 2449787; 430027, 2449878; 430068, 2449856; 430088, 2449848; 430172, 2449815; 430207, 2449804; 430261, 2449795; 430317, 2449781; 428666, 2448993; 429941, 2449841; 430191, 2446386; 428996, 2446347; 430671, 2447997; 430690, 2447765; 430393, 2447748; 430242, 2447664; 430107, 2447429; 430073, 2447126; 430793, 2448310; 430291, 2446570; 430886, 2448507; 429871, 2446234; 429547, 2446209; 429451, 2446226; 429357, 2446224; 429280, 2446207; 429242, 2446209; 429160, 2446277; 428149, 2446847; 430124, 2446907; 431362, 2449169; 431520, 2449691; 431720, 2449620; 431705, 2449569; 431769, 2449447; 431727, 2449372; 431403, 2449436; 431322, 2449418; 430764, 2448188; 431391, 2449273; 428979, 2446425; 431200, 2449070; 431205, 2448983; 431414, 2448890; 431629, 2448739; 431560, 2448675; 431171, 2448699; 430985, 2448705; 430903, 2448664; 431322, 2449372; 427039, 2447867; 429036, 2446320; 427161, 2447669; 427157, 2447676; 427157, 2447711; 427165, 2447729; 427158, 2447803; 427133, 2447817; 427520, 2447201; 427039, 2447866; 427535, 2447190; 427001, 2447889; 426958, 2448061; 426963, 2448149; 427064, 2448142; 427235, 2448086; 427563, 2447928; 427677, 2447929; 427733, 2448045; 427108, 2447853; 428047, 2446484; 428831, 2446497; 428775, 2446510; 428706, 2446470; 428620, 2446396; 428570, 2446443; 428493, 2446458; 428399, 2446395; 427178, 2447664; 428248, 2446467; 427932, 2448032; 427784, 2446844; 429744, 2449390; 427992, 2446846; 431520, 2449691; 428177, 2446890; 428105, 2447006; 427906, 2447077; 427734, 2447192; 428326, 2446439; 429333, 2449272.

(2) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 434084, 2450395; 434586, 2450652; 434573, 2450493; 434417, 2450376; 434288, 2450520; 434089, 2450518; 433962, 2450344; 435379, 2451538; 433998, 2450334; 434826, 2450972; 434156, 2450444; 434237, 2450456; 434288, 2450459; 434329, 2450469; 434298, 2450420; 434255, 2450337; 433951, 2450321; 435177, 2451612; 435402, 2451617; 435412, 2451678; 435318, 2451714; 435231, 2451780; 435178, 2451869; 435105, 2451886; 434656, 2450870; 435205, 2451713; 434640, 2451058; 435064, 2451510; 435050, 2451437; 435164, 2451394; 435165, 2451250; 435152, 2451105; 435053, 2450974; 434229, 2450100; 435091, 2451771; 435635, 2451403; 434201, 2450220; 435693, 2450581; 435744, 2450673; 435769, 2450813; 435762, 2450931; 435759, 2450963; 435608, 2450342; 435676, 2451273; 435567, 2450146; 435602, 2451485; 435568, 2451531; 435564, 2451535; 435526, 2451558; 435488, 2451543; 435455, 2451520; 435379, 2451538; 435724, 2451110; 434791, 2450099; 434415, 2450298; 434275, 2450082; 434315, 2450105; 434354, 2450189; 434458, 2450344; 434527, 2450344; 435649, 2450502; 434695, 2450176; 434198, 2450176; 434834, 2450015; 434933, 2449939; 435091, 2449882; 435257, 2449864; 435432, 2449887; 435496, 2449915; 435537, 2449994; 434578, 2450244; 434504, 2450369.

(3) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 434600, 2453100; 434431, 2452829; 434289, 2452715; 434275, 2452687; 434275, 2452765; 434274, 2452895; 435095, 2453567; 434458, 2453099; 434814, 2453088; 434628, 2453158; 434656, 2453260; 434769, 2453333; 434911, 2453349; 435025, 2453349; 434330, 2453055; 434735, 2453035; 435237, 2453582; 434890, 2453142; 434915, 2453139; 434902, 2452974; 434943, 2452791; 435055, 2452699; 435187, 2452668; 435284, 2452706; 435360, 2452826; 435353, 2452958; 435266, 2453062; 435177, 2453131; 435129, 2453220; 434569, 2452921; 435534, 2453517; 435067, 2453494; 435279, 2453583; 435145, 2453314; 435221, 2453373; 435488, 2453454; 435129, 2453220; 435626, 2453626; 435703, 2453748; 435563, 2453642; 435772, 2453903; 435792, 2453934; 435775, 2453963; 435675, 2453918; 435620, 2453730; 435741, 2453842; 435376, 2453408.

(4) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 439159, 2453759; 439171, 2453735; 439242, 2453562; 439244, 2453448; 439043, 2454237; 439466, 2454892; 439468, 2454903; 439115, 2453850; 439485, 2454824; 439087, 2453909; 439065, 2454132; 439121, 2454259; 439243, 2454297; 439360, 2454300; 439454, 2454376; 439498, 2454643; 439296, 2454804; 439268, 2454731; 439480, 2454475; 438791, 2453685; 439211, 2454615; 439381, 2454833; 439016, 2454063; 439016, 2453962; 439002, 2453918; 438904, 2453772; 438791, 2453608; 438833, 2453598; 438870, 2453588; 438962, 2453532; 439041, 2453446; 439145, 2453405; 439244, 2453448; 439085, 2454310; 439001, 2454179; 439085, 2454397; 439098, 2454498; 438982, 2453510; 438946, 2453845; 439183, 2454600.

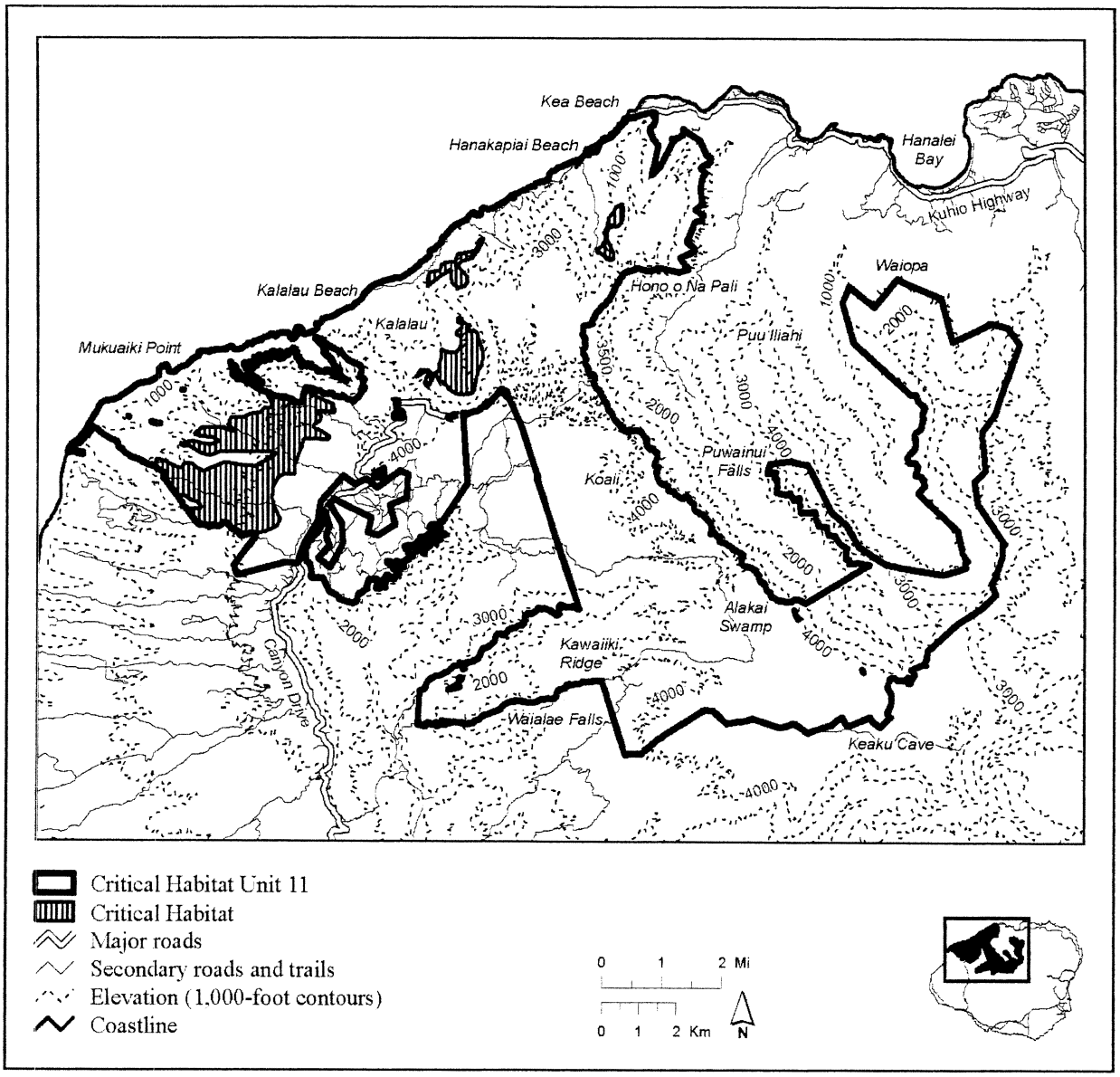
(B) Note: Map 66a follows:

BILLING CODE 4310–55–S

## 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




BILLING CODE 4310–55–C

* * * * *

(cxxxv) Kauai 11–*Chamaesyce eleanoriae*–b

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

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

(cxxxvi) Kauai 11–*Chamaesyce eleanoriae*–c

(A) This is a unit of the Dry Cliff ecosystem and consists of 712 ac (288 ha). 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)(ccxxxviii), (a)(1)(cccix), and (a)(1)(cccxxix), respectively, of this section).

(1) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 434920, 2449394; 434124, 2449948; 435916, 2450057; 434137, 2449869; 434141, 2449863; 434208, 2449767; 434338, 2449660; 434752, 2449405; 434074, 2449972; 433287, 2450063; 434498, 2449522; 434034, 2449950; 434026, 2449951; 433969, 2449958; 433903, 2449882; 433831, 2449767; 433742, 2449724; 433633, 2449724; 433493, 2449765; 435080, 2449407; 433353, 2449880; 435576, 2449421; 433196, 2450196; 433467, 2449787; 435716, 2449506; 435496, 2449915; 433046, 2450280; 435915, 2449832; 435916, 2450057; 435762, 2450931; 435853, 2450609; 435876, 2450522; 435906, 2450349; 435908, 2450232; 435913, 2450123; 435549, 2449426; 435728, 2449514; 435183, 2449401; 435669, 2449472; 435664, 2449469; 435598, 2449429; 435573, 2449422; 435517, 2449423; 435501, 2449420; 435498, 2449418; 435469, 2449405; 435420, 2449387; 435284, 2449396; 435232, 2449399; 435813, 2449619; 434834, 2450015; 434229, 2450100; 435257, 2449864; 434315, 2450105; 434354, 2450189; 434415, 2450298; 434458, 2450344; 435769, 2450813; 434504, 2450369; 434527, 2450344; 434578, 2450244; 432904, 2450341; 434791, 2450099; 434198, 2450176; 434933, 2449939; 435091, 2449882; 435892, 2449772; 435432, 2449887; 435537, 2449994; 435567, 2450146; 435608, 2450342; 435649, 2450502; 435693, 2450581; 435744, 2450673; 434695, 2450176; 433480, 2450152; 432882, 2450351; 432808, 2450383; 432852, 2450453; 432985, 2450649; 433015, 2450660; 433154, 2450657; 433185, 2450610; 433146, 2450539; 433093, 2450504; 434275, 2450082; 433237, 2450310; 434201, 2450220; 433807, 2450155; 433920, 2450257; 433951, 2450321; 433998, 2450334; 434084, 2450395; 434156, 2450444; 434237, 2450456; 434288, 2450459; 434329, 2450469; 434298, 2450420; 434255, 2450337; 433051, 2450468.

(2) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 435055, 2452699; 435912, 2452703; 435448, 2452106; 435379, 2451538; 435455, 2451520; 435488, 2451543; 435526, 2451558; 435564, 2451535; 435568, 2451531; 435537, 2451675; 435516, 2451752; 435744, 2452655; 435461, 2451989; 435318, 2451714; 435472, 2452346; 435476, 2452390; 435474, 2452446; 435495, 2452579; 435560, 2452671; 435574, 2452690; 435596, 2452692; 435668, 2452695; 435284, 2452706; 435483, 2451879; 435031, 2452321; 434814, 2453088; 434735, 2453035; 434569, 2452921; 434431, 2452829; 434289, 2452715; 434275, 2452687; 434275, 2452664; 434475, 2452549; 434646, 2452550; 435402, 2451617; 434902, 2452407; 435412, 2451678; 435003, 2452190; 435131, 2452148; 435118, 2451988; 435062, 2451915; 435105, 2451887; 435105, 2451886; 435178, 2451869; 435231, 2451780; 435859, 2452647; 434789, 2452406; 435858, 2453212; 435772, 2453903; 435792, 2453934; 435807, 2453891; 435744, 2452655; 435812, 2453641; 435817, 2453489; 435839, 2453341; 435741, 2453842; 435880, 2453252; 435805, 2453913; 435833, 2453129; 435816, 2453051; 435815, 2452963; 435839, 2452896; 435922, 2452711; 435914, 2452704; 435912, 2452703; 435880, 2453252; 435353, 2452958; 435881, 2452670; 434890, 2453142; 434915, 2453139; 434902, 2452974; 434943, 2452791; 435802, 2453804; 435360, 2452826; 435703, 2453748; 435266, 2453062; 435534, 2453517; 435187, 2452668; 435626, 2453626; 435177, 2453131; 435488, 2453454; 435376, 2453408; 435221, 2453373; 435145, 2453314; 435129, 2453220.

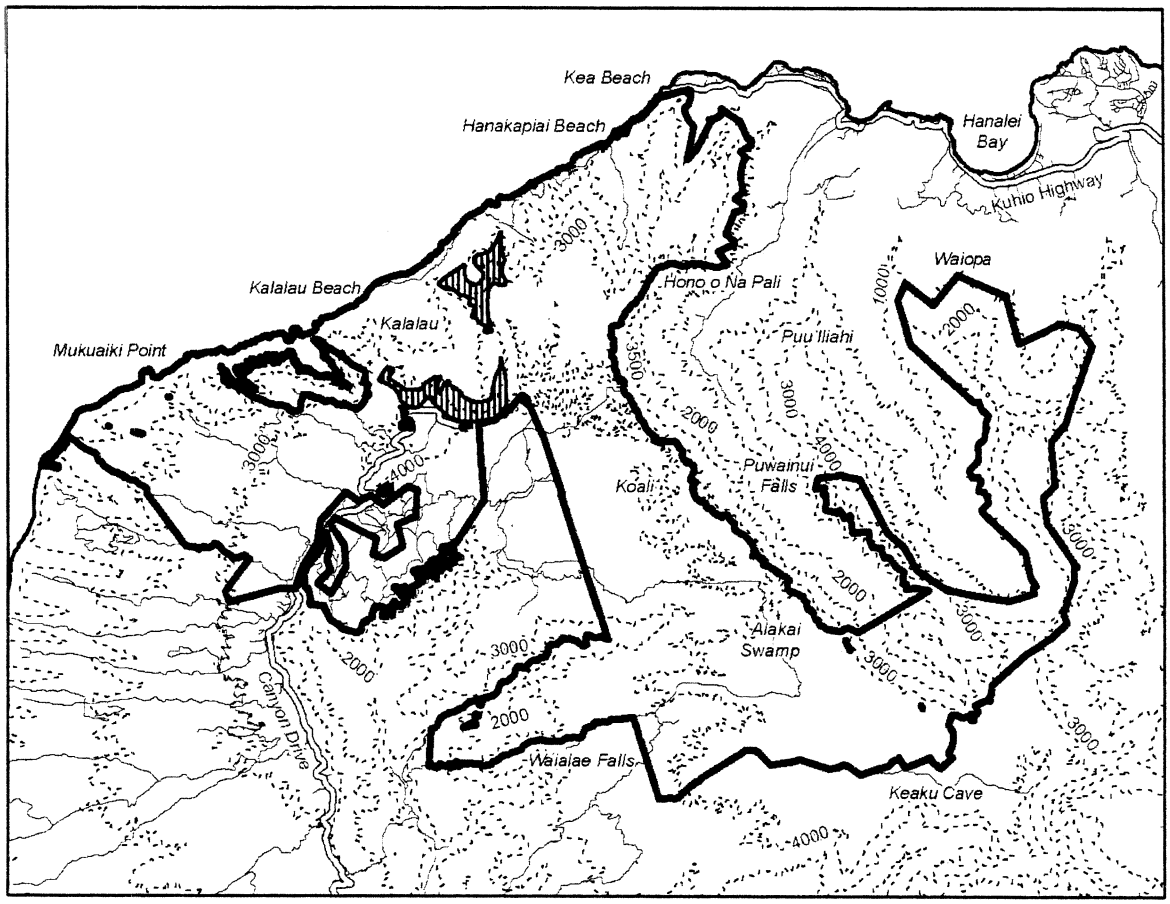
(B) Note: Map 67a follows:

BILLING CODE 4310–55–S

## Map 67a

**Kauai 11–*Chamaesyce eleanoriae*–c, Kauai 11–*Lysimachia scopulensis*–a, Kauai 11–*Schiedea attenuata*–a, Kauai 11–*Stenogyne kealiae*–b**

## Dry Cliff




BILLING CODE 4310–55–C

* * * * *

(cxl) Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–d

(A) This is a unit of the Lowland Wet ecosystem and consists of 2,618 ac (1,060 ha). This unit is also critical habitat for 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, and Kauai 11–*Tetraplasandra flynii*–d (see paragraphs (a)(1)(cxliv), (a)(1)(cxlviii), (a)(1)(cli), (a)(1)(clii), (a)(1)(cliii), (a)(1)(clxiii), (a)(1)(clxxviii), (a)(1)(ccxxiv), (a)(1)(ccxlviii), (a)(1)(ccl), (a)(1)(cclxvii), (a)(1)(cclxxix), (a)(1)(cccxxx), (a)(1)(cccxxxiii), and (a)(1)(cccxxxv) respectively, of this section).

(1) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 439674, 2454816; 440829, 2456531; 440674, 2456209; 440674, 2456209; 440498, 2455883; 440318, 2455684; 440265, 2455650; 440437, 2456434; 441321, 2455601; 440968, 2454371; 441022, 2454452; 441060, 2454503; 441116, 2454605; 441175, 2454734; 441201, 2454902; 441196, 2455050; 441203, 2455144; 441204, 2455238; 439597, 2454271; 441257, 2455421; 440812, 2453929; 441354, 2455706; 441400, 2455825; 441459, 2455917; 441541, 2456046; 441561, 2456125; 441543, 2456184; 441556, 2456273; 441574, 2456339; 441574, 2456384; 441564, 2456402; 441227, 2455309; 439928, 2453312; 439377, 2452849; 439390, 2452876; 439414, 2452909; 439464, 2452963; 439473, 2452985; 439481, 2453022; 439503, 2453046; 439553, 2453082; 439600, 2453107; 439618, 2453112; 440902, 2454287; 439788, 2453246; 440828, 2454112; 440061, 2453330; 440216, 2453312; 440430, 2453245; 440521, 2453222; 440539, 2453242; 440554, 2453392; 440588, 2453586; 440685, 2453700; 440805, 2453832; 441338, 2456446; 439646, 2453139; 438605, 2452379; 441501, 2456407; 439055, 2453168; 439012, 2453084; 438938, 2452886; 438872, 2452703; 438787, 2452586; 439373, 2452840; 438691, 2452533; 438684, 2452527; 438617, 2452469; 439307, 2453234; 438540, 2452374; 439402, 2453308; 438669, 2452384; 438716, 2452393; 438779, 2452391; 438816, 2452396; 438851, 2452395; 438954, 2452430; 439114, 2452513; 439201, 2452565; 439225, 2452608; 439322, 2452763; 438550, 2452386; 439705, 2455362; 439372, 2452836; 441231, 2456494; 440834, 2456579; 440867, 2456555; 440437, 2456434; 440319, 2456582; 440302, 2456453; 440131, 2455839; 439992, 2455240; 439972, 2455227; 439183, 2453214; 439766, 2455332; 441434, 2456415; 439659, 2455337; 439664, 2455162; 439671, 2454996; 439635, 2454556; 439595, 2454252; 439571, 2454009; 439545, 2453798; 439499, 2453587; 439453, 2453425; 439827, 2455286.

(2) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 437020, 2453189; 435477, 2452358; 435941, 2452670; 435881, 2452670; 435859, 2452647; 435744, 2452655; 435744, 2452655; 435668, 2452695; 435596, 2452692; 435579, 2452684; 435560, 2452671; 435495, 2452579; 436027, 2452670; 435476, 2452390; 435810, 2452427; 435698, 2452376; 435719, 2452378; 435838, 2452443; 435955, 2452326; 436003, 2452334; 436189, 2452365; 436579, 2452559; 436804, 2452559; 437201, 2452932; 437201, 2452932; 435474, 2452446; 437541, 2453313; 435902, 2452378; 436122, 2452693; 437202, 2452948; 437592, 2453026; 437797, 2453318; 437675, 2453322; 437408, 2453303; 437279, 2453284; 437072, 2453217; 437144, 2453246; 436929, 2453132; 436865, 2453080; 436370, 2452779; 436152, 2452704; 436156, 2452702; 437746, 2453322; 436849, 2453037; 436289, 2452750; 436289, 2452751; 436230, 2452707; 436547, 2452854; 436556, 2452755; 436617, 2452681; 436668, 2452719; 436783, 2452859.

(3) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 446053, 2443486; 445952, 2443580; 446981, 2444484; 446142, 2443241; 445804, 2443684; 446282, 2443149; 446918, 2444619; 446104, 2443348; 447039, 2444332; 447126, 2444222; 447271, 2444151; 447573, 2443995; 447576, 2443919; 445601, 2443759; 446555, 2445050; 447507, 2443875; 447387, 2443832; 447525, 2444041; 444938, 2444714; 446880, 2443495; 447257, 2443817; 446806, 2444770; 446697, 2444890; 446605, 2444969; 446565, 2445119; 446615, 2445149; 446102, 2445409; 445418, 2443802; 444984, 2444620; 445009, 2444513; 445012, 2444375; 444988, 2444177; 445001, 2443989; 445072, 2443925; 445224, 2443866; 446305, 2445519; 446994, 2442927; 446674, 2443625; 446456, 2443857; 446573, 2443696; 446918, 2444619; 446771, 2443591; 446964, 2443367; 446176, 2444094; 447035, 2443034; 446024, 2444124; 446915, 2442876; 446884, 2442866; 446775, 2442871; 446694, 2442917; 446590, 2443009; 446526, 2443067; 446401, 2443101; 447022, 2443176; 446142, 2444537; 446985, 2443802; 446860, 2443759; 446738, 2443759; 446647, 2443816; 446614, 2443869; 446586, 2443953; 446533, 2444139; 446339, 2444002; 446342, 2444424; 447097, 2443835; 445951, 2444583; 445795, 2444540; 445727, 2444471; 445716, 2444349; 445736, 2444232; 445790, 2444143; 445920, 2444117; 446459, 2444299.

(4) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 448432, 2447019; 447903, 2444783; 448513, 2444734; 448070, 2445147; 447289, 2445280; 447290, 2445278; 447361, 2445143; 447455, 2445039; 448629, 2445470; 447763, 2444809; 448699, 2445511; 447992, 2444811; 448076, 2444859; 448152, 2444890; 448229, 2444872; 448272, 2444798; 448279, 2444742; 448386, 2444722; 447626, 2444886; 447985, 2447674; 448180, 2447012; 448099, 2447086; 448061, 2447208; 448030, 2447292; 447961, 2447328; 447898, 2447376; 448658, 2445334; 447964, 2447547; 447413, 2447271; 447960, 2447776; 447907, 2447792; 448254, 2446981; 447397, 2447323; 448180, 2447012; 448450, 2446319; 448577, 2445718; 447903, 2447455; 448762, 2446566; 449384, 2445679; 449351, 2445830; 449234, 2445954; 449125, 2446061; 449008, 2446171; 448932, 2446245; 449330, 2445539; 448871, 2446421; 448828, 2446507; 448696, 2446769; 448661, 2446881; 448582, 2446983; 448518, 2447032; 448345, 2446991; 448661, 2444721; 447568, 2447493; 448889, 2446339; 449086, 2444624; 448760, 2444688; 448714, 2446647; 449284, 2445379; 448923, 2444619; 448956, 2444594; 449025, 2444591; 448854, 2444652; 449177, 2444680; 449226, 2444703; 449340, 2444954; 449294, 2444695; 449376, 2444651; 449391, 2444608; 449459, 2444635; 449346, 2444938; 449302, 2445178; 448981, 2444568; 449312, 2445026.

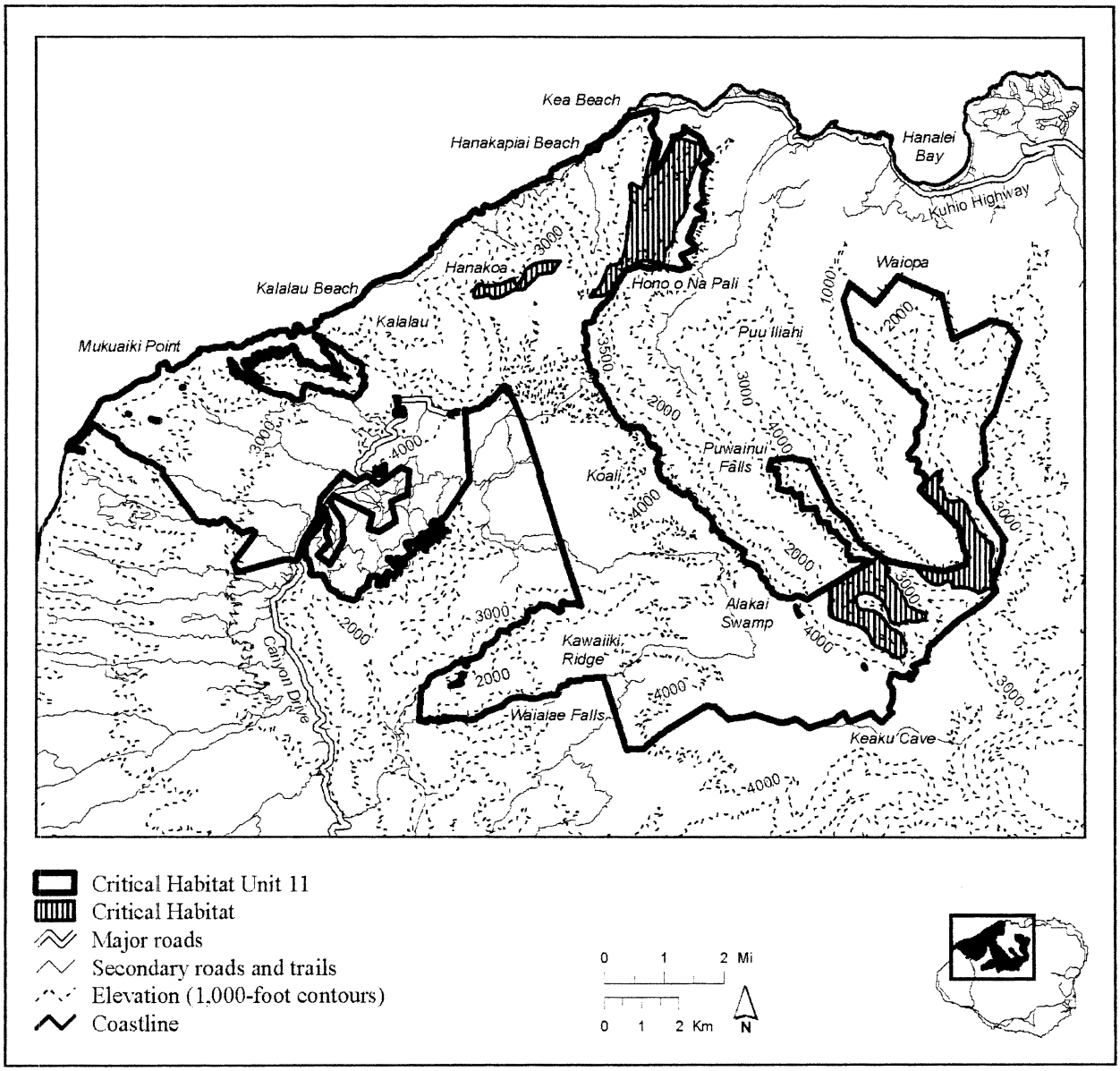
(B) Note: Map 70a follows:

BILLING CODE 4310–55–S

**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, Kauai 11–*Tetraplasandra flynnii*–d**

**Lowland Wet**



(cxli) Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–e

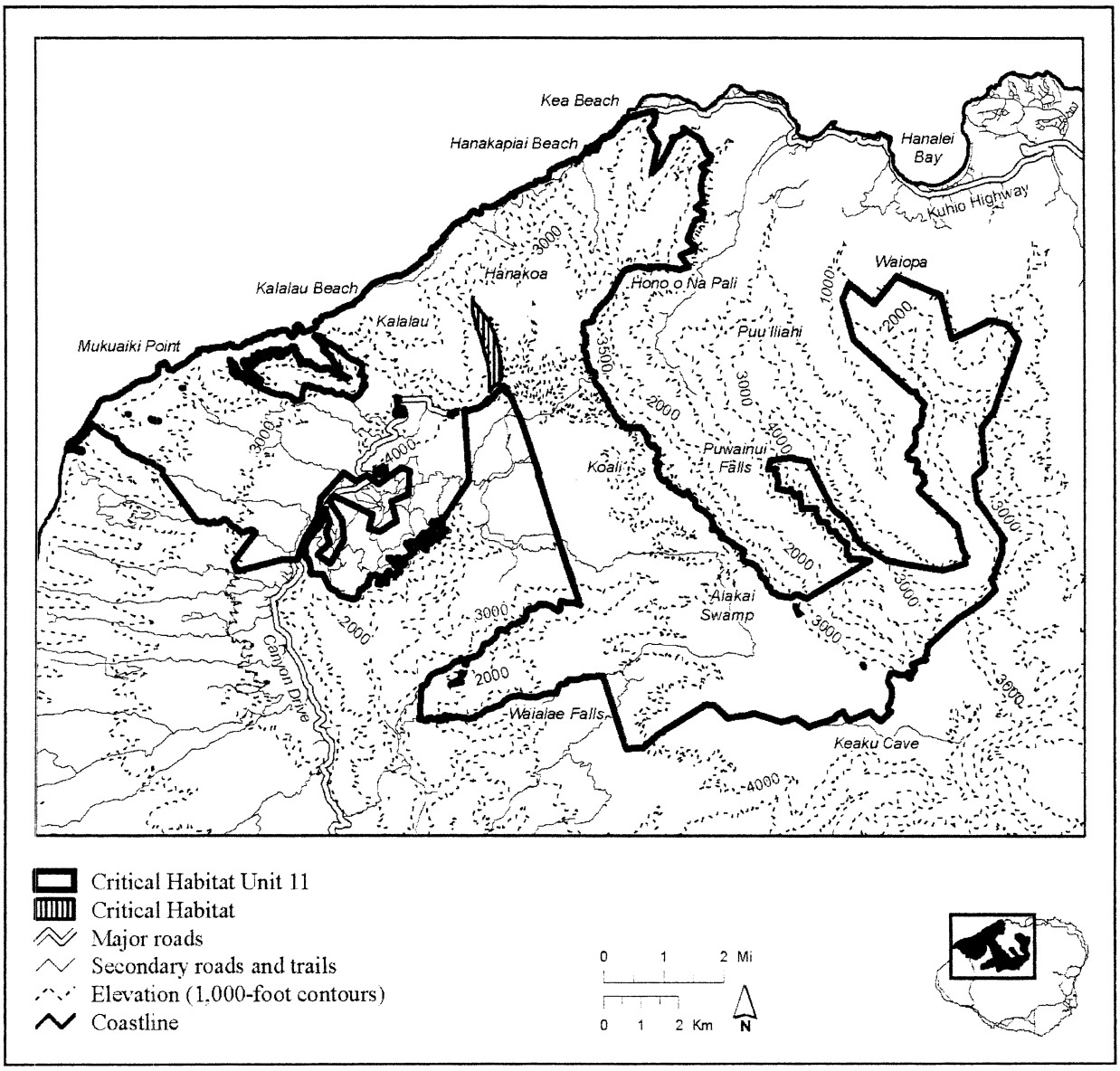
(A) This is a unit of the Wet Cliff ecosystem and consists of 190 ac; 77 ha. This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 436103, 2451262; 436027, 2451466; 435961, 2451591; 435895, 2451700; 435779, 2451881; 435540, 2452168; 435479, 2452304; 436162, 2451016; 435519, 2452190; 435517, 2452192; 435631, 2452072; 436212, 2450766; 436230, 2450590; 436234, 2450558; 436235, 2450550; 436250, 2450410; 436234, 2450237; 436107, 2450051; 436007, 2449993; 435478, 2452345; 435913, 2450123; 435941, 2449899; 436186, 2450120; 435635, 2451403; 435941, 2449899; 435915, 2449832; 435916, 2450057; 435908, 2450232; 435876, 2450522; 435853, 2450609; 435762, 2450931; 435759, 2450963; 435906, 2450349; 435676, 2451273; 435477, 2452358; 435602, 2451485; 435568, 2451531; 435537, 2451675; 435516, 2451752; 435483, 2451879; 435461, 2451989; 435448, 2452106; 435472, 2452346; 435476, 2452390; 435724, 2451110. 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)(cxlv), (a)(1)(cl), (a)(1)(clxiv), (a)(1)(clxv), (a)(1)(clxxxiv), (a)(1)(ccxxxvi), (a)(1)(ccxxxvii), (a)(1)(ccxxxix), and (a)(1)(cclxxx), 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

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(cxlii) Kauai 11–*Chamaesyce remyi* var. *remyi*–f

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

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

(cxliii) Kauai 11–*Chamaesyce remyi* var. *remyi*–g

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

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

(cxliv) Kauai 11–*Chamaesyce remyi* var. *remyi*–h

(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*–i

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

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

(cxlvi) Kauai 11–*Chamaesyce remyi* var. *remyi*–j

(A) This is a unit of the Montane Mesic ecosystem and consists of 2,790 ac (1,129 ha). 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*–e (see paragraphs (a)(1)(clxxii), (a)(1)(ccxxv), (a)(1)(ccliii), (a)(1)(cclix), (a)(1)(cclxxxi), (a)(1)(ccxci), (a)(1)(ccxxxi), and (a)(1)(cccxxxvi), respectively, of this section).

(1) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 434254, 2447886; 430671, 2447997; 430191, 2445898; 429898, 2446100; 429871, 2446234; 430191, 2446386; 430291, 2446570; 430124, 2446907; 430073, 2447126; 430107, 2447429; 430242, 2447664; 431205, 2448983; 430690, 2447765; 430442, 2445640; 430764, 2448188; 430793, 2448310; 430886, 2448507; 430903, 2448664; 430985, 2448705; 431171, 2448699; 431560, 2448675; 431629, 2448739; 432609, 2447647; 430393, 2447748; 431069, 2446331; 432320, 2447497; 432195, 2447587; 432136, 2447629; 432133, 2447631; 432081, 2447668; 432073, 2447674; 432001, 2447726; 431323, 2447013; 431211, 2446394; 430204, 2445809; 431112, 2446394; 430323, 2445779; 431058, 2446300; 431007, 2446203; 430944, 2446145; 430939, 2446061; 430902, 2445976; 430854, 2445930; 430826, 2445805; 430857, 2445727; 430824, 2445631; 431200, 2449070; 431101, 2446447; 432882, 2450351; 432579, 2450036; 432552, 2450080; 432551, 2450083; 432531, 2450116; 432534, 2450174; 432530, 2450196; 432565, 2450262; 432560, 2450267; 432740, 2450249; 431414, 2448890; 432808, 2450383; 432486, 2449909; 432904, 2450341; 433046, 2450280; 432827, 2447751; 432932, 2447668; 433014, 2447717; 433109, 2447775; 433094, 2447922; 432827, 2447751; 434318, 2448182; 432796, 2450365; 431904, 2449665; 431362, 2449169; 431391, 2449273; 431322, 2449372; 431322, 2449418; 431403, 2449436; 431727, 2449372; 431769, 2449447; 431705, 2449569; 431720, 2449620; 432504, 2449961; 431919, 2449578; 432498, 2449952; 432046, 2449781; 432052, 2449783; 432113, 2449740; 432217, 2449712; 432251, 2449685; 432259, 2449679; 432344, 2449744; 432419, 2449806; 432441, 2449848; 431905, 2449660; 431805, 2449591; 434202, 2447345; 434612, 2446807; 434073, 2448685; 434228, 2448620; 434292, 2448479; 434318, 2448298; 434279, 2447951; 434163, 2447783; 433725, 2448994; 434073, 2447500; 433545, 2449136; 434357, 2447229; 434486, 2447126; 434627, 2447088; 434686, 2447020; 434682, 2447017; 434657, 2446977; 434652, 2446933; 434086, 2447693; 433401, 2449697; 431875, 2449780; 432639, 2447624; 433046, 2450280; 433196, 2450196; 433287, 2450063; 433353, 2449880; 433429, 2449741; 433880, 2448827; 433399, 2449709; 433408, 2449708; 433339, 2449600; 433313, 2449484; 433339, 2449381; 433368, 2449293; 433368, 2449292; 433369, 2449255; 433389, 2449256; 433407, 2449708; 433257, 2446958; 434392, 2446421; 434386, 2446429; 434103, 2446297; 434090, 2446098; 434086, 2446095; 433862, 2446165; 433606, 2446193; 434400, 2446429; 433397, 2446440; 432672, 2447598; 432918, 2447407; 433577, 2447086; 433467, 2449787; 433706, 2447138; 433746, 2447766; 433562, 2447841; 433527, 2447856; 434641, 2446663; 433449, 2446235; 434533, 2446441; 434631, 2446528; 434623, 2446526; 434620, 2446512; 434628, 2446479; 434625, 2446467; 434618, 2446459; 434201, 2446573; 434558, 2446439; 434403, 2446435; 434514, 2446449; 434423, 2446441; 434582, 2446443; 434416, 2446441; 434500, 2446448; 434434, 2446428; 434447, 2446420; 434457, 2446416; 434471, 2446422.

(2) This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 431975, 2446280; 432548, 2444752; 432135, 2444807; 432674, 2444970; 431873, 2444849; 431730, 2445114; 431645, 2445326; 432001, 2445941; 431950, 2444792; 432559, 2446255; 432659, 2446240; 432948, 2446150; 433067, 2445928; 432912, 2445580; 432758, 2445304; 432674, 2444970; 432377, 2444722.

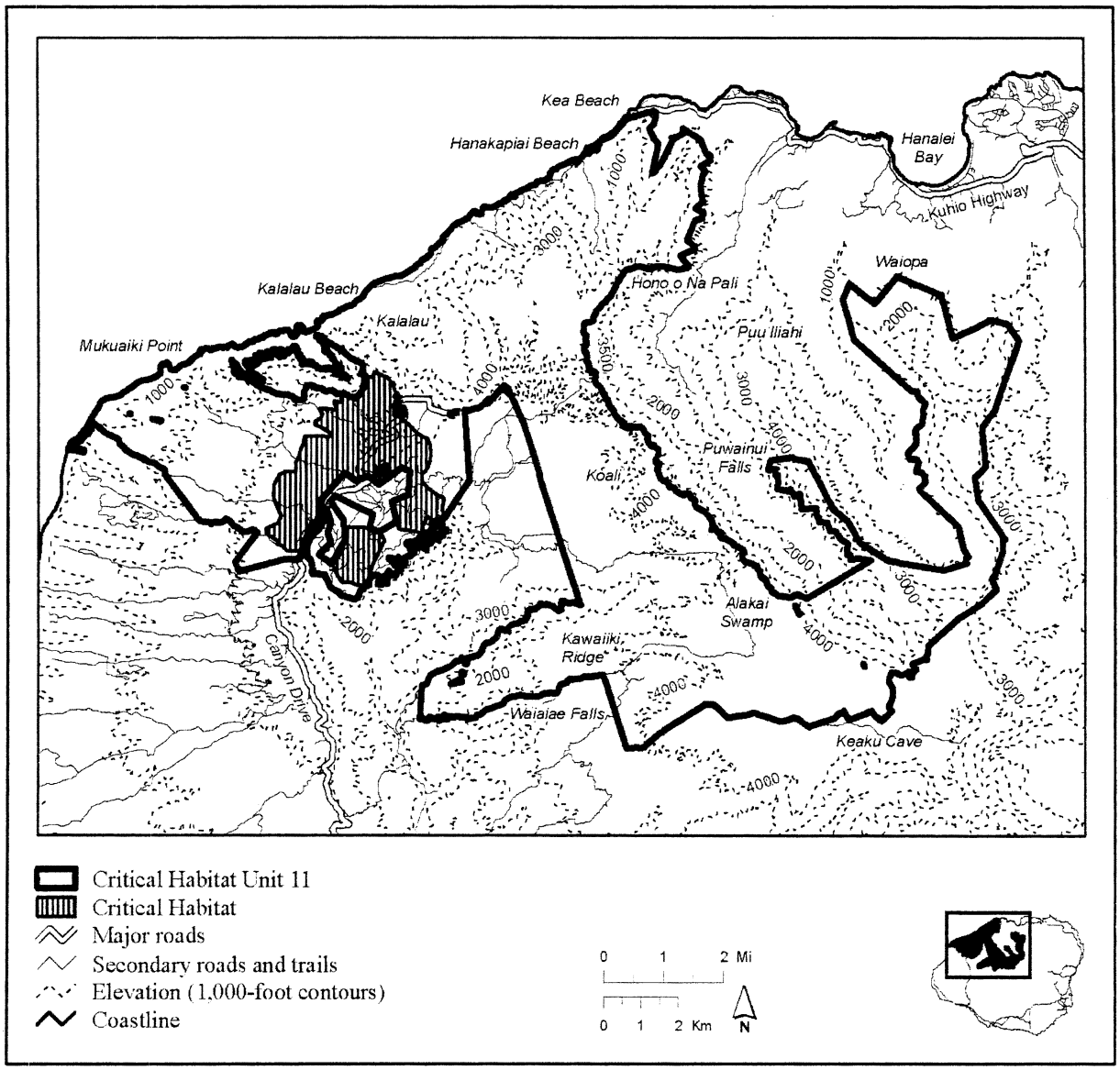
(B) Note: Map 70c follows:

BILLING CODE 4310–55–S

## 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*–e**

### Montane Mesic




BILLING CODE 4310–55–C

(cxlvii) Kauai 11–*Charpentiera densiflora*–c

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

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

(cxlviii) Kauai 11–*Charpentiera densiflora*–d

(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 dolichopoda*–c

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

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

(cli) Kauai 11–*Cyanea eleeleensis*–b

(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.

(clii) Kauai 11–*Cyanea kolekoleensis*–b

(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.

(cliii) Kauai 11–*Cyanea kuhihewa*–b

(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.

* * * * *

(clxiii) Kauai 11–*Cyrtandra oenobarba*–d

(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 oenobarba*–e

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

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

(clxv) Kauai 11–*Cyrtandra paliku*–c

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

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

* * * * *

(clxxii) Kauai 11–*Diellia mannii*–a

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

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

* * * * *

(clxxvi) Kauai 11–*Doryopteris angelica*–b

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

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

(clxxvii) Kauai 11–*Dryopteris crinalis* var. *podosorus*–b

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

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

(clxxviii) Kauai 11–*Dubautia imbricata* ssp. *imbricata*–b

(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.

(clxxix) Kauai 11–*Dubautia kalalauensis*–b

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

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

(clxxx) Kauai 11–*Dubautia kenwoodii*–b

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

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

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(clxxxiv) Kauai 11–*Dubautia plantaginea* ssp. *magnifolia*–c

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

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

(clxxxv) Kauai 11–*Dubautia waialealae*–b

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

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

* * * * *

(cxcix) Kauai 11–*Geranium kauaiense*–b

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

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

* * * * *

(ccxvi) Kauai 11–*Keysseria erici*–b

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

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

(ccxvii) Kauai 11–*Keysseria helenae*–b

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

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

* * * * *

(ccxxii) Kauai 11–*Labordia helleri*–d

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

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

(ccxxiii) Kauai 11–*Labordia helleri*–e

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

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

(ccxxiv) Kauai 11–*Labordia helleri*–f

(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.

(ccxxv) Kauai 11–*Labordia helleri*–g

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

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

* * * * *

(ccxxix) Kauai 11–*Labordia pumila*–b

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

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

* * * * *

(ccxxxv) Kauai 11–*Lysimachia daphnoides*–b

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

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

(ccxxxvi) Kauai 11–*Lysimachia iniki*–c

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

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

(ccxxxvii) Kauai 11–*Lysimachia pendens*–c

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

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

(ccxxxviii) Kauai 11–*Lysimachia scopulensis*–a

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

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

(ccxxxix) Kauai 11–*Lysimachia venosa*–c

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

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

* * * * *

(ccxli) Kauai 11–*Melicope degeneri*–b

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

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

* * * * *

(ccxlviii) Kauai 11–*Melicope paniculata*–b

(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.

(ccxlix) Kauai 11–*Melicope puberula*–c

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

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

(ccl) Kauai 11–*Melicope puberula*–d

(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.

* * * * *

(ccliii) Kauai 11–*Myrsine knudsenii*–a

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

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

* * * * *

(cclviii) Kauai 11–*Myrsine mezii*–b

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

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

(cclix) Kauai 11–*Myrsine mezii*–c

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

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

* * * * *

(cclxvi) Kauai 11–*Phyllostegia renovans*–c

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

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

(cclxvii) Kauai 11–*Phyllostegia renovans*–d

(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.

* * * * *

(cclxxii) Kauai 11–*Pittosporum napaliense*–b

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

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

* * * * *

(cclxxvii) Kauai 11–*Platydesma rostrata*–f

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

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

(cclxxviii) Kauai 11–*Platydesma rostrata*–g

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

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

(cclxxix) Kauai 11–*Platydesma rostrata*–h

(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*–i

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

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

(cclxxxi) Kauai 11–*Platydesma rostrata*–j

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

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

* * * * *

(ccxc) Kauai 11–*Psychotria grandiflora*–b

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

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

(ccxci) Kauai 11–*Psychotria grandiflora*–c

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

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

(ccxcii) Kauai 11–*Psychotria hobdyi*–b

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

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

* * * * *

(cccix) Kauai 11–*Schiedea attenuata*–a

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

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

* * * * *

(cccxxix) Kauai 11–*Stenogyne kealiae*–b

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

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

(cccxxx) Kauai 11–*Stenogyne kealiae*–c

(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.

(cccxxxi) Kauai 11–*Stenogyne kealiae*–d

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

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

(cccxxxii) Kauai 11–*Tetraplasandra bisattenuata*–c

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

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

(cccxxxiii) Kauai 11–*Tetraplasandra bisattenuata*–d

(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.

(cccxxxiv) Kauai 11–*Tetraplasandra flynnii*–c

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

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

(cccxxxv) Kauai 11–*Tetraplasandra flynnii*–d

(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.

(cccxxxvi) Kauai 11–*Tetraplasandra flynnii*–e

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

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

* * * * *

(cccli) Kauai 18—*Chamaesyce remyi* var. *kauaiensis*–f

(A) This is a unit of the Wet Cliff ecosystem and consists of 296 ac (120 ha). This unit includes lands bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 450192, 2441100; 450045, 2441036; 449907, 2441014; 449732, 2441017; 449661, 2441029; 449662, 2441006; 449663, 2440988; 450391, 2441245; 449861, 2440726; 450358, 2441446; 449987, 2440561; 449861, 2440726; 450478, 2441377; 450009, 2440531; 450480, 2441446; 450309, 2440710; 450188, 2441428; 450030, 2441469; 449977, 2441622; 450043, 2441776; 450987, 2441509; 450061, 2441818; 451012, 2441536; 450204, 2441935; 450313, 2442034; 450493, 2441438; 450738, 2441687; 450390, 2442146; 450854, 2441404; 450786, 2441366; 450732, 2441298; 450694, 2441214; 450762, 2441153; 450892, 2441119; 450971, 2441101; 451006, 2441096; 451065, 2441045; 451024, 2440992; 450235, 2440578; 451009, 2440898; 450036, 2440543; 450976, 2440839; 450923, 2441455; 450866, 2440829; 450759, 2440839; 450630, 2440857; 450492, 2440870; 450439, 2440863; 450352, 2440802; 450263, 2440642; 450209, 2440565; 450148, 2440581; 450981, 2440954; 450959, 2441758; 450649, 2441819; 450519, 2441677; 450483, 2441603; 450567, 2441606; 450649, 2441639; 450942, 2442140; 450855, 2441735; 450807, 2441995; 451040, 2441587; 451048, 2441778; 451104, 2441763; 451135, 2441750; 451127, 2441727; 451071, 2441643; 450459, 2442263; 451207, 2442613; 450538, 2442344; 450573, 2442334; 450550, 2442082; 450540, 2442051; 450598, 2442069; 450759, 2442234; 450927, 2442387; 451072, 2442509; 451307, 2442664; 451370, 2442679; 451385, 2442651; 451299, 2442539; 451115, 2442323; 450942, 2442140. This unit is also critical habitat for Kauai 18–*Chamaesyce remyi* var. *remyi*–k, Kauai 18–*Cyanea dolichopoda*–d, Kauai 18–*Cyrtandra oenobarba*–f, Kauai 18–*Cyrtandra paliku*–d, Kauai 18–*Dubautia plantaginea* ssp. *magnifolia*–d, Kauai 18–*Lysimachia iniki*–d, Kauai 18–*Lysimachia pendens*–d, Kauai 18–*Lysimachia venosa*–d, and Kauai 18–*Platydesma rostrata*–k (see paragraphs (a)(1)(ccclii), (a)(1)(cccliii), (a)(1)(ccccliv), (a)(1)(ccclv), (a)(1)(ccclvi), (a)(1)(ccclvii), (a)(1)(ccclviii), (a)(1)(ccclix), and (a)(1)(ccclx), respectively, of this section).

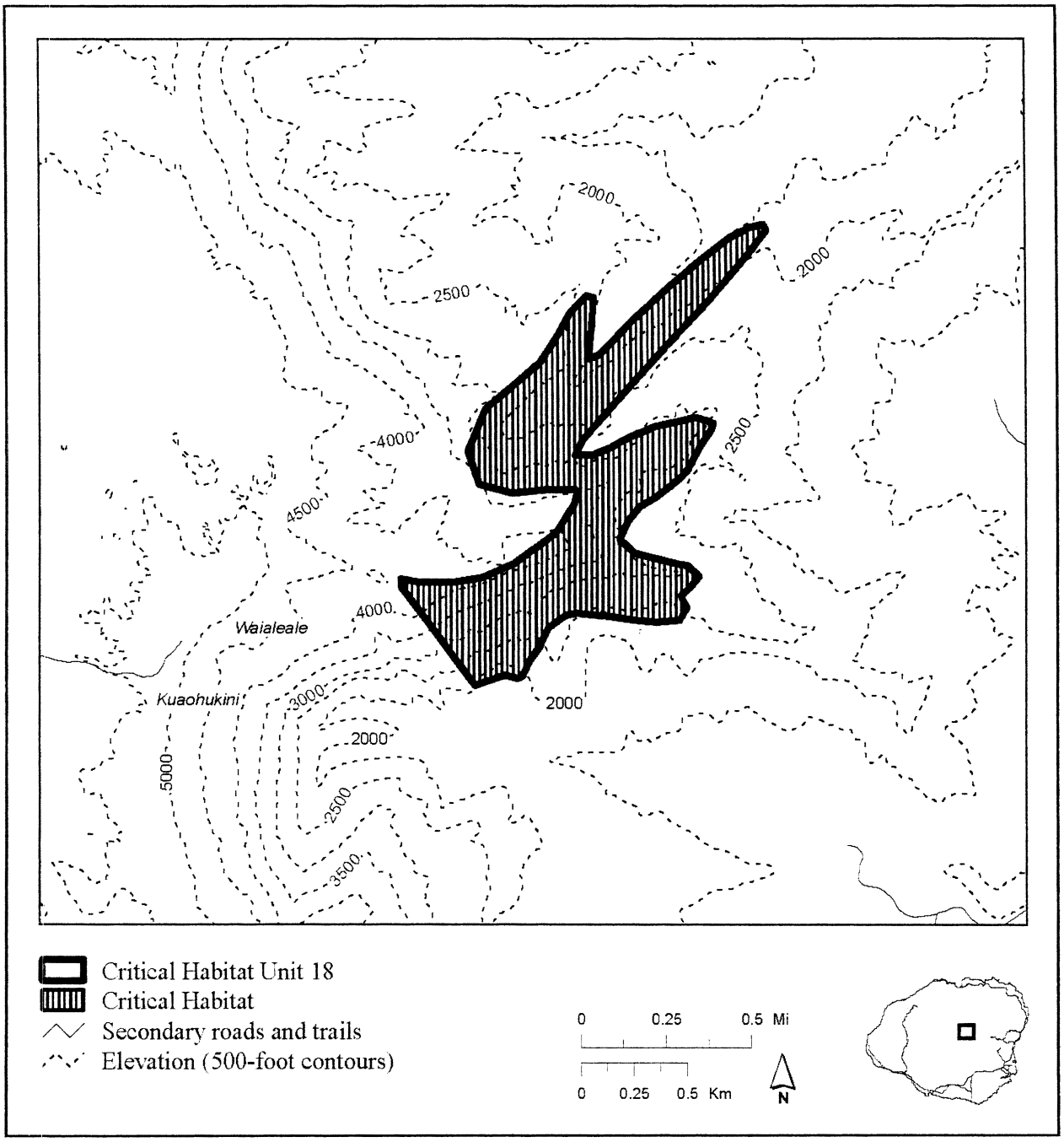
(B) Note: Map 217a follows:

BILLING CODE 4310–55–S

## Map 217a

**Kauai 18–*Chamaesyce remyi* var. *kauaiensis*–f, Kauai 18–*Chamaesyce remyi* var. *remyi*–k, Kauai 18–*Cyanea dolichopoda*–d, Kauai 18–*Cyrtandra oenobarba*–f, Kauai 18–*Cyrtandra paliku*–d, Kauai 18–*Dubautia plantaginea* ssp. *magnifolia*–d, Kauai 18–*Lysimachia iniki*–d, Kauai 18–*Lysimachia pendens*–d, Kauai 18–*Lysimachia venosa*–d, Kauai 18–*Platydesma rostrata*–k**

### Wet Cliff




BILLING CODE 4310–55–C

(ccclii) Kauai 18–*Chamaesyce remyi* var. *remyi*–k

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

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

(cccliii) Kauai 18–*Cyanea dolichopoda*–d

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

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

(cccliv)Kauai 18–*Cyrtandra oenobarba*–f

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

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

(ccclv) Kauai 18–*Cyrtandra paliku*–d

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

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

(ccclvi) Kauai 18–*Dubautia plantaginea* ssp. *magnifolia*–d

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

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

(ccclvii) Kauai 18–*Lysimachia iniki*–d

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

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

(ccclviii) Kauai 18–*Lysimachia pendens*–d

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

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

(ccclix) Kauai 18–*Lysimachia venosa*–d

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

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

(ccclx) Kauai 18–*Platydesma rostrata*–k

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

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

(ccclxi) Kauai 19–*Chamaesyce remyi* var. *kauaiensis*–g

(A) This is a unit of the Wet Cliff ecosystem and consists of 23 ac (9 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 457006, 2449562; 456297, 2449627; 456152, 2449645; 456213, 2449635; 456892, 2449577; 456297, 2449627; 456355, 2449622; 456429, 2449624; 456528, 2449621; 456587, 2449619; 456683, 2449611; 457144, 2449549; 456823, 2449588; 456116, 2449661; 457123, 2449562; 456901, 2449549; 456313, 2449442; 456256, 2449472; 456187, 2449533; 456154, 2449589; 456126, 2449635; 456742, 2449603. This unit is also critical habitat for Kauai 19–*Chamaesyce remyi* var. *remyi*–l, Kauai 19–*Cyanea dolichopoda*–e, Kauai 19–*Cyrtandra oenobarba*–g, Kauai 19–*Cyrtandra paliku*–e, Kauai 19–*Dubautia plantaginea* ssp. *magnifolia*–e, Kauai 19–*Lysimachia iniki*–e, Kauai 19–*Lysimachia pendens*–e, Kauai 19–*Lysimachia venosa*–e, and Kauai 19–*Platydesma rostrata*–l (see paragraphs (a)(1)(ccclxii), (a)(1)(ccclxiii), (a)(1)(ccclxiv), (a)(1)(ccclxv), (a)(1)(ccclxvi), (a)(1)(ccclxvii), (a)(1)(ccclxviii), (a)(1)(ccclxix), and (a)(1)(ccclxx), respectively, of this section).

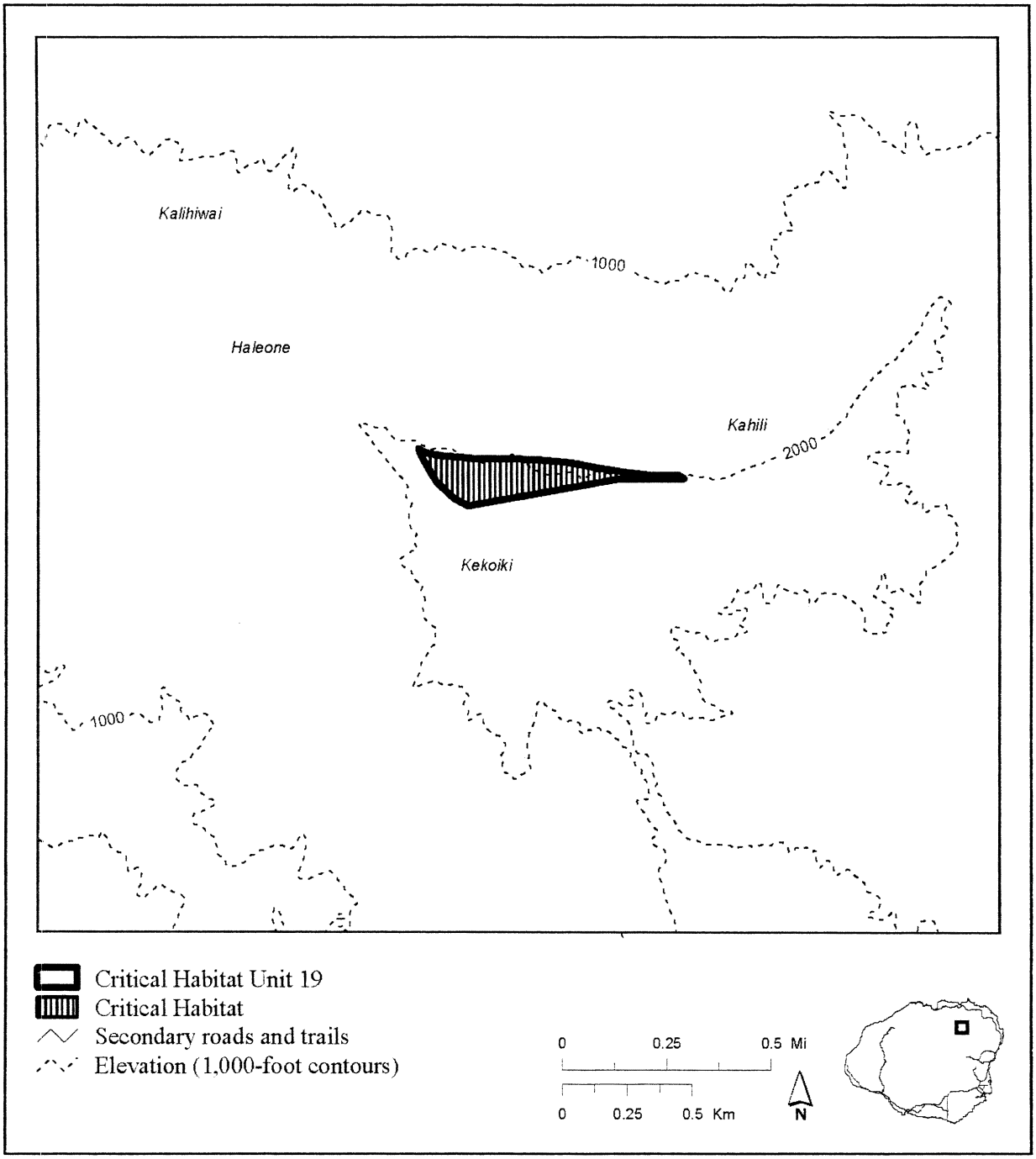
(B) Note: Map 217b follows:

BILLING CODE 4310–55–S

## Map 217b

**Kauai 19–*Chamaesyce remyi* var. *kauaiensis*–g, Kauai 19–*Chamaesyce remyi* var. *remyi*–l, Kauai 19–*Cyanea dolichopoda*–e, Kauai 19–*Cyrtandra oenobarba*–g, Kauai 19–*Cyrtandra paliku*–e, Kauai 19–*Dubautia plantaginea* ssp. *magnifolia*–e, Kauai 19–*Lysimachia iniki*–e, Kauai 19–*Lysimachia pendens*–e, Kauai 19–*Lysimachia venosa*–e, Kauai 19–*Platydesma rostrata*–l**

## Wet Cliff




BILLING CODE 4310–55–C

(ccclxii) Kauai 19–*Chamaesyce remyi* var. *remyi*–l

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

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

(ccclxiii) Kauai 19–*Cyanea dolichopoda*–e

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

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

(ccclxiv) Kauai 19–*Cyrtandra oenobarba*–g

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

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

(ccclxv) Kauai 19–*Cyrtandra paliku*–e

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

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

(ccclxvi) Kauai 19–*Dubautia plantaginea* ssp. *magnifolia*–e

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

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

(ccclxvii) Kauai 19–*Lysimachia iniki*–e

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

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

(ccclxviii) Kauai 19–*Lysimachia pendens*–e

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

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

(ccclxix) Kauai 19–*Lysimachia venosa*–e

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

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

(ccclxx) Kauai 19–*Platydesma rostrata*–l

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

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

(ccclxxi) Kauai 20–*Chamaesyce remyi* var. *kauaiensis*–h

(A) This is a unit of the Lowland Wet ecosystem and consists of 65 ac (26 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 440498, 2455883; 440674, 2456209; 440674, 2456209; 440829, 2456531; 440867, 2456555; 440834, 2456579; 440382, 2456676; 440343, 2456672; 440329, 2456652; 440319, 2456582; 440437, 2456434; 440265, 2455650; 440318, 2455684; 440318, 2455684. This unit is also critical habitat for Kauai 20–*Chamaesyce remyi* var. *remyi*–m, Kauai 20–*Charpentiera densiflora*–e, Kauai 20–*Cyanea eleeleensis*–c, Kauai 20–*Cyanea kolekoleensis*–c, Kauai 20–*Cyanea kuhihewa*–c, Kauai 20–*Cyrtandra oenobarba*–h, Kauai 20–*Dubautia imbricata* ssp. *imbricata*–c, Kauai 20–*Labordia helleri*–h, Kauai 20–*Melicope paniculata*–c, Kauai 20–*Melicope puberula*–e, Kauai 20–*Phyllostegia renovans*–e, Kauai 20–*Platydesma rostrata*–m, Kauai 20–*Stenogyne kealiae*–e, Kauai 20–*Tetraplasandra bisattenuata*–e, and Kauai 20–*Tetraplasandra flynnii*–f, (see paragraphs (a)(1)(ccclxxii), (a)(1)(ccclxxiii), (a)(1)(ccclxxiv), (a)(1)(ccclxxv), (a)(1)(ccclxxvi), (a)(1)(ccclxxvii), (a)(1)(ccclxxviii), (a)(1)(ccclxxix), (a)(1)(ccclxxx), (a)(1)(ccclxxxi), (a)(1)(ccclxxxii), (a)(1)(ccclxxxiii), (a)(1)(ccclxxxiv), (a)(1)(ccclxxxv), and (a)(1)(ccclxxxvi), respectively, of this section).

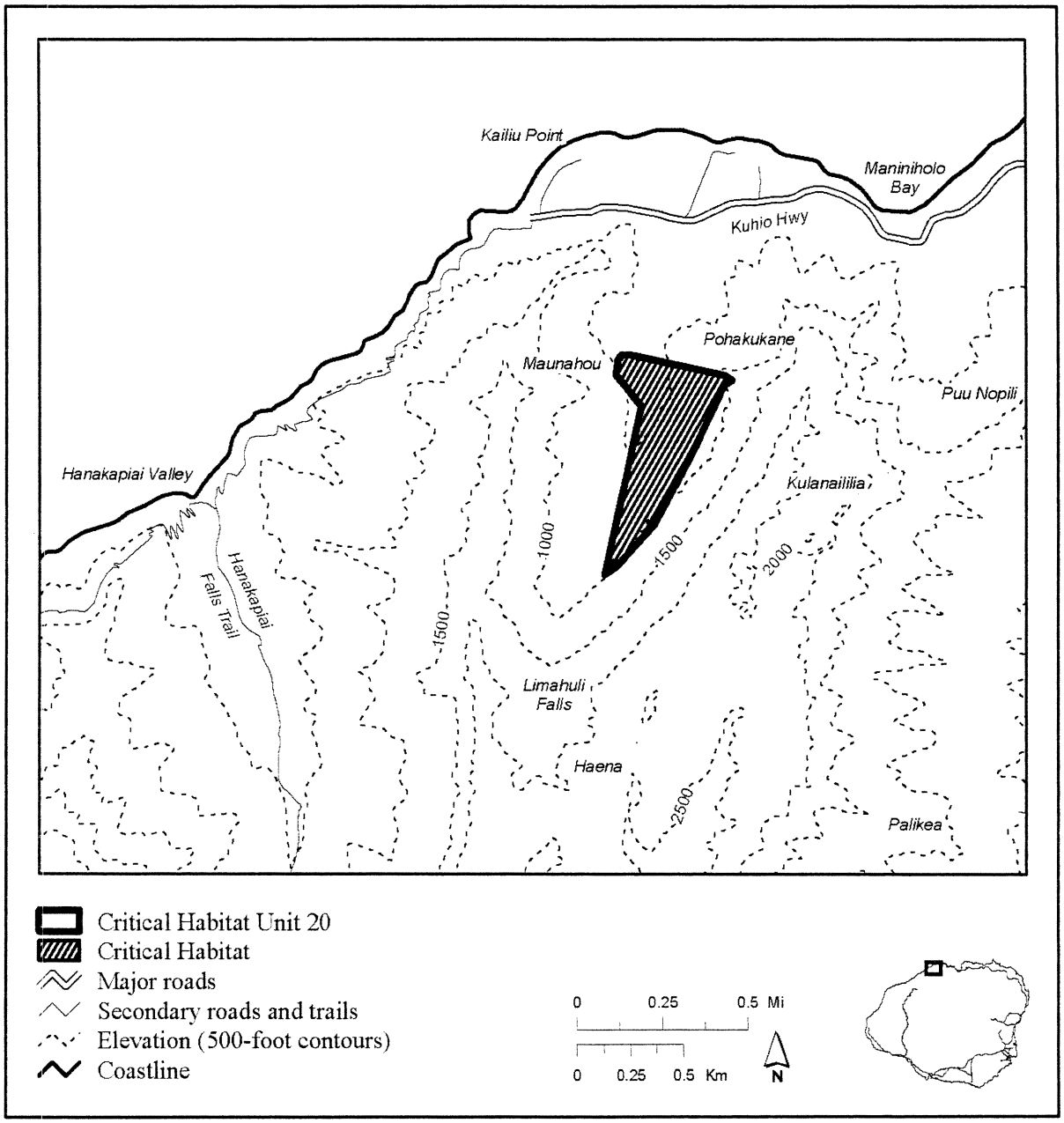
(B) Note: Map 217c follows:

BILLING CODE 4310–55–S

## Map 217c

**Kauai 20–*Chamaesyce remyi* var. *kauaiensis*–h, Kauai 20–*Chamaesyce remyi* var. *remyi*–m, Kauai 20–*Charpentiera densiflora*–e, Kauai 20–*Cyanea eleeleensis*–c, Kauai 20–*Cyanea kolekoleensis*–c, Kauai 20–*Cyanea kuhihewa*–c, Kauai 20–*Cyrtandra oenobarba*–h, Kauai 20–*Dubautia imbricata* ssp. *imbricata*–c, Kauai 20–*Labordia helleri*–h, Kauai 20–*Melicope paniculata*–c, Kauai 20–*Melicope puberula*–e, Kauai 20–*Phyllostegia renovans*–e, Kauai 20–*Platydesma rostrata*–m, Kauai 20–*Stenogyne kealiae*–e, Kauai 20–*Tetraplasandra bisattenuata*–e, Kauai 20–*Tetraplasandra flynnii*–f**

**Lowland Wet**




BILLING CODE 4310–55–C

(ccclxxii) Kauai 20–*Chamaesyce remyi* var. *remyi*–m

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

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

(ccclxxiii) Kauai 20–*Charpentiera densiflora*–e

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

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

(ccclxxiv) Kauai 20–*Cyanea eleeleensis*–c

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

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

(ccclxxv) Kauai 20–*Cyanea kolekoleensis*–c

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

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

(ccclxxvi) Kauai 20–*Cyanea kuhihewa*–c

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

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

(ccclxxvii) Kauai 20–*Cyrtandra oenobarba*–h

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

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

(ccclxxviii) Kauai 20–*Dubautia imbricata* ssp. *imbricata*–c

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

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

(ccclxxix) Kauai 20–*Labordia helleri*–h

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

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

(ccclxxx) Kauai 20–*Melicope paniculata*–c

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

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

(ccclxxxi) Kauai 20–*Melicope puberula*–e

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

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

(ccclxxxii) Kauai 20–*Phyllostegia renovans*–e

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

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

(ccclxxxiii) Kauai 20–*Platydesma rostrata*–m

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

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

(ccclxxxiv) Kauai 20–*Stenogyne kealiae*–e

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

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

(ccclxxxv) Kauai 20–*Tetraplasandra bisattenuata*–e

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

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

(ccclxxxvi) Kauai 20–*Tetraplasandra flynnii*–f

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

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

(ccclxxxvii) Kauai 21–*Chamaesyce remyi* var. *remyi*–n

(A) This is a unit of the Montane Mesic ecosystem and consists of 8 ac (3 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 431626, 2445435; 432001, 2445941; 431736, 2445617; 432001, 2445941; 431645, 2445326. This unit is also critical habitat for Kauai 21–*Diellia mannii*–b, Kauai 21–*Labordia helleri*–i, Kauai 21–*Myrsine knudsenii*–b, Kauai 21–*Myrsine mezii*–d, Kauai 21–*Platydesma rostrata*–n, Kauai 21–*Psychotria grandiflora*–d, Kauai 21–*Stenogyne kealiae*–f, and Kauai 21–*Tetraplasandra flynnii*–g (see paragraphs (a)(1)(ccclxxxviii), (a)(1)(ccclxxxix), (a)(1)(cccxc), (a)(1)(cccxci), (a)(1)(cccxcii), (a)(1)(cccxciii), (a)(1)(cccxciv), and (a)(1)(cccxcv), respectively, of this section).

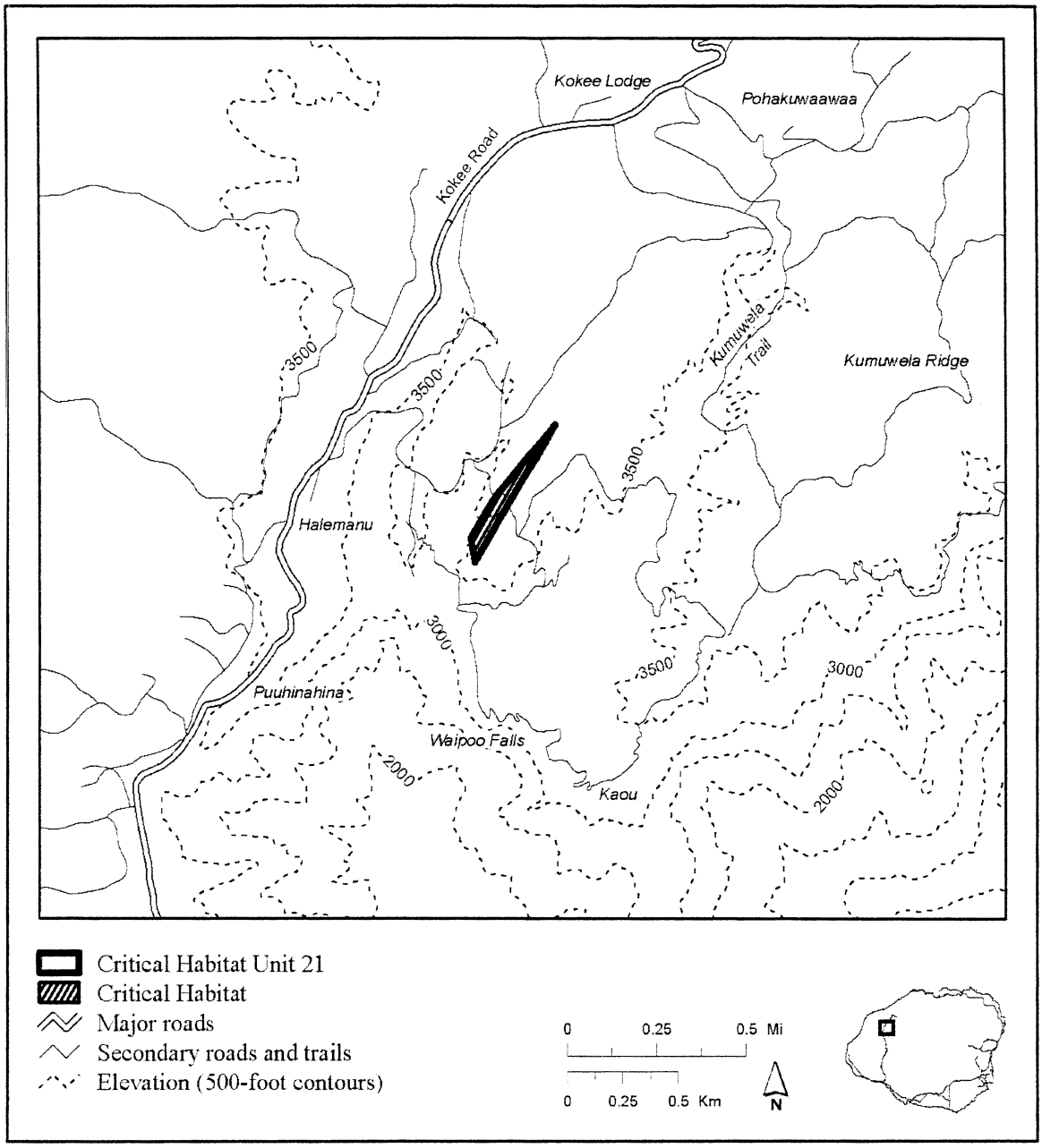
(B) Note: Map 217d follows:

BILLING CODE 4310–55–S

## Map 217d

**Kauai 21–*Chamaesyce remyi* var. *remyi*–n, Kauai 21–*Diellia mannii*–b, Kauai 21–*Labordia helleri*–i, Kauai 21 –*Myrsine knudsenii*–b, Kauai 21–*Myrsine mezii*–d, Kauai 21–*Platydesma rostrata*–n, Kauai 21–*Psychotria grandiflora*–d, Kauai 21–*Stenogyne kealiae*–f, Kauai 21–*Tetraplasandra flynnii*–g**

### Montane Mesic




BILLING CODE 4310–55–C

(ccclxxxviii) Kauai 21–*Diellia mannii*–b

(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–*Labordia helleri*–i

(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–*Myrsine knudsenii*–b

(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.

(cccxci) Kauai 21–*Myrsine mezii*–d

(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–*Platydesma rostrata*–o

(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–*Psychotria grandiflora*–d

(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–*Stenogyne kealiae*–f

(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–*Tetraplasandra flynnii*–g

(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 22–*Chamaesyce remyi* var. *remyi*–o

(A) This is a unit of the Montane Mesic ecosystem and consists of 139 ac (56 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 438012, 2440389; 437687, 2439960; 438227, 2440730; 438149, 2440714; 438111, 2440652; 438112, 2440588; 438028, 2440577; 438243, 2440830; 438014, 2440437; 438253, 2440854; 437922, 2440355; 437912, 2440201; 437870, 2440140; 437827, 2440132; 437817, 2440071; 437785, 2440013; 438023, 2440484; 437335, 2440180; 437586, 2439743; 437636, 2439819; 437586, 2439743; 437529, 2439721; 438287, 2440738; 437450, 2440047; 437335, 2440329; 437336, 2440335; 437602, 2440771; 437987, 2441027; 438159, 2440914; 438249, 2440857; 437545, 2439761. This unit is also critical habitat for Kauai 22–*Diellia mannii*–c, Kauai 22–*Labordia helleri*–j, Kauai 22–*Myrsine knudsenii*–c, Kauai 22–*Myrsine mezii*–e, Kauai 22–*Platydesma rostrata*–o, Kauai 22–*Psychotria grandiflora*–e, Kauai 22–*Stenogyne kealiae*–g, and Kauai 22–*Tetraplasandra flynnii*–h (see paragraphs (a)(1)(cccxcvii), (a)(1)(cccxcviii), (a)(1)(cccxcix), (a)(1)(cd), (a)(1)(cdi), (a)(1)(cdii), (a)(1)(cdiii), and (a)(1)(cdiv), respectively, of this section).

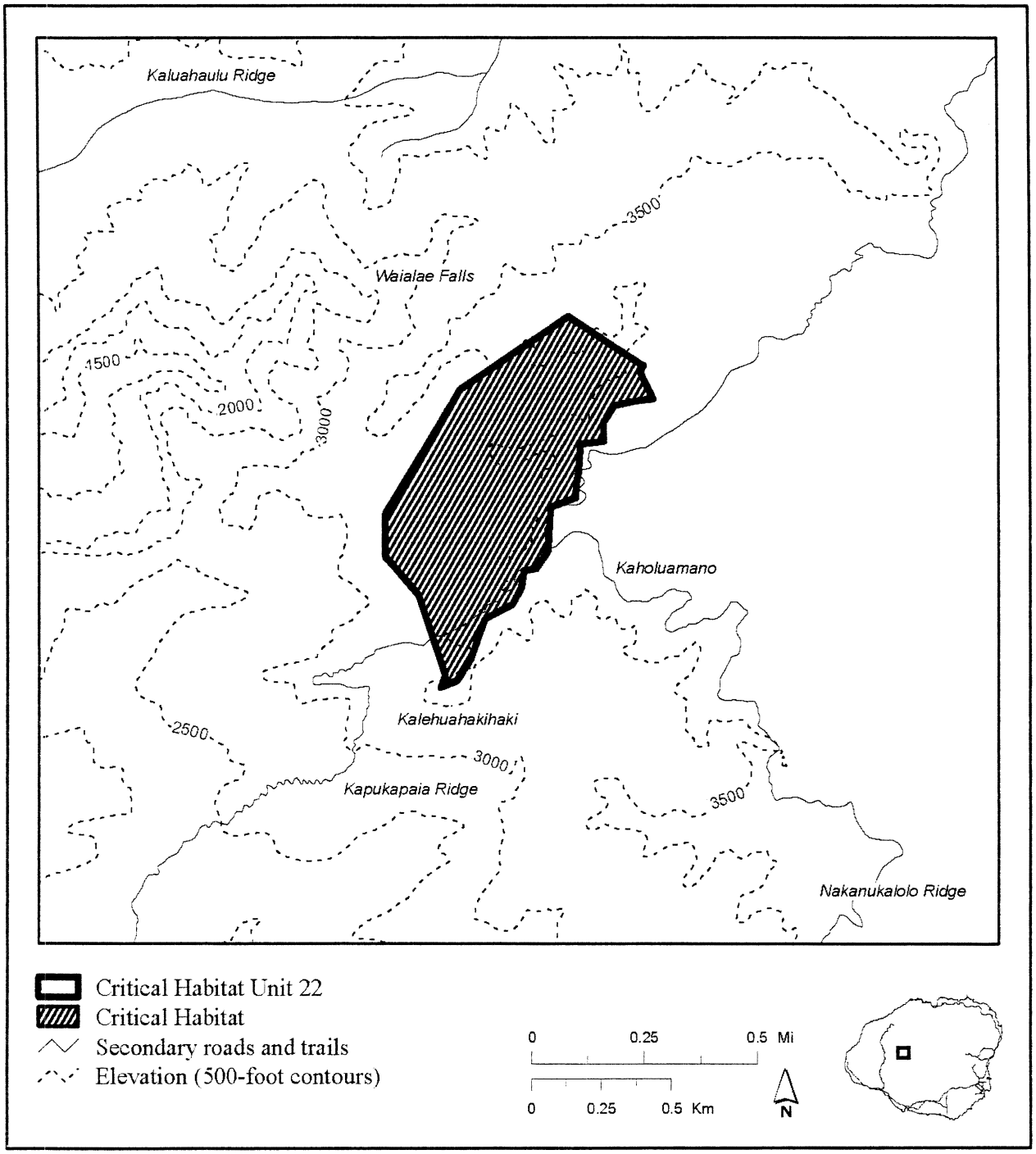
(B) Note: Map 217e follows:

BILLING CODE 4310–55–S

## Map 217e

**Kauai 22–*Chamaesyce remyi* var. *remyi*–o, Kauai 22–*Diellia mannii*–c, Kauai 22–*Labordia helleri*–j, Kauai 22–*Myrsine knudsenii*–c, Kauai 22–*Myrsine mezii*–e, Kauai 22–*Platydesma rostrata*–o, Kauai 22–*Psychotria grandiflora*–e, Kauai 22–*Stenogyne kealiae*–g, Kauai 22–*Tetraplasandra flynnii*–h**

## Montane Mesic




BILLING CODE 4310–55–C

(cccxcvii) Kauai 22–*Diellia mannii*–c

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

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

(cccxcviii) Kauai 22–*Labordia helleri*–j

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

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

(cccxcix) Kauai 22–*Myrsine knudsenii*–c

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

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

(cd) Kauai 22–*Myrsine mezii*–e

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

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

(cdi) Kauai 22–*Platydesma rostrata*–o

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

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

(cdii) Kauai 22–*Psychotria grandiflora*–e

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

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

(cdiii) Kauai 22–*Stenogyne kealiae*–g

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

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

(cdiv) Kauai 22–*Tetraplasandra flynnii*–h

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

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

(cdv) Kauai 23–*Astelia waialealae*–c

(A) This is a unit of the Montane Wet ecosystem and consists of 0.4 ac (0.2 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 444193, 2443965; 444088, 2444202; 444117, 2444107; 444088, 2444202. This unit is also critical habitat for Kauai 23–*Chamaesyce remyi* var. *remyi*–p, Kauai 23–*Dryopteris crinalis* var. *podosorus*–c, Kauai 23–*Dubautia kalalauensis*–c, Kauai 23–*Dubautia waialealae*–c, Kauai 23–*Geranium kauaiense*–c, Kauai 23–*Keysseria erici*–c, Kauai 23–*Keysseria helenae*–c, Kauai 23–*Labordia helleri*–k, Kauai 23–*Labordia pumila*–c, Kauai 23–*Lysimachia daphnoides*–c, Kauai 23–*Melicope degeneri*–c, Kauai 23–*Melicope puberula*–f, Kauai 23–*Myrsine mezii*–f, Kauai 23–*Phyllostegia renovans*–f, Kauai 23–*Platydesma rostrata*–p, Kauai 23–*Psychotria grandiflora*–f, and Kauai 23–*Tetraplasandra flynnii*–i (see paragraphs (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), and (a)(1)(cdxxii), respectively, of this section).

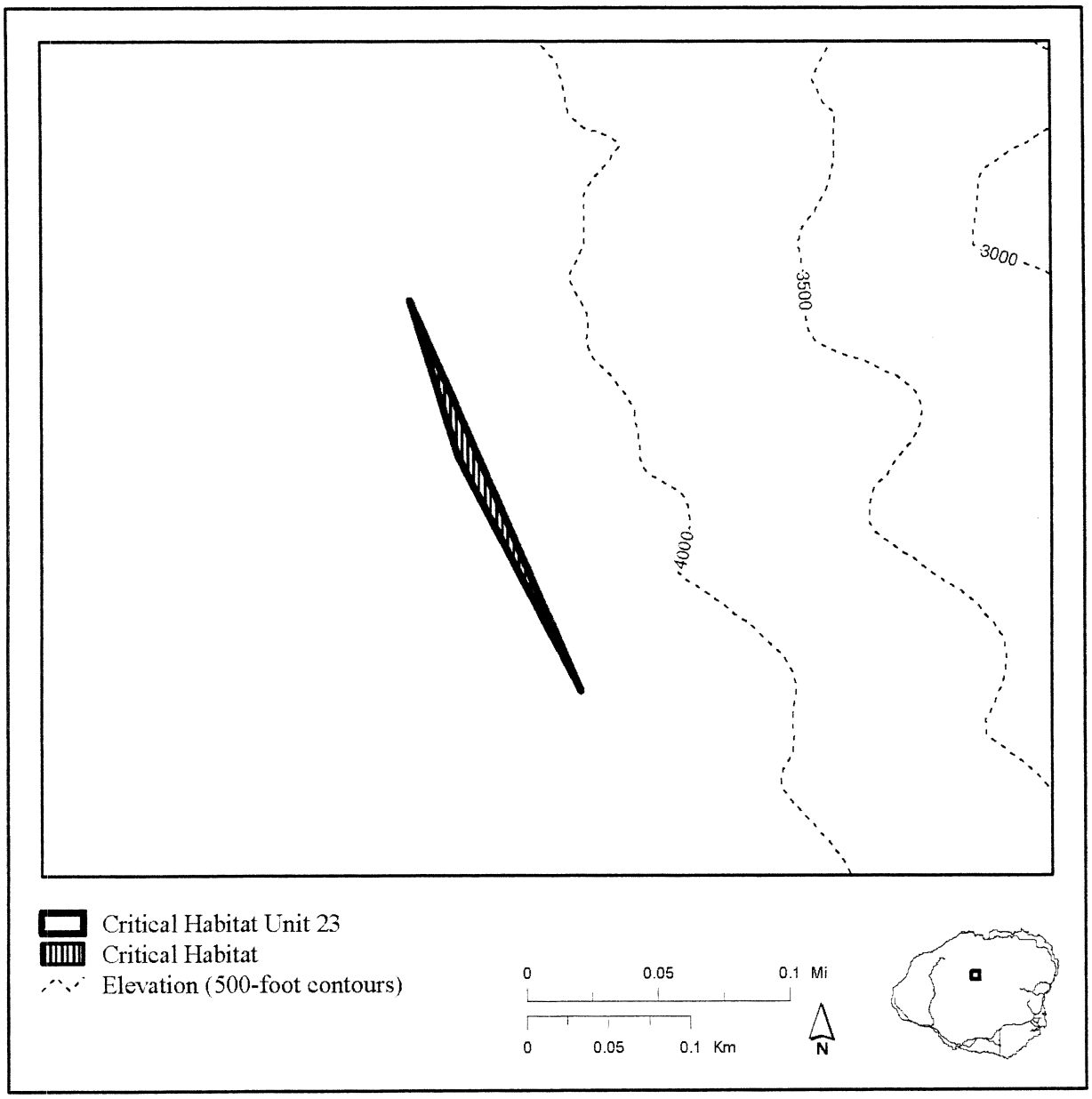
(B) Note: Map 217f follows:

BILLING CODE 4310–55–S

## Map 217f

**Kauai 23–*Astelia waialealae*–c, Kauai 23–*Chamaesyce remyi* var. *remyi*–p, Kauai 23–*Dryopteris crinalis* var. *podosorus*–c, Kauai 23–*Dubautia kalalauensis*–c, Kauai 23–*Dubautia waialealae*–c, Kauai 23–*Geranium kauaiense*–c, Kauai 23–*Keysseria erici*–c, Kauai 23–*Keysseria helenae*–c, Kauai 23–*Labordia helleri*–k, Kauai 23–*Labordia pumila*–c, Kauai 23–*Lysimachia daphnoides*–c, Kauai 23–*Melicope degeneri*–c, Kauai 23–*Melicope puberula*–f, Kauai 23–*Myrsine mezii*–f, Kauai 23–*Phyllostegia renovans*–f, Kauai 23–*Platydesma rostrata*–p, Kauai 23–*Psychotria grandiflora*–f, Kauai 23–*Tetraplasandra flynnii*–i**

### Montane Wet




BILLING CODE 4310–55–C

(cdvi) Kauai 23–*Chamaesyce remyi* var. *remyi*–p

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

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

(cdvii) Kauai 23–*Dryopteris crinalis* var. *podosorus*–c

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

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

(cdviii) Kauai 23–*Dubautia kalalauensis*–c

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

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

(cdix) Kauai 23–*Dubautia waialealae*–c

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

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

(cdx) Kauai 23–*Geranium kauaiense*–c

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

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

(cdxi) Kauai 23–*Keysseria erici*–c

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

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

(cdxii) Kauai 23–*Keysseria helenae*–c

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

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

(cdxiii) Kauai 23–*Labordia helleri*–k

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

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

(cdxiv) Kauai 23–*Labordia pumila*–c

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

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

(cdxv) Kauai 23–*Lysimachia daphnoides*–c

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

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

(cdxvi) Kauai 23–*Melicope degeneri*–c

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

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

(cdxvii) Kauai 23–*Melicope puberula*–f

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

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

(cdxviii) Kauai 23–*Myrsine mezii*–f

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

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

(cdxix) Kauai 23–*Phyllostegia renovans*–f

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

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

(cdxx) Kauai 23–*Platydesma rostrata*–p

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

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

(cdxxi) Kauai 23–*Psychotria grandiflora*–f

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

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

(cdxxii) Kauai 23–*Tetraplasandra flynnii*–i

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

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

(cdxxiii) Kauai 24–*Astelia waialealae*–d

(A) This is a unit of the Montane Wet ecosystem and consists of 0.04 ac (0.01 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 445955, 2442594; 445955, 2442594; 445951, 2442593; 445907, 2442657. 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*–j (see paragraphs (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), and (a)(1)(cdxl), respectively, of this section).

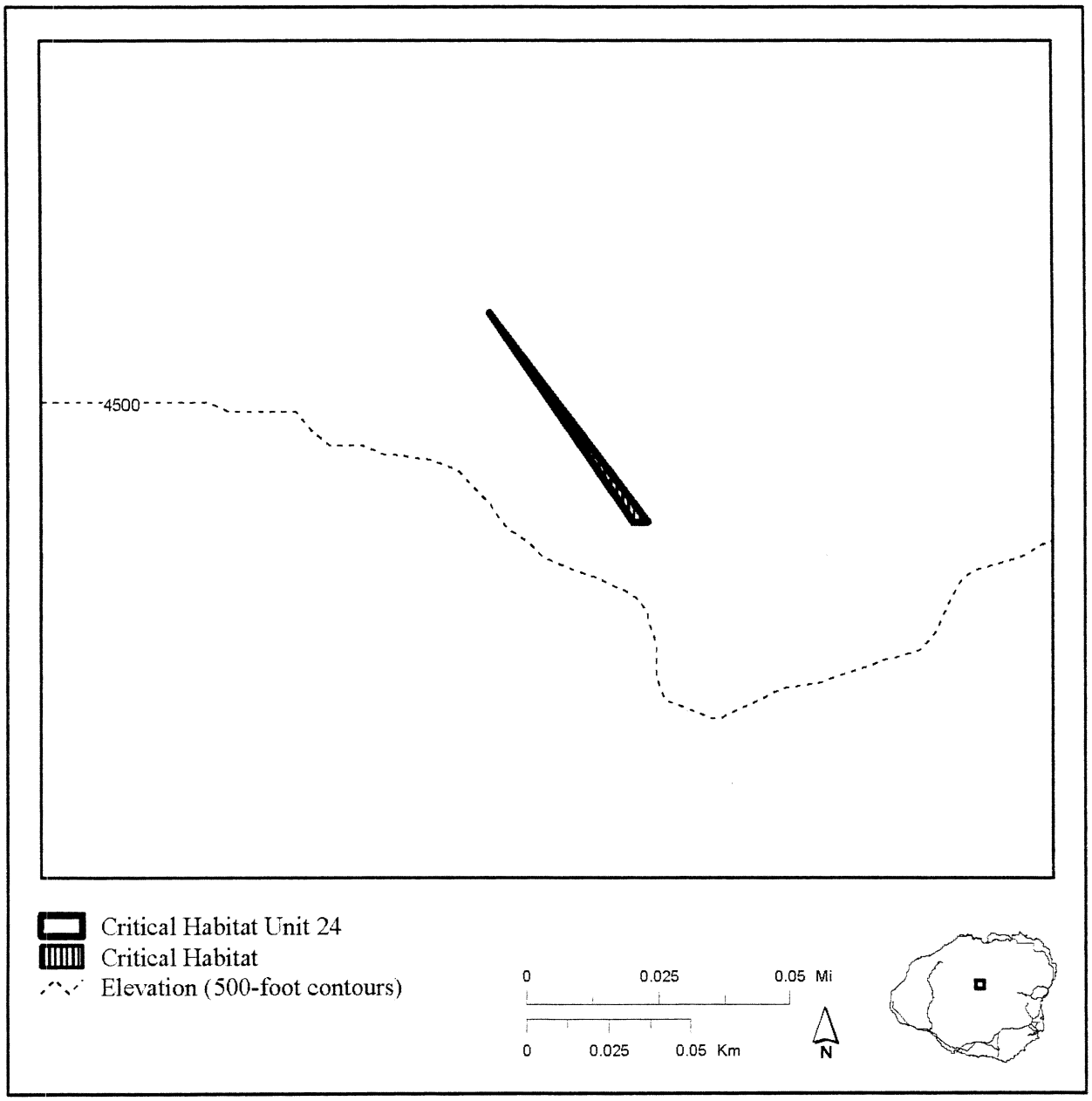
(B) Note: Map 217g follows:

BILLING CODE 4310–55–S

## 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 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*–j**

### Montane Wet




BILLING CODE 4310–55–C

(cdxxiv) Kauai 24–*Chamaesyce remyi* var. *remyi*–q

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

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

(cdxxv) Kauai 24–*Dryopteris crinalis* var. *podosorus*–d

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

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

(cdxxvi) Kauai 24–*Dubautia kalalauensis*–d

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

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

(cdxxvii) Kauai 24–*Dubautia waialealae*–d

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

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

(cdxxviii) Kauai 24–*Geranium kauaiense*–e

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

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

(cdxxix) Kauai 24–*Keysseria erici*–d

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

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

(cdxxx) Kauai 24–*Keysseria helenae*–d

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

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

(cdxxxi) Kauai 24–*Labordia helleri*–l

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

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

(cdxxxii) Kauai 24–*Labordia pumila*–d

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

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

(cdxxxiii) Kauai 24–*Lysimachia daphnoides*–d

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

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

(cdxxxiv) Kauai 24–*Melicope degeneri*–d

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

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

(cdxxxv) Kauai 24–*Melicope puberula*–g

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

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

(cdxxxvi) Kauai 24–*Myrsine mezii*–g

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

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

(cdxxxvii) Kauai 24–*Phyllostegia renovans*–g

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

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

(cdxxxviii) Kauai 24–*Platydesma rostrata*–q

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

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

(cdxxxix) Kauai 24–*Psychotria grandiflora*–g

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

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

(cdxl) Kauai 24–*Tetraplasandra flynnii*–j

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

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

(cdxli) Kauai 25–*Astelia waialealae*–e

(A) This is a unit of the Montane Wet ecosystem and consists of 64 ac (26 ha). This unit includes land bounded by the following UTM Zone 4, NAD83 coordinates (E, N): 448428, 2442750; 448440, 2442604; 448443, 2442627; 448443, 2442636; 448447, 2442663; 448447, 2442675; 448447, 2442688; 448443, 2442699; 448437, 2442711; 448438, 2442565; 448428, 2442738; 448464, 2442531; 448431, 2442766; 448432, 2442775; 448435, 2442791; 448437, 2442805; 448442, 2442821; 448462, 2442858; 448432, 2442727; 448536, 2442523; 448481, 2442894; 448637, 2442455; 448634, 2442459; 448623, 2442466; 448615, 2442472; 448602, 2442477; 448587, 2442486; 448449, 2442536; 448550, 2442513; 448441, 2442549; 448530, 2442527; 448515, 2442533; 448505, 2442534; 448488, 2442531; 448474, 2442530; 448455, 2442534; 448880, 2442563; 448566, 2442503; 448512, 2443792; 448522, 2443706; 448507, 2443727; 448504, 2443735; 448502, 2443743; 448504, 2443752; 448509, 2443760; 448513, 2443769; 448669, 2443477; 448512, 2443783; 448552, 2443643; 448500, 2443823; 448473, 2443878; 448470, 2443888; 448479, 2443895; 448609, 2443974; 448614, 2443950; 448634, 2443800; 448469, 2442871; 448513, 2443779; 448518, 2443559; 448588, 2443466; 448591, 2443484; 448589, 2443493; 448582, 2443508; 448577, 2443516; 448569, 2443527; 448560, 2443535; 448553, 2443539; 448538, 2443682; 448518, 2443552; 448546, 2443665; 448523, 2443570; 448527, 2443576; 448533, 2443587; 448544, 2443601; 448549, 2443613; 448551, 2443621; 448552, 2443630; 448674, 2443301; 448528, 2443546; 448579, 2443112; 448587, 2443214; 448586, 2443203; 448582, 2443190; 448582, 2443172; 448582, 2443162; 448583, 2443151; 448585, 2443140; 448657, 2443629; 448585, 2443122; 448592, 2443254; 448562, 2443086; 448545, 2443051; 448529, 2443019; 448507, 2442976; 448498, 2442952; 448490, 2442930; 448486, 2442910; 448585, 2443461; 448586, 2443129; 448584, 2443388; 448651, 2443187; 448653, 2443075; 448696, 2442955; 448765, 2442787; 448805, 2442677; 448861, 2442593; 448880, 2442563; 448578, 2443441; 448589, 2443224; 448576, 2443405; 448591, 2443241; 448590, 2443369; 448595, 2443352; 448593, 2443325; 448590, 2443306; 448591, 2443291; 448592, 2443277; 448592, 2443261; 448477, 2442887; 448572, 2443417. This unit is also critical habitat for 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, and Kauai 25–*Tetraplasandra flynnii*–k (see paragraphs (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)(cdl), (a)(1)(cdli), (a)(1)(cdlii), (a)(1)(cdliii), (a)(1)(cdliv), (a)(1)(cdlv), (a)(1)(cdlvi), (a)(1)(cdlvii), and (a)(1)(cdlviii), respectively, of this section).

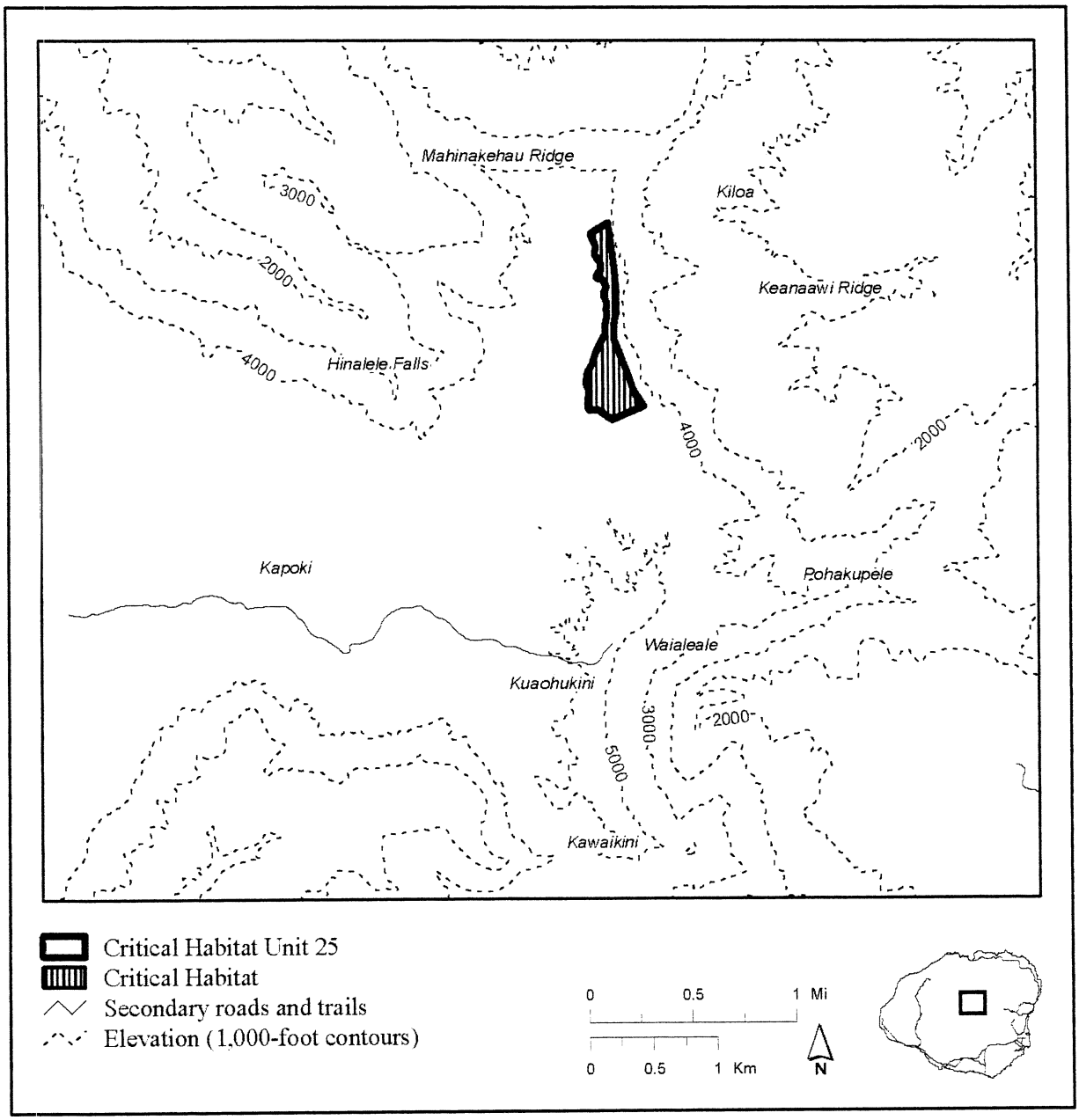
(B) Note: Map 217h follows:

BILLING CODE 4310–55–S

## 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 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 18–*Phyllostegia renovans*–h, Kauai 25–*Platydesma rostrata*–r, Kauai 25–*Psychotria grandiflora*–h, Kauai 25–*Tetraplasandra flynnii*–k**

## Montane Wet




BILLING CODE 4310–55–C

(cdxlii) Kauai 25–*Chamaesyce remyi* var. *remyi*–r

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

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

(cdxliii) Kauai 25–*Dryopteris crinalis* var. *podosorus*–e

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

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

(cdxliv) Kauai 25–*Dubautia kalalauensis*–d

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

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

(cdxlv) Kauai 25–*Dubautia waialealae*–e

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

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

(cdxlvi) Kauai 25–*Geranium kauaiense*–f

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

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

(cdxlvii) Kauai 25–*Keysseria erici*–e

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

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

(cdxlviii) Kauai 25–*Keysseria helenae*–e

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

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

(cdxlix) Kauai 25–*Labordia helleri*–m

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

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

(cdl) Kauai 25–*Labordia pumila*–e

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

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

(cdli) Kauai 25–*Lysimachia daphnoides*–e

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

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

(cdlii) Kauai 25–*Melicope degeneri*–e

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

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

(cdliii) Kauai 25–*Melicope puberula*–h

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

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

(cdliv) Kauai 25–*Myrsine mezii*–h

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

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

(cdlv) Kauai 25–*Phyllostegia renovans*–h

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

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

(cdlvi) Kauai 25–*Platydesma rostrata*–r

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

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

(cdlvii) Kauai 25–*Psychotria grandiflora*–h

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

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

(cdlviii) Kauai 25–*Tetraplasandra flynnii*–k

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

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

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| * * * | * * | * * |
| Kauai 4–*Chamaesyce remyi* var. *kauaiensis*–a | | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 4–*Chamaesyce remyi* var. *remyi*–a | | *Chamaesyce remyi* var. *remyi* |
| * * * | * * | * * |
| Kauai 4–*Cyanea dolichopoda*–a | | Cyanea dolichopoda |
| * * * | * * | * * |
| Kauai 4–*Cyrtandra oenobarba*–a | | Cyrtandra oenobarba |
| Kauai 4–*Cyrtandra paliku*–a | *Cyrtandra paliku* | Cyrtandra paliku |
| Kauai 4–*Dubautia plantaginea* ssp. *magnifolia*–a | | *Dubautia plantaginea* ssp. *magnifolia* |
| * * * | * * | * * |
| Kauai 4–*Lysimachia iniki*–a | | Lysimachia iniki |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| Kauai 4–*Lysimachia pendens*–a | | Lysimachia pendens |
| Kauai 4–*Lysimachia venosa*–a | | *Lysimachia venosa* |
| * * * | * * | * * |
| Kauai 4–*Platydesma rostrata*–a | | Platydesma rostrata |
| * * * | * * | * * |
| Kauai 7–*Canavalia napaliensis*–a | | Canavalia napaliensis |
| Kauai 7–*Chamaesyce eleanoriae*–a | | Chamaesyce eleanoriae |
| Kauai 7–*Chamaesyce remyi* var. *remyi*–b | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 7–*Charpentiera densiflora*–a | | Charpentiera densiflora |
| * * * | * * | * * |
| Kauai 7–*Doryopteris angelica*–a | | Doryopteris angelica |
| Kauai 7–*Dubautia kenwoodii*–a | | *Dubautia kenwoodii* |
| * * * | * * | * * |
| Kauai 7–*Labordia helleri*–a | | Labordia helleri |
| * * * | * * | * * |
| Kauai 7–*Pittosporum napaliense*–a | | Pittosporum napaliense |
| Kauai 7–*Platydesma rostrata*–b | | Platydesma rostrata |
| Kauai 7–*Psychotria hobdyi*–a | | Psychotria hobdyi |
| * * * | * * | * * |
| Kauai 7–*Tetraplasandra bisattenuata*–a | *Tetraplasandra bisattenuata* | Tetraplasandra bisattenuata |
| * * * | * * | * * |
| Kauai 10–*Astelia waialealae*–a | *Astelia waialealae* | Astelia waialealae |
| * * * | * * | * * |
| Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–b | | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 10–*Chamaesyce remyi* var. *kauaiensis*–c | *Chamaesyce remyi* var. *kauaiensis* | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 10–*Chamaesyce remyi* var. *remyi*–c | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 10–*Chamaesyce remyi* var. *remyi*–d | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 10–*Chamaesyce remyi* var. *remyi*–e | | *Chamaesyce remyi* var. *remyi* |
| Kauai 10–*Charpentiera densiflora*–b | | Charpentiera densiflora |
| * * * | * * | * * |
| Kauai 10–*Cyanea dolichopoda*–b | | *Cyanea dolichopoda* |
| Kauai 10–*Cyanea eleeleensis*–a | | *Cyanea eleeleensis* |
| Kauai 10–*Cyanea kolekoleensis*–a | | *Cyanea kolekoleensis* |
| Kauai 10–*Cyanea kuhihewa*–a | | *Cyanea kuhihewa* |
| * * * | * * | * * |
| Kauai 10–*Cyrtandra oenobarba*–b | *Cyrtandra oenobarba* | Cyrtandra oenobarba |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| Kauai 10–*Cyrtandra oenobarba*–c | *Cyrtandra oenobarba* | Cyrtandra oenobarba |
| Kauai 10–*Cyrtandra paliku*–b | | Cyrtandra paliku |
| Kauai 10–*Dryopteris crinalis* var. *podosorus*–a | *Dryopteris crinalis* var. *podosorus* | *Dryopteris crinalis* var. *podosorus* |
| Kauai 10–*Dubautia imbricata* ssp. *imbricata*–a | *Dubautia imbricata* ssp. *imbricata* | *Dubautia imbricata* ssp. *imbricata* |
| Kauai 10–*Dubautia kalalauensis*–a | | Dubautia kalalauensis |
| * * * | * * | * * |
| Kauai 10–*Dubautia plantaginea* ssp. *magnifolia*–b | *Dubautia plantaginea* ssp. *magnifolia* | *Dubautia plantaginea* ssp. *magnifolia* |
| Kauai 10–*Dubautia waialealae*–a | *Dubautia waialealae* | Dubautia waialealae |
| * * * | * * | * * |
| Kauai 10–*Geranium kauaiense*–a | *Geranium kauaiense* | Geranium kauaiense |
| * * * | * * | * * |
| Kauai 10–*Keysseria erici*–a | *Keysseria erici* | Keysseria erici |
| Kauai 10–*Keysseria helenae*–a | *Keysseria helenae* | Keysseria helenae |
| Kauai 10–*Labordia helleri*–b | *Labordia helleri* | Labordia helleri |
| Kauai 10–*Labordia helleri*–c | | Labordia helleri |
| * * * | * * | * * |
| Kauai 10–*Labordia pumila*–a | *Labordia pumila* | Labordia pumila |
| * * * | * * | * * |
| Kauai 10–*Lysimachia daphnoides*–a | *Lysimachia daphnoides* | Lysimachia daphnoides |
| * * * | * * | * * |
| Kauai 10–*Lysimachia iniki*–b | *Lysimachia iniki* | Lysimachia iniki |
| Kauai 10–*Lysimachia pendens*–b | *Lysimachia pendens* | Lysimachia pendens |
| Kauai 10–*Lysimachia venosa*–b | | *Lysimachia venosa* |
| Kauai 10–*Melicope degeneri*–a | *Melicope paniculata* | Melicope paniculata |
| Kauai 10–*Melicope paniculata*–a | *Melicope paniculata* | Melicope paniculata |
| Kauai 10–*Melicope puberula*–a | *Melicope puberula* | Melicope puberula |
| Kauai 10–*Melicope puberula*–b | | Melicope puberula |
| * * * | * * | * * |
| Kauai 10–*Myrsine mezii*–a | *Myrsine mezii* | Myrsine mezii |
| * * * | * * | * * |
| Kauai 10–*Phyllostegia renovans*–a | *Phyllostegia renovans* | Phyllostegia renovans |
| Kauai 10–*Phyllostegia renovans*–b | *Phyllostegia renovans* | Phyllostegia renovans |
| * * * | * * | * * |
| Kauai 10–*Platydesma rostrata*–c | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 10–*Platydesma rostrata*–d | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 10–*Platydesma rostrata*–e | *Platydesma rostrata* | Platydesma rostrata |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| Kauai 10–*Psychotria grandiflora*–a | | Psychotria grandiflora |
| * * * | * * | * * |
| Kauai 10–*Stenogyne kealiae*–a | | Stenogyne kealiae |
| Kauai 10–*Tetraplasandra bisattenuata*–b | *Tetraplasandra bisattenuata* | Tetraplasandra bisattenuata |
| Kauai 10–*Tetraplasandra flynnii*–a | | *Tetraplasandra flynnii* |
| Kauai 10–*Tetraplasandra flynnii*–b | | *Tetraplasandra flynnii* |
| * * * | * * | * * |
| Kauai 11–*Astelia waialealae*–b | *Astelia waialealae* | Astelia waialealae |
| * * * | * * | * * |
| Kauai 11–*Canavalia napaliensis*–b | *Canavalia napaliensis* | Canavalia napaliensis |
| * * * | * * | * * |
| Kauai 11–*Chamaesyce eleanoriae*–b | *Chamaesyce eleanoriae* | Chamaesyce eleanoriae |
| Kauai 11–*Chamaesyce eleanoriae*–c | *Chamaesyce eleanoriae* | Chamaesyce eleanoriae |
| * * * | * * | * * |
| Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–d | *Chamaesyce remyi* var. *kauaiensis* | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 11–*Chamaesyce remyi* var. *kauaiensis*–e | | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 11–*Chamaesyce remyi* var. *remyi*–f | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 11–*Chamaesyce remyi* var. *remyi*–g | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 11–*Chamaesyce remyi* var. *remyi*–h | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 11–*Chamaesyce remyi* var. *remyi*–i | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 11–*Chamaesyce remyi* var. *remyi*–j | *Chamaesyce remyi* var. *remyi* | *Chamaesyce remyi* var. *remyi* |
| Kauai 11–*Charpentiera densiflora*–c | *Charpentiera densiflora* | Charpentiera densiflora |
| Kauai 11–*Charpentiera densiflora*–d | *Charpentiera densiflora* | Charpentiera densiflora |
| * * * | * * | * * |
| Kauai 11–*Cyanea dolichopoda*–c | | *Cyanea dolichopoda* |
| Kauai 11–*Cyanea eleeleensis*–b | | *Cyanea eleeleensis* |
| Kauai 11–*Cyanea kolekoleensis*–b | | *Cyanea kolekoleensis* |
| Kauai 11–*Cyanea kuhihewa*–b | | *Cyanea kuhihewa* |
| * * * | * * | * * |
| Kauai 11–*Cyrtandra oenobarba*–d | *Cyrtandra oenobarba* | Cyrtandra oenobarba |
| Kauai 11–*Cyrtandra oenobarba*–e | | Cyrtandra oenobarba |
| Kauai 11–*Cyrtandra paliku*–c | | Cyrtandra paliku |
| * * * | * * | * * |
| Kauai 11–*Diellia mannii*–a | *Diellia mannii* | Diellia mannii |
| * * * | * * | * * |
| Kauai 11–*Doryopteris angelica*–b | *Doryopteris angelica* | Doryopteris angelica |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| Kauai 11–*Dryopteris crinalis* var. *podosorus*–b | *Dryopteris crinalis* var. *podosorus* | *Dryopteris crinalis* var. *podosorus* |
| Kauai 11–*Dubautia imbricata* ssp. *imbricata*–b | | *Dubautia imbricata* ssp. *imbricata* |
| Kauai 11–*Dubautia kalalauensis*–b | *Dubautia kalalauensis* | Dubautia kalalauensis |
| Kauai 11–*Dubautia kenwoodii*–b | | *Dubautia kenwoodii* |
| * * * | * * | * * |
| Kauai 11–*Dubautia plantaginea* ssp. *magnifolia*–c | | *Dubautia plantaginea* ssp. *magnifolia* |
| Kauai 11–*Dubautia waialealae*–b | *Dubautia waialealae* | Dubautia waialealae |
| * * * | * * | * * |
| Kauai 11–*Geranium kauaiense*–b | *Geranium kauaiense* | Geranium kauaiense |
| * * * | * * | * * |
| Kauai 11–*Keysseria erici*–b | *Keysseria erici* | Keysseria erici |
| Kauai 11–*Keysseria helenae*–b | *Keysseria helenae* | Keysseria helenae |
| * * * | * * | * * |
| Kauai 11–*Labordia helleri*–d | *Labordia helleri* | Labordia helleri |
| Kauai 11–*Labordia helleri*–e | *Labordia helleri* | Labordia helleri |
| Kauai 11–*Labordia helleri*–f | *Labordia helleri* | Labordia helleri |
| Kauai 11–*Labordia helleri*–g | *Labordia helleri* | Labordia helleri |
| * * * | * * | * * |
| Kauai 11–*Labordia pumila*–b | *Labordia pumila* | Labordia pumila |
| * * * | * * | * * |
| Kauai 11–*Lysimachia daphnoides*–b | *Lysimachia daphnoides* | Lysimachia daphnoides |
| Kauai 11–*Lysimachia iniki*–c | | Lysimachia iniki |
| Kauai 11–*Lysimachia pendens*–c | | Lysimachia pendens |
| Kauai 11–*Lysimachia scopulensis*–a | *Lysimachia scopulensis* | Lysimachia scopulensis |
| Kauai 11–*Lysimachia venosa*–c | | *Lysimachia venosa* |
| * * * | * * | * * |
| Kauai 11–*Melicope degeneri*–b | *Melicope degeneri* | Melicope degeneri |
| * * * | * * | * * |
| Kauai 11–*Melicope paniculata*–b | *Melicope paniculata* | Melicope paniculata |
| Kauai 11–*Melicope puberula*–c | *Melicope puberula* | Melicope puberula |
| Kauai 11–*Melicope puberula*–d | *Melicope puberula* | Melicope puberula |
| * * * | * * | * * |
| Kauai 11–*Myrsine knudsenii*–a | *Myrsine knudsenii* | Myrsine knudsenii |
| * * * | * * | * * |
| Kauai 11–*Myrsine mezii*–b | *Myrsine mezii* | Myrsine mezii |
| Kauai 11–*Myrsine mezii*–c | | Myrsine mezii |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| * * * | * * | * * |
| Kauai 11–*Phyllostegia renovans*–c | *Phyllostegia renovans* | Phyllostegia renovans |
| Kauai 11–*Phyllostegia renovans*–d | *Phyllostegia renovans* | Phyllostegia renovans |
| * * * | * * | * * |
| Kauai 11–*Pittosporum napaliense*–b | *Pittosporum napaliense* | Pittosporum napaliense |
| * * * | * * | * * |
| Kauai 11–*Platydesma rostrata*–f | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 11–*Platydesma rostrata*–g | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 11–*Platydesma rostrata*–h | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 11–*Platydesma rostrata*–i | | Platydesma rostrata |
| Kauai 11–*Platydesma rostrata*–j | *Platydesma rostrata* | Platydesma rostrata |
| * * * | * * | * * |
| Kauai 11–*Psychotria grandiflora*–b | *Psychotria grandiflora* | Psychotria grandiflora |
| Kauai 11–*Psychotria grandiflora*–c | *Psychotria grandiflora* | Psychotria grandiflora |
| Kauai 11–*Psychotria hobdyi*–b | *Psychotria hobdyi* | Psychotria hobdyi |
| * * * | * * | * * |
| Kauai 11–*Schiedea attenuata*–a | *Schiedea attenuata* | Schiedea attenuata |
| * * * | * * | * * |
| Kauai 11–*Stenogyne kealiae*–b | *Stenogyne kealiae* | Stenogyne kealiae |
| Kauai 11–*Stenogyne kealiae*–c | *Stenogyne kealiae* | Stenogyne kealiae |
| Kauai 11–*Stenogyne kealiae*–d | *Stenogyne kealiae* | Stenogyne kealiae |
| Kauai 11–*Tetraplasandra bisattenuata*–c | | Tetraplasandra bisattenuata |
| Kauai 11–*Tetraplasandra bisattenuata*–d | | Tetraplasandra bisattenuata |
| Kauai 11–*Tetraplasandra flynnii*–c | *Tetraplasandra flynnii* | Tetraplasandra flynnii |
| Kauai 11–*Tetraplasandra flynnii*–d | | Tetraplasandra flynnii |
| Kauai 11–*Tetraplasandra flynnii*–e | *Tetraplasandra flynnii* | *Tetraplasandra flynnii* |
| * * * | * * | * * |
| Kauai 18–*Chamaesyce remyi* var. *kauaiensis*–f | *Chamaesyce remyi* var. *kauaiensis* | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 18–*Chamaesyce remyi* var. *remyi*–k | | *Chamaesyce remyi* var. *remyi* |
| Kauai 18–*Cyanea dolichopoda*–d | | *Cyanea dolichopoda* |
| Kauai 18–*Cyrtandra oenobarba*–f | *Cyrtandra oenobarba* | Cyrtandra oenobarba |
| Kauai 18–*Cyrtandra paliku*–d | | Cyrtandra paliku |
| Kauai 18–*Dubautia plantaginea* ssp. *magnifolia*–d | *Dubautia plantaginea* ssp. *magnifolia* | Dubautia plantaginea ssp. *magnifolia* |
| Kauai 18–*Lysimachia iniki*–d | *Lysimachia iniki* | Lysimachia iniki |
| Kauai 18–*Lysimachia pendens*–d | *Lysimachia pendens* | Lysimachia pendens |
| Kauai 18–*Lysimachia venosa*–d | | *Lysimachia venosa* |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| Kauai 18–*Platydesma rostrata*–k | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 19–*Chamaesyce remyi* var. *kauaiensis*–g | | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 19–*Chamaesyce remyi* var. *remyi*–l | | *Chamaesyce remyi* var. *remyi* |
| Kauai 19–*Cyanea dolichopoda*–e | | *Cyanea dolichopoda* |
| Kauai 19–*Cyrtandra oenobarba*–g | | Cyrtandra oenobarba |
| Kauai 19–*Cyrtandra paliku*–e | *Cyrtandra paliku* | Cyrtandra paliku |
| Kauai 19–*Dubautia plantaginea* ssp. *magnifolia*–e | | *Dubautia plantaginea* ssp. *magnifolia* |
| Kauai 19–*Lysimachia iniki*–e | | Lysimachia iniki |
| Kauai 19–*Lysimachia pendens*–e | | Lysimachia pendens |
| Kauai 19– *Lysimachia venosa*–e | | *Lysimachia venosa* |
| Kauai 19–*Platydesma rostrata*–l | | Platydesma rostrata |
| Kauai 20–*Chamaesyce remyi* var. *kauaiensis*–h | | *Chamaesyce remyi* var. *kauaiensis* |
| Kauai 20–*Chamaesyce remyi* var. *remyi*–m | *Chamaesyce remyi* var. *remyi* | Chamaesyce remyi var. *remyi* |
| Kauai 20–*Charpentiera densiflora*–e | *Charpentiera densiflora* | Charpentiera densiflora |
| Kauai 20–*Cyanea eleeleensis*–c | | *Cyanea eleeleensis* |
| Kauai 20–*Cyanea kolekoleensis*–c | | *Cyanea kolekoleensis* |
| Kauai 20–*Cyanea kuhihewa*–c | | *Cyanea kuhihewa* |
| Kauai 20–*Cyrtandra oenobarba*–h | | Cyrtandra oenobarba |
| Kauai 20–*Dubautia imbricata* ssp. *imbricata*–c | *Dubautia imbricata* ssp. *imbricata* | Dubautia imbricata ssp. *imbricata* |
| Kauai 20–*Labordia helleri*–h | *Labordia helleri* | Labordia helleri |
| Kauai 20–*Melicope paniculata*–c | | Melicope paniculata |
| Kauai 20–*Melicope puberula*–e | | Melicope puberula |
| Kauai 20–*Phyllostegia renovans*–e | *Phyllostegia renovans* | Phyllostegia renovans |
| Kauai 20–*Platydesma rostrata*–m | | Platydesma rostrata |
| Kauai 20–*Stenogyne kealiae*–e | | Stenogyne kealiae |
| Kauai 20–*Tetraplasandra bisattenuata*–e | | Tetraplasandra bisattenuata |
| Kauai 20–*Tetraplasandra flynii*–f | | Tetraplasandra flynii |
| Kauai 21–*Chamaesyce remyi* var. *remyi*–n | | Chamaesyce remyi var. *remyi* |
| Kauai 21–*Diellia mannii*–b | *Diellia mannii* | Diellia mannii |
| Kauai 21–*Labordia helleri*–i | | Labordia helleri |
| Kauai 21–*Myrsine knudsenii*–b | | Myrsine knudsenii |
| Kauai 21–*Myrsine mezii*–d | | Myrsine mezii |
| Kauai 21–*Platydesma rostrata*–n | | Platydesma rostrata |
| Kauai 21–*Psychotria grandiflora*–d | | Psychotria grandiflora |
| Kauai 21–*Stenogyne kealiae*–f | | Stenogyne kealiae |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| Kauai 21–*Tetraplasandra flynnii*–g | | Tetraplasandra flynnii |
| Kauai 22–*Chamaesyce remyi* var. *remyi*–o | | Chamaesyce remyi var. *remyi* |
| Kauai 22–*Diellia mannii*–c | | Diellia mannii |
| Kauai 22–*Labordia helleri*–j | | Labordia helleri |
| Kauai 22–*Myrsine knudsenii*–c | | Myrsine knudsenii |
| Kauai 22–*Myrsine mezii*–e | *Myrsine mezii* | Myrsine mezii |
| Kauai 22–*Platydesma rostrata*–o | | Platydesma rostrata |
| Kauai 22–*Psychotria grandiflora*–e | | Psychotria grandiflora |
| Kauai 22–*Stenogyne kealiae*–g | | Stenogyne kealiae |
| Kauai 22–*Tetraplasandra flynnii*–h | | Tetraplasandra flynnii |
| Kauai 23–*Astelia waialealae*–c | *Astelia waialealae* | Astelia waialealae |
| Kauai 23–*Chamaesyce remyi* var. *remyi*–p | *Chamaesyce remyi* var. *remyi* | Chamaesyce remyi var. *remyi* |
| Kauai 23–*Dryopteris crinalis* var. *podosorus*–c | *Dryopteris crinalis* var. *podosorus* | Dryopteris crinalis var. *podosorus* |
| Kauai 23–*Dubautia kalalauensis*–c | | Dubautia kalalauensis |
| Kauai 23–*Dubautia waialealae*–c | *Dubautia waialealae* | Dubautia waialealae |
| Kauai 23–*Geranium kauaiense*–c | *Geranium kauaiense* | Geranium kauaiense |
| Kauai 23–*Keysseria erici*–c | *Keysseria erici* | Keysseria erici |
| Kauai 23–*Keysseria helenae*–c | *Keysseria helenae* | Keysseria helenae |
| Kauai 23–*Labordia helleri*–k | *Labordia helleri* | Labordia helleri |
| Kauai 23–*Labordia pumila*–c | *Labordia pumila* | Labordia pumila |
| Kauai 23–*Lysimachia daphnoides*–c | *Lysimachia daphnoides* | Lysimachia daphnoides |
| Kauai 23–*Melicope degeneri*–c | *Melicope degeneri* | Melicope degeneri |
| Kauai 23–*Melicope puberula*–f | *Melicope puberula* | Melicope puberula |
| Kauai 23–*Myrsine mezii*–f | *Myrsine mezii* | Myrsine mezii |
| Kauai 23–*Phyllostegia renovans*–f | *Phyllostegia renovans* | Phyllostegia renovans |
| Kauai 23–*Platydesma rostrata*–p | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 23–*Psychotria grandiflora*–f | | Psychotria grandiflora |
| Kauai 23–*Tetraplasandra flynnii*–i | | Tetraplasandra flynnii |
| Kauai 24–*Astelia waialealae*–d | *Astelia waialealae* | Astelia waialealae |
| Kauai 24–*Chamaesyce remyi* var. *remyi*–q | *Chamaesyce remyi* var. *remyi* | Chamaesyce remyi var. *remyi* |
| Kauai 24–*Dryopteris crinalis* var. *podosorus*–d | *Dryopteris crinalis* var. *podosorus* | Dryopteris crinalis var. *podosorus* |
| Kauai 24–*Dubautia kalalauensis*–d | | Dubautia kalalauensis |
| Kauai 24–*Dubautia waialealae*–d | *Dubautia waialealae* | Dubautia waialealae |
| Kauai 24–*Geranium kauaiense*–d | *Geranium kauaiense* | Geranium kauaiense |
| Kauai 24–*Keysseria erici*–d | *Keysseria erici* | Keysseria erici |
| Kauai 24–*Keysseria helenae*–d | *Keysseria helenae* | Keysseria helenae |
| Kauai 24–*Labordia helleri*–l | *Labordia helleri* | Labordia helleri |

(CDLIX) TABLE OF PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

| Unit name | Species occupied | Species unoccupied |
|---|---|---|
| Kauai 24–*Labordia pumila*–d | *Labordia pumila* | Labordia pumila |
| Kauai 24–*Lysimachia daphnoides*–d | *Lysimachia daphnoides* | Lysimachia daphnoides |
| Kauai 24–*Melicope degeneri*–d | *Melicope degeneri* | Melicope degeneri |
| Kauai 24–*Melicope puberula*–g | *Melicope puberula* | Melicope puberula |
| Kauai 24–*Myrsine mezii*–g | *Myrsine mezii* | Myrsine mezii |
| Kauai 24–*Phyllostegia renovans*–g | *Phyllostegia renovans* | Phyllostegia renovans |
| Kauai 24–*Platydesma rostrata*–q | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 24–*Psychotria grandiflora*–g | | Psychotria grandiflora |
| Kauai 24–*Tetraplasandra flynnii*–j | | Tetraplasandra flynnii |
| Kauai 25–*Astelia waialealae*–e | *Astelia waialealae* | Astelia waialealae |
| Kauai 25–*Chamaesyce remyi* var. *remyi*–r | *Chamaesyce remyi* var. *remyi* | Chamaesyce remyi var. *remyi* |
| Kauai 25–*Dryopteris crinalis* var. *podosorus*–e | *Dryopteris crinalis* var. *podosorus* | Dryopteris crinalis var. *podosorus* |
| Kauai 25–*Dubautia kalalauensis*–e | | Dubautia kalalauensis |
| Kauai 25–*Dubautia waialealae*–e | *Dubautia waialealae* | Dubautia waialealae |
| Kauai 25–*Geranium kauaiense*–e | *Geranium kauaiense* | Geranium kauaiense |
| Kauai 25–*Keysseria erici*–e | *Keysseria erici* | Keysseria erici |
| Kauai 25–*Keysseria helenae*–e | *Keysseria helenae* | Keysseria helenae |
| Kauai 25–*Labordia helleri*–m | *Labordia helleri* | Labordia helleri |
| Kauai 25–*Labordia pumila*–e | *Labordia pumila* | Labordia pumila |
| Kauai 25–*Lysimachia daphnoides*–e | *Lysimachia daphnoides* | Lysimachia daphnoides |
| Kauai 25–*Melicope degeneri*–e | *Melicope degeneri* | Melicope degeneri |
| Kauai 25–*Melicope puberula*–h | *Melicope puberula* | Melicope puberula |
| Kauai 25–*Myrsine mezii*–h | *Myrsine mezii* | Myrsine mezii |
| Kauai 25–*Phyllostegia renovans*–h | *Phyllostegia renovans* | Phyllostegia renovans |
| Kauai 25–*Platydesma rostrata*–r | *Platydesma rostrata* | Platydesma rostrata |
| Kauai 25–*Psychotria grandiflora*–h | | Psychotria grandiflora |
| Kauai 25–*Tetraplasandra flynnii*–k | | Tetraplasandra flynnii |

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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 20–*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 (914 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 20–*Charpentiera densiflora*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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, Kadua, 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 20–*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 (914 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 20–*Tetraplasandra bisattenuata*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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, Kadua, Melicope.*

(F) Understory: *Alyxia, Cyrtandra, Dicranopteris, Diplazium, Machaerina, Microlepia.*

FAMILY ARALIACEAE: *Tetraplasandra flynnii* (NCN)

Kauai 10–*Tetraplasandra flynnii*–a, Kauai 10–*Tetraplasandra flynnii*–b, Kauai 11–*Tetraplasandra flynnii*–c, Kauai 11–*Tetraplasandra flynnii*–d, Kauai 11–*Tetraplasandra flynnii*–e, Kauai 20–*Tetraplasandra flynnii*–f, Kauai 21–*Tetraplasandra flynnii*–g, Kauai 22–*Tetraplasandra flynnii*–h, Kauai 23–*Tetraplasandra flynnii*–i, Kauai 24–*Tetraplasandra flynnii*–j, and Kauai 25–*Tetraplasandra flynnii*–k, 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*–e, Kauai 21–*Tetraplasandra flynnii*–g, and Kauai 22–*Tetraplasandra flynnii*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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, Kadua, Ilex, Myoporum, Myrsine.*

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

(ii) In units Kauai 10–*Tetraplasandra flynnii*–a, Kauai 11–*Tetraplasandra flynnii*–c, Kauai 23–*Tetraplasandra flynnii*–i, Kauai 24–*Tetraplasandra flynnii*–j, and Kauai 25–*Tetraplasandra flynnii*–k, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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.*

(iii) In units Kauai 10–*Tetraplasandra flynii*–b, Kauai 11–*Tetraplasandra flynii*–d, and Kauai 20–*Tetraplasandra flynnii*–f, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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, Kadua, Melicope.*

(F) Understory: *Alyxia, Cyrtandra, Dicranopteris, Diplazium, Machaerina, Microlepia.*

FAMILY ASTELIACEAE: *Astelia waialealae* (PAINIU)

Kauai 10–*Astelia waialealae*–a, Kauai 11–*Astelia waialealae*–b, Kauai 23–*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 5,243 ft (914 to 1,598 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 20–*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 (914 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, Kadua, 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 23–*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 5,243 ft (914 to 1,598 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 (914 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 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 18–*Dubautia plantaginea* ssp. *magnifolia*–d, and Kauai 19–*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) 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, Kadua, Peperomia.*

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FAMILY ASTERACEAE: *Dubautia waialealae* (NAENAE)

Kauai 10–*Dubautia waialealae*–a, Kauai 11–*Dubautia waialealae*–b, Kauai 23–*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 5,243 ft (914 to 1,598 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 ASTERACEAE: *Keysseria erici* (NCN)

Kauai 10–*Keysseria erici*–a, Kauai 11–*Keysseria erici*–b, Kauai 23–*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 5,243 ft (914 to 1,598 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 23–*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 5,243 ft (914 to 1,598 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 CAMPANULACEAE: *Cyanea dolichopoda* (HAHA)

Kauai 4–*Cyanea dolichopoda*–a, Kauai 10–*Cyanea dolichopoda*–b, Kauai 11–*Cyanea dolichopoda*–c, Kauai 18–*Cyanea dolichopoda*–d, and Kauai 19–*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, Kadua, Peperomia.*

FAMILY CAMPANULACEAE: *Cyanea eleeleensis* (HAHA)

Kauai 10–*Cyanea eleeleensis*–a, Kauai 11–*Cyanea eleeleensis*–b, and Kauai 20–*Cyanea eleeleensis*–c, identified in the legal descriptions in paragraph (a)(1) of this section, constitute critical habitat for *Cyanea eleeleensis* on Kauai. Within these units, the primary constituent elements of critical habitat are:

(i) Elevation: Less than 3,000 ft (914 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, Kadua, 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 20–*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 (914 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*, *Kadua, 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 20–*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 (914 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*, *Kadua, 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 (914 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 18–*Chamaesyce remyi* var. *kauaiensis*–f, Kauai 19–*Chamaesyce remyi* var. *kauaiensis*–g, and Kauai 20–*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 20–*Chamaesyce remyi* var. *kauaiensis*–h, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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*, *Kadua, 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 18–*Chamaesyce remyi* var. *kauaiensis*–f, and Kauai 19–*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*, *Kadua, 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 (914 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 20–*Chamaesyce remyi* var. *remyi*–

m, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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*, *Kadua, Melicope*.

(F) Understory: *Alyxia, Cyrtandra*, *Dicranopteris, Diplazium*, *Machaerina, Microlepia*.

(iii) In units Kauai 11–*Chamaesyce remyi* var. *remyi*–j, Kauai 21–*Chamaesyce remyi* var. *remyi*–n, and Kauai 22–*Chamaesyce remyi* var. *remyi*–o, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*, *Kadua, 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 23–*Chamaesyce remyi* var. *remyi*–p, 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 5,243 ft (914 to 1,598 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 18–*Chamaesyce remyi* var. *remyi*–k, and Kauai 19–*Chamaesyce remyi* var. *remyi*–l, 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*, *Kadua, 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 (914 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 23–*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 5,243 ft (914 to 1,598 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 18–*Cyrtandra oenobarba*–f, Kauai 19–*Cyrtandra oenobarba*–g, and Kauai 20–*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 20–*Cyrtandra oenobarba*–h, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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*, *Kadua, 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 18–*Cyrtandra oenobarba*–f, and Kauai 19–*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*, *Kadua, Peperomia*.

FAMILY GESNERIACEAE: *Cyrtandra paliku* (HAIWALE)

Kauai 4–*Cyrtandra paliku*–a, Kauai 10–*Cyrtandra paliku*–b, Kauai 11–*Cyrtandra paliku*–c, Kauai 18–*Cyrtandra paliku*–d, and Kauai 19–*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*, *Kadua, 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 20–*Phyllostegia renovans*–e, Kauai 23–*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 20–*Phyllostegia renovans*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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*, *Kadua, Melicope*.

(F) Understory: *Alyxia, Cyrtandra*, *Dicranopteris, Diplazium*, *Machaerina, Microlepia*.

(ii) In units Kauai 10–*Phyllostegia renovans*–a, Kauai 11–*Phyllostegia renovans*–c, Kauai 23–*Phyllostegia renovans*–f, Kauai 24–*Phyllostegia renovans*–g, and Kauai 25–*Phyllostegia renovans*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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 20–*Stenogyne kealiae*–e, Kauai 21–*Stenogyne kealiae*–f, and Kauai 22–*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 20–*Stenogyne kealiae*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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*, *Kadua, Melicope*.

(F) Understory: *Alyxia, Cyrtandra*, *Dicranopteris, Diplazium*, *Machaerina, Microlepia*.

(ii) In units Kauai 11–*Stenogyne kealiae*–d, Kauai 21–*Stenogyne kealiae*–f, and Kauai 22–*Stenogyne kealiae*–g, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*, *Kadua, 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 20–*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 (914 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 20–*Labordia helleri*–h, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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*, *Kadua, Melicope*.

(F) Understory: *Alyxia, Cyrtandra*, *Dicranopteris, Diplazium*, *Machaerina, Microlepia*.

(iii) In units Kauai 11–*Labordia helleri*–g, Kauai 21–*Labordia helleri*–i, and Kauai 22–*Labordia helleri*–j, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*, *Kadua, 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 23–*Labordia helleri*–k, Kauai 24–*Labordia helleri*–l, and Kauai 25–*Labordia helleri*–m, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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 23–*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 5,243 ft (914 to 1,598 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 23–*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 5,243 ft (914 to 1,598 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 MYRSINACEAE: *Lysimachia iniki* (NCN)

Kauai 4–*Lysimachia iniki*–a, Kauai 10–*Lysimachia iniki*–b, Kauai 11–*Lysimachia iniki*–c, Kauai 18–*Lysimachia iniki*–d, and Kauai 19–*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*, *Kadua, Peperomia*.

FAMILY MYRSINACEAE: *Lysimachia pendens* (NCN)

Kauai 4–*Lysimachia pendens*–a, Kauai 10–*Lysimachia pendens*–b, Kauai 11–*Lysimachia pendens*–c, Kauai 18–*Lysimachia pendens*–d, and Kauai 19–*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*, *Kadua, 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 18–*Lysimachia venosa*–d, and Kauai 19–*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*, *Kadua, Peperomia*.

FAMILY MYRSINACEAE: *Myrsine knudsenii* (KOLEA)

Kauai 11–*Myrsine knudsenii*–a, Kauai 21–*Myrsine knudsenii*–b, and Kauai 22–*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 5,243 ft (914 to 1,598 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*, *Kadua, 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 21–*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 21–*Myrsine mezii*–d, and Kauai 22–*Myrsine mezii*–e, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*, *Kadua, 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 23–*Myrsine mezii*–f, Kauai 24–*Myrsine mezii*–g, and Kauai 25–*Myrsine mezii*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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 (914 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 21–*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 21–*Psychotria grandiflora*–d, and Kauai 22–*Psychotria grandiflora*–e, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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*, *Kadua, 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 23–*Psychotria grandiflora*–f, Kauai 24–*Psychotria grandiflora*–g, and Kauai 25–*Psychotria grandiflora*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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 (914 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 23–*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 5,243 ft (914 to 1,598 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 20–*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 (914 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*, *Kadua, 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 20–*Melicope puberula*–e, Kauai 23–*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 20–*Melicope puberula*–e, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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*, *Kadua, Melicope*.

(F) Understory: *Alyxia, Cyrtandra, Dicranopteris, Diplazium, Machaerina, Microlepia.*

(ii) In units Kauai 10–*Melicope puberula*–a, Kauai 11–*Melicope puberula*–c, Kauai 23–*Melicope puberula*–f, Kauai 24–*Melicope puberula*–g, and Kauai 25–*Melicope puberula*–h, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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 LII)

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 (914 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 20–*Platydesma rostrata*–m, the primary constituent elements of critical habitat are:

(A) Elevation: Less than 3,000 ft (914 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, Kadua, Melicope.*

(F) Understory: *Alyxia, Cyrtandra, Dicranopteris, Diplazium, Machaerina, Microlepia.*

(iii) In units Kauai 11–*Platydesma rostrata*–j, Kauai 21–*Platydesma rostrata*–n, and Kauai 22–*Platydesma rostrata*–o, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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, Kadua, 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 23–*Platydesma rostrata*–p, Kauai 24–*Platydesma rostrata*–q, and Kauai 25–*Platydesma rostrata*–r, the primary constituent elements of critical habitat are:

(A) Elevation: 3,000 to 5,243 ft (914 to 1,598 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 18–*Platydesma rostrata*–k, and Kauai 19–*Platydesma rostrata*–l, 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, Kadua, Peperomia.*

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FAMILY ASPLENIACEAE: *Diellia mannii* (NCN)

Kauai 11–*Diellia mannii*–a, Kauai 21–*Diellia mannii*–b, and Kauai 22–*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 5,243 ft (914 to 1,598 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, Kadua, 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 23–*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 5,243 ft (914 to 1,598 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 (914 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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**Thomas L. Strickland**

*Assistant Secretary for Fish and Wildlife and Parks*

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