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Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

**Endangered and Threatened Wildlife and
Plants; Final Designation of Critical
Habitat for Three Plant Species From the
Island of Lanai, Hawaii; Final Rule**

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AH10

Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Three Plant Species From the Island of Lanai, Hawaii

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat pursuant to the Endangered Species Act of 1973, as amended (Act), for three of the 37 species known historically from the Hawaiian island of Lanai. The three species are *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi*. A total of approximately 320 hectares (789 acres) of land on Lanai fall within the

boundaries of the six critical habitat units designated for the three species. This critical habitat designation provides additional protection under section 7 of the Act with regard to actions carried out, funded, or authorized by a Federal agency. Section 4 of the Act requires us to consider economic and other relevant impacts when specifying any particular area as critical habitat. We solicited data and comments from the public on all aspects of the proposed rule, including data on economic and other impacts of the designation.

DATES: This rule becomes effective on February 10, 2003.

ADDRESSES: Comments and materials received, as well as supporting documentation, used in the preparation of this final rule will be available for public inspection, by appointment, during normal business hours at U.S. Fish and Wildlife Service, Pacific Islands Office, 300 Ala Moana Blvd., Room 3-122, P.O. Box 50088, Honolulu, HI 96850-0001.

FOR FURTHER INFORMATION CONTACT: Paul Henson, Field Supervisor, Pacific Islands Office at the above address (telephone 808/541-3441; facsimile 808/541-3470).

SUPPLEMENTARY INFORMATION:

Background

In the Lists of Endangered and Threatened Plants (50 CFR 17.12), there are 37 plant species that, at the time of listing, were reported from the island of Lanai (Table 1). Seven of these species are endemic to the island of Lanai, while 30 species are reported from one or more other islands, as well as Lanai. Each of the 37 species is described in more detail below in the section, "Discussion of Plant Taxa." Although we considered designating critical habitat on Lanai for each of the 37 plant species, for the reasons described below, the final designation includes critical habitat for only 3 of 37 plant species. Species that also occur on other islands may have critical habitat designated on other islands in subsequent rulemakings.

TABLE 1.—SUMMARY OF ISLAND DISTRIBUTION OF 37 SPECIES FROM LANAI

Species	Island distribution						
	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	N.W. Isles, Kahoolawe, Niihau
<i>Abutilon eremitopetalum</i> (NCN)				C			
<i>Adenophorus periens</i> (pendant kiki fern).	C	H	C	R	R	C	
<i>Bidens micrantha</i> ssp. <i>kalealaha</i> (kookoolau).				C	C		
<i>Bonamia menziesii</i> (NCN)	C	C	H	C	C	C	
<i>Brighamia rockii</i> (pua ala)			C	H	H		
<i>Cenchrus agrimonioides</i> (kamanomano, sandbur, agrimony).		C		H	C	R	NW Isles (H)
<i>Centaurium sebaeoides</i> (awiwi)	C	C	C	C	C		
<i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i> (oha wai).				C	C		
<i>Ctenitis squamigera</i> (pauoa)	H	C	C	C	C	H	
<i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> (haha).		C	C	C	C		
<i>Cyanea lobata</i> (haha)				H	C		
<i>Cyanea macrostegia</i> ssp. <i>gibsonii</i> (NCN).				C			
<i>Cyperus trachysanthos</i> (puukaa) ..	C	C	H	H			Ni (C)
<i>Cyrtandra munroi</i> (haiwale)				C	C		
<i>Diellia erecta</i> (NCN)	C	C	C	H	C	C	
<i>Diplazium molokaiense</i> (NCN)	H	H	H	H	C		
<i>Gahnia lanaiensis</i> (NCN)				C			
<i>Hedyotis mannii</i> (pilo)			C	C	C		
<i>Hedyotis schlechtendahliana</i> var. <i>remyi</i> (kopa).				C			
<i>Hesperomannia arborescens</i> (NCN).		C	C	H	C		
<i>Hibiscus brackenridgei</i> (mao hau hele).	H	C	H	C	C	C	Ka (R)
<i>Isodendron pyrifolium</i> (wahine noho kula).		H	H	H	H	C	Ni (H)
<i>Labordia tinifolia</i> var. <i>lanaiensis</i> (kamakahala).				C			
<i>Mariscus fauriei</i> (NCN)			C	H		C	
<i>Melicope munroi</i> (alani)			H	C			

TABLE 1.—SUMMARY OF ISLAND DISTRIBUTION OF 37 SPECIES FROM LANAI—Continued

Species	Island distribution						
	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	N.W. Isles, Kahoolawe, Niihau
<i>Neraudia sericea</i> (NCN)			C	H	C		Ka (H)
<i>Phyllostegia glabra</i> var. <i>lanaiensis</i> (NCN).				H			
<i>Portulaca sclerocarpa</i> (poe)				C		C	
<i>Sesbania tomentosa</i> (ohai)	C	C	C	H	C	C	Ni (H), Ka (C), NW Isles (C)
<i>Silene lanceolata</i> (NCN)	H	C	C	H		C	
<i>Solanum incompletum</i> (popolo ku mai).	H		H	H	H	C	
<i>Spermolepis hawaiiensis</i> (NCN) ...	C	C	C	C	C	C	
<i>Tetramolopium lepidotum</i> ssp. <i>lepidotum</i> (NCN).		C		H			
<i>Tetramolopium remyi</i> (NCN)				C	H		
<i>Vigna o-wahuensis</i> (NCN)		H	C	C	C	C	Ni (H), Ka (C)
<i>Viola lanaiensis</i> (NCN)				C			
<i>Zanthoxylum hawaiiense</i> (ae)	C		C	H	C	C	

Key

C (Current)—occurrence last observed within the past 30 years.

H (Historical)—occurrence not seen for more than 30 years.

R (Reported)—reported from undocumented observations.

* NCN—No Common Name.

The Island of Lanai

Lanai is a small island totaling about 360 square kilometers (sq km) (139 sq miles (mi) in area. Hidden from the trade winds in the lee or rain shadow of the more massive West Maui Mountains, Lanai was formed from a single shield volcano built by eruptions at its summit and along three rift zones. The principal rift zone runs in a northwesterly direction and forms a broad ridge whose highest point, Lanaihale, has an elevation of 1,027 meters (m) (3,370 feet (ft)). The entire ridge is commonly called Lanaihale, after its highest point. Annual rainfall on the summit of Lanaihale is 760 to 1,015 millimeters (mm) (30 to 40 inches (in)), but is considerably less, 250 to 500 mm (10 to 20 in), over much of the rest of the island (Department of Geography 1998).

Geologically, Lanai is part of the four-island complex comprising Maui, Molokai, Lanai, and Kahoolawe, known collectively as Maui Nui (Greater Maui). During the last Ice Age about 12,000 years ago, when sea levels were about 160 m (525 ft) below their present level, these four islands were connected by a broad lowland plain. This land bridge allowed the movement and interaction of each island's flora and fauna and contributed to the present close relationships of their biota (Department of Geography 1998).

Changes in Lanai's ecosystem began with the arrival of the first Polynesians about 1,500 years ago. In the 1800s, goats (*Capra hircus*), pigs (*Sus scrofa*), and sheep (*Ovis aries*) were first

introduced to the island. Native vegetation was soon decimated by these nonnative ungulates, and erosion from wind and rain caused further damage to the native forests. Formal ranching was begun in 1902, and by 1910, the Territorial forester helped to revegetate the island. By 1911, a ranch manager from New Zealand, George Munro, instituted forest management practices to recover the native forests and bird species which included fencing and eradication of sheep and goats from the mountains. Mouflon sheep (*Ovis musimon*) and axis deer (*Axis axis*) were introduced to Lanai in 1954 and 1920 respectively, leading to renewed impacts on the native vegetation. By the 1920s, Castle and Cooke had acquired more than 98 percent of the island and established a 6,500 ha (16,000 ac) pineapple plantation surrounding its company town, Lanai City. In the early 1990s, the pineapple plantation closed, and two luxury hotels were developed by the private landowner, sustaining the island's economy today (Hobdy 1993).

There are no military installations on the island of Lanai.

Discussion of Plant Taxa**Species Endemic to Lanai*****Abutilon eremitopetalum* (NCN)**

Abutilon eremitopetalum is a long-lived shrub in the mallow family (Malvaceae) with grayish-green, densely hairy, and heart-shaped leaves. It is the only *Abutilon* species on Lanai whose flowers have green petals hidden within

the calyx (the outside leaf-like part of the flower) (Bates 1999).

Abutilon eremitopetalum is known to flower during February. Little else is known about the life history of this species. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Abutilon eremitopetalum* was found in small, widely scattered colonies in the ahupuaa (geographical areas) of Kalulu, Mahana, Maunalei, Mamaki, and Paawili on the northern, northeastern, and eastern parts of Lanai. Currently, about seven individuals are known from a single occurrence on privately owned land in Kahea Gulch on the northeastern part of the island (Caum 1933; Geographic Decision Systems International (GDSI) 2000; Hawaii Natural Heritage Program (HINHP) Database 2000; Service 1995).

Abutilon eremitopetalum is found in lowland dry forest at elevations between 108 and 660 m (354 and 2,165 ft), on a moderately steep north-facing slope on red sandy soil and rock, usually near gulch bottoms. *Erythrina sandwicensis* (wiliwili) and *Diospyros sandwicensis* (lama) are the dominant trees in open forest of the area. Other associated native species include *Dodonaea viscosa* (aalii), *Nesoluma polynesianum* (keahi), *Psydrax odorata* (alahee), *Rauwolfia sandwicensis* (hao), *Sida fallax* (ilima), or *Wikstroemia* sp. (akia) (HINHP Database 2000; Service 1995).

The threats to *Abutilon eremitopetalum* are habitat degradation

and competition by encroaching nonnative plant species such as *Lantana camara* (lantana), *Leucaena leucocephala* (koa haole), and *Pluchea carolinensis* (sourbush); browsing by axis deer; soil erosion caused by feral ungulate grazing on grasses and forbs; and the small number of extant individuals, as the limited gene pool may depress reproductive vigor, or a single natural or man-caused environmental disturbance could destroy the only known existing occurrence. Fire is another potential threat because the area is dry much of the year (HINHP Database 2000; Service 1995; 56 FR 47686).

Cyanea macrostegia ssp. *gibsonii* (NCN)

Cyanea macrostegia ssp. *gibsonii*, a long-lived perennial and a member of the bellflower family (Campanulaceae), is a palm-like tree 1 to 7 m (3 to 23 ft) tall with elliptic or oblong leaves that have fine hairs covering the lower surface. The following combination of characters separates this species from the other members of the genus on Lanai: calyx lobes are oblong, narrowly oblong, or ovate in shape, and the calyx and corolla (petals of a flower) are both more than 5 mm (0.2 in) wide (Lammers 1999; 56 FR 47686).

Limited observations suggest *Cyanea macrostegia* ssp. *gibsonii* flowers during the month of July. Pollination vectors, seed dispersal agents, longevity of plants and seeds, specific environmental requirements, and other limiting factors are unknown (Service 1995).

Cyanea macrostegia ssp. *gibsonii* has been documented from the summit of Lanaihale and the upper parts of Mahana, Kaiholena, and Maunalei Valleys of Lanai. There are currently only two occurrences containing 74 individuals. One occurrence is located north of Lanaihale and the second occurrence is north of Puu Aalii (puu = summit or hill) on privately owned land (GDSI 2000; HINHP Database 2000; Lammers 1999; 56 FR 47686).

The habitat of *Cyanea macrostegia* ssp. *gibsonii* is lowland wet *Metrosideros polymorpha* (ohia) forest or *Diplopterygium pinnatum* (uluhe lau nui)-*M. polymorpha* shrubland between elevations of 738 and 1,032 m (2,421 and 3,385 ft). It has been observed to grow on flat to moderate or steep slopes, usually on lower gulch slopes or gulch bottoms, often at edges of streambanks, probably due to vulnerability to ungulate damage at more accessible locations. Associated vegetation includes *Antidesma platyphyllum* (hame), *Broussaisia arguta* (kanawao), *Cheirodendron trigynum* (olapa),

Clermontia sp. (oha wai), *Cyrtandra* sp. (haiwale), *Dicranopteris linearis* (uluhe), *Dubautia* sp. (naenae), *Freycinetia arborea* (ieie), *Hedyotis* sp. (NCN), *Ilex anomala* (kawau), *Labordia* sp. (kamakahala), *Melicope* sp. (alani), *Perrottetia sandwicensis* (olomea), *Pipturus albidus* (mamaki), *Pneumatopteris sandwicensis* (NCN), *Psychotria* sp. (kopiko), *Sadleria* sp. (amau), or *Scaevola chamissoniana* (naupaka kuahiwi) (HINHP Database 2000; Service 1995; Joel Lau, HINHP, pers. comm., 2001).

The threats to *Cyanea macrostegia* ssp. *gibsonii* are browsing by axis deer; competition with the nonnative plant *Hedychium gardnerianum* (kahili ginger); and the small number of extant individuals, as the limited gene pool may depress reproductive vigor, or any natural or man-caused environmental disturbance could destroy the existing occurrences (HINHP Database 2000; Service 1995; 56 FR 47686).

Gahnia lanaiensis (NCN)

Gahnia lanaiensis, a short-lived perennial and a member of the sedge family (Cyperaceae), is a tall (1.5 to 3 m (5 to 10 ft)), tufted, grass-like plant. This sedge may be distinguished from grasses and other genera of sedges on Lanai by its spirally arranged flowers, its solid stems, and its numerous, three-ranked leaves. *Gahnia lanaiensis* differs from the other members of the genus on the island by its achenes (seed-like fruits), which are 3.6 to 4.6 mm (0.14 to 0.18 in) long and purplish-black when mature (Koyama 1999).

July has been described as the "end of the flowering season" for *Gahnia lanaiensis*. Plants of this species have been observed with fruit in October. Pollination vectors, seed dispersal agents, longevity of plants and seeds, specific environmental requirements, and other limiting factors are unknown (Degener *et al.*, 1964; 56 FR 47686).

Gahnia lanaiensis is known from one occurrence containing 47 individuals on privately owned land along the summit of Lanaihale in the Haalelepaakai area and on the eastern edge of Hauola Gulch. The occurrence is found between 915 and 1,030 m (3,000 and 3,380 ft) in elevation. This distribution encompasses the entire known historic range of the species (GDSI 2000; HINHP Database 2000).

The habitat of *Gahnia lanaiensis* is lowland wet forest (shrubby rainforest to open scrubby fog belt or degraded lowland mesic forest), wet *Diplopterygium pinnatum*-*Dicranopteris linearis*-*Metrosideros polymorpha* shrubland, or wet *M. polymorpha*-*Dicranopteris linearis* shrubland at

elevations between 737 and 1,032 m (2,417 and 3,385 ft). It occurs on flat to gentle ridgecrest topography in moist to wet clay or other soil substrate in open areas or in moderate shade. Associated species include native mat ferns, *Coprosma* sp. (pilo), *Doodia* sp. (okupukupu laulii), *Hedyotis terminalis* (manono), *Ilex anomala*, *Leptecophylla tameiameiae* (pukiawe), *Lycopodium* sp. (wawaeiole), *Sadleria* spp. (amau), *Scaevola* sp. (naupaka), or *Sphenomeris chinensis* (palaa) (Service 1995).

The primary threats to this species are the small number of plants and their restricted distribution, which increase the potential for extinction from naturally occurring events. In addition, *Gahnia lanaiensis* is threatened by habitat destruction resulting from the planned development of the island, and competition with *Leptospermum scoparium* (manuka), a weedy tree introduced from New Zealand, which is spreading along Lanaihale, but has not yet reached the area where *Gahnia* is found (HINHP Database 2000; Service 1995).

Hedyotis schlechtendahliana var. *remyi* (kopa)

Hedyotis schlechtendahliana var. *remyi*, a short-lived perennial and a member of the coffee family (Rubiaceae), is a few-branched subshrub from 0.6 to 6 m (2 to 10 ft) long, with weakly erect or climbing stems that may be somewhat square, smooth, and glaucous (with a fine waxy coating that imparts a whitish or bluish hue to the stem). The species is distinguished from others in the genus by the distance between leaves and the length of the sprawling or climbing stems, and the variety *remyi* is distinguished from *H. schlechtendahliana* var. *schlechtendahliana* by the leaf shape, presence of narrow flowering stalks, and flower color (Wagner *et al.*, 1999).

Pollination vectors, seed dispersal agents, longevity of plants and seeds, specific environmental requirements, and other limiting factors are unknown for *Hedyotis schlechtendahliana* var. *remyi* (Service 2001).

Historically, *Hedyotis schlechtendahliana* var. *remyi* was known from five locations on the northwestern portion of Lanaihale. Currently, this species is known from eight individuals in two occurrences on privately owned land on Kaiholeha-Hulupoe Ridge, Kapohaku drainage, and Waiapaa drainage on Lanaihale (GDSI 2000; HINHP Database 2000; 64 FR 48307).

Hedyotis schlechtendahliana var. *remyi* typically grows on or near ridge crests in mesic windswept shrubland

with a mixture of dominant plant species that may include *Metrosideros polymorpha*, *Dicranopteris linearis*, or *Leptecophylla tameiameia* at elevations between 558 and 1,032 m (1,830 and 3,385 ft). Associated plant species include *Dodonaea viscosa*, *Dubautia* spp., *Myrsine* sp. (kolea), *Sadleria* spp., or *Sphenomeris chinensis* (HINHP Database 2000; 64 FR 48307).

The primary threats to *Hedyotis schlechtendahliana* var. *remyi* are habitat degradation and destruction by axis deer; competition with nonnative plant species, such as *Leptospermum scoparium*, *Myrica faya* (firetree), *Psidium cattleianum* (strawberry guava), or *Schinus terebinthifolius* (Christmasberry); and random environmental events or reduced reproductive vigor due to the small number of remaining individuals and occurrences (HINHP Database 2000; 64 FR 48307).

Labordia tinifolia var. *lanaiensis* (kamakahala)

Labordia tinifolia var. *lanaiensis*, a short-lived perennial in the logan family (Loganiaceae), is an erect shrub or small tree 1.2 to 15 m (4 to 49 ft) tall. The stems branch regularly into two forks of nearly equal size. This subspecies differs from the other species in this endemic Hawaiian genus by having larger capsules (a dry, generally many seeded fruit) and smaller corollas (petals, whorl of flower parts) (Wagner *et al.*, 1999).

Little is known about the life history of *Labordia tinifolia* var. *lanaiensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 2001).

Labordia tinifolia var. *lanaiensis* was historically known from the entire length of the summit ridge of Lanaihale. Currently, *L. tinifolia* var. *lanaiensis* is known from only one occurrence on privately owned land at the southeastern end of the summit ridge of Lanaihale. This occurrence totals 3 to 8 scattered individuals (GDSI 2000; HINHP Database 2000; Service 2001).

The typical habitat of *Labordia tinifolia* var. *lanaiensis* is gulch slopes in lowland mesic forest. Associated native species include *Alyxia oliviformis* (maile), *Bobea elatior* (ahakea launui), *Clermontia* spp., *Coprosma* spp., *Cyrtandra grayana* (haiwale), *Dicranopteris linearis*, *Diospyros sandwicensis*, *Diplopterygium pinnatum*, *Freycinetia arborea*, *Hedyotis acuminata* (au), *Melicope* spp., *Myrsine lessertiana* (kolea), *Perrottetia sandwicensis*,

Pipturus albidus, *Pittosporum confertiflorum* (hoawa), *Pleomele fernaldii* (hala pepe), *Pouteria sandwicensis* (alaa), *Psychotria* spp., *Sadleria cyatheoides* (amau), *Scaevola chamissoniana*, or *Xylosma hawaiiense* (maua) at elevations between 550 and 1,013 m (1,804 and 3,323 ft) (HINHP Database 2000; Service 2001; 64 FR 48307).

Labordia tinifolia var. *lanaiensis* is threatened by axis deer and several nonnative plant species. The species is also threatened by random environmental factors or reduced reproductive vigor because of the small population (Service 2001; 64 FR 48307).

Phyllostegia glabra var. *lanaiensis* (NCN)

Phyllostegia glabra var. *lanaiensis* is a robust, erect to decumbent (reclining, with the end ascending), glabrous, short-lived perennial herb in the mint family (Lamiaceae). Its leaves are thin and narrow, often red-tinged or with red veins, and toothed at the edges. The flowers are white, occasionally tinged with purple, and are variable in size, about 1 to 2.5 centimeters (cm) (0.4 to 1.0 in) long. This variety is very similar to *Phyllostegia glabra* var. *glabra*; it may be difficult to differentiate between the two species without flowers (Wagner *et al.*, 1999).

Little is known about the life history of *Phyllostegia glabra* var. *lanaiensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Phyllostegia glabra var. *lanaiensis* is known from only two collections from Lanai (one near Kaiholena) and was last collected in 1914 (two fertile specimens). A report of this plant from the early 1980s probably was erroneous and should be referred to as *Phyllostegia glabra* var. *glabra* (Robert Hobdy, Hawaii Division of Forestry and Wildlife (DOFAW), pers. comm., 1992; Service 1995).

Nothing is known of the preferred habitat of or native plant species associated with *Phyllostegia glabra* var. *lanaiensis* on the island of Lanai (Service 1995).

Nothing is known of the threats to *Phyllostegia glabra* var. *lanaiensis* on the island of Lanai (Service 1995).

Viola lanaiensis (NCN)

Viola lanaiensis, a short-lived perennial of the violet family (Violaceae), is a small, erect, unbranched or little-branched subshrub. The leaves, which are clustered toward the upper part of the stem, are lance-

shaped with a pair of narrow, membranous stipules (leaf-like appendages arising from the base of a leaf) below each leaf axis. The flowers are small and white with purple-tinged or purple veins, and occur singly or up to four per upper leaf axil. The fruit is a capsule, about 1.0 to 1.3 cm (0.4 to 0.5 in) long. It is the only member of the genus on Lanai (Wagner *et al.*, 1999).

Little is known about the life history of *Viola lanaiensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Viola lanaiensis was known historically from scattered sites on the summit, ridges, and upper slopes of Lanaihale (from near the head of Kaiolena and Hookio Gulches to the vicinity of Haalelepaakai, a distance of about 4 km (2.5 mi)), at elevations of approximately 850 to 975 m (2,790 to 3,200 ft). An occurrence of *V. lanaiensis* was known in the late 1970s along the summit road near the head of Waiialala Gulch where an occurrence of approximately 20 individuals flourished. That occurrence has since disappeared due to habitat disturbance. Two occurrences are currently known from privately owned land on southern Lanai: In Kunoa Gulch, between Kunoa and Waiialala Gulches; and in the upper end of the northernmost drainage of Awehi Gulch, in Hauola Gulch and along Hauola Trail. It is estimated that the occurrences total less than 80 plants (GDSI 2000; HINHP Database 2000).

The habitat of *Viola lanaiensis* is *Metrosideros polymorpha*-*Dicranopteris linearis* lowland wet forest or lowland mesic shrubland. The species has been observed on moderate to steep slopes from lower gulches to ridgetops, at elevations between 639 and 1,032 m (2,096 and 3,385 ft), with a soil and decomposed rock substrate in open to shaded areas. It was once observed growing from crevices in drier soil on a mostly open rock area near a recent landslide. Associated vegetation includes ferns and short windswept shrubs or other diverse mesic community members, such as *Antidesma* spp. (hame), *Carex* sp. (NCN), *Coprosma* spp., *Freycinetia arborea*, *Hedyotis centranthoides* (NCN), *Hedyotis terminalis*, *Ilex anomala*, *Leptecophylla tameiameia*, *Myrsine* spp., *Nestegis sandwicensis* (olopua), *Psychotria* spp., *Scaevola chamissoniana*, or *Xylosma* sp. (Service 1995; 56 FR 47686).

The main threats to *Viola lanaiensis* include browsing and habitat disturbance by axis deer; encroaching

nonnative plant species, such as *Leptospermum* sp. (NCN); depressed reproductive vigor due to a limited local gene pool; the probable loss of appropriate pollinators; and predation by slugs (*Midax gigetes*) (Service 1995; 56 FR 47686).

Multi-Island Species

Adenophorus periens (pendent kihi fern)

Adenophorus periens, a member of the grammitis family (Grammitidaceae), is a small, pendant, epiphytic (not rooted on the ground), and short-lived perennial fern. This species differs from other species in this endemic Hawaiian genus by having hairs along the pinna (leaflet) margins, pinnae at right angles to the midrib axis, placement of the sori on the pinnae, and by the degree of dissection of each pinna (Linney 1989).

Little is known about the life history of *Adenophorus periens*, which seems to grow only in closed canopy dense forest with high humidity. Its breeding system is unknown, but outbreeding is very likely to be the predominant mode of reproduction. Spores (minute, reproductive dispersal unit of ferns and fern allies) may be dispersed by wind, water, or perhaps on the feet of birds or insects. *Adenophorus periens* spores lack a thick resistant coat, which may indicate their longevity is brief, probably measured in days at most. Additional information on reproductive cycles, longevity, specific environmental requirements, and limiting factors is not known (Linney 1989; Service 1999).

Historically, *Adenophorus periens* was known from Kauai, Oahu, and the island of Hawaii, with undocumented reports from Lanai and Maui. Currently, it is known from several locations on Kauai, Molokai, and Hawaii. On Lanai, it was last seen in the 1860s (GDSI 2000; HINHP Database 2000; Service 1999; 59 FR 56333).

This epiphytic species, usually growing on *Metrosideros polymorpha* trunks, is found in riparian banks of stream systems in well-developed, closed canopy that provides deep shade or high humidity in *M. polymorpha-Dicranopteris linearis-Diplopterygium pinnatum* wet forests, open *M. polymorpha* montane wet forest, or *M. polymorpha-D. linearis* lowland wet forest at elevations between 763 and 1,032 m (2,503 and 3,385 ft). Associated native plant species include *Broussaisia arguta*, *Cheirodendron trigynum*, *Clermontia* spp., *Freycinetia arborea*, *Hedyotis terminalis*, *Machaerina angustifolia* (uki), *Melicope* spp., *Psychotria* spp., *Sadleria* spp., or

Syzygium sandwicensis (ohia ha) (Linney 1989; Service 1999; 59 FR 56333; Kenneth Wood, National Tropical Botanical Garden, pers. comm., 2001).

Nothing is known of the threats to *Adenophorus periens* on the island of Lanai because the species was last seen there in the 1860s.

Bidens micrantha ssp. *kalealaha* (kookoolau)

Bidens micrantha ssp. *kalealaha*, a short-lived member of the aster family (Asteraceae), is an erect perennial herb. This subspecies can be distinguished from other subspecies by the shape of the seeds, the density of the flower clusters, the numbers of ray and disk florets per head, differences in leaf surfaces, and other characteristics (Ganders and Nagata 1999; 57 FR 20772).

Bidens micrantha is known to hybridize with other native *Bidens*, such as *B. mauiensis* and *B. menziesii*, and possibly *B. conjuncta*. Little else is known about the life history of *B. micrantha* ssp. *kalealaha*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, and specific environmental requirements are unknown (Ganders and Nagata 1999; Service 1997; 57 FR 20772).

Historically, *Bidens micrantha* ssp. *kalealaha* was known from Lanai and Maui. Currently, this species remains on East Maui and there is one Lanai occurrence in the Waiapaa Gulch area on privately owned land (Ganders and Nagata 1999; GDSI 2000; HINHP Database 2000; Service 1997; 57 FR 20772; HINHP Database 2000; R. Hobdy, pers. comm., 2002).

The habitat of *Bidens micrantha* ssp. *kalealaha* is gulch slopes in dry *Dodonaea viscosa* shrubland at elevations between 409 and 771 m (1,342 and 2,529 ft) (J. Lau, pers. comm., 2001).

The threats to this species on Lanai include habitat destruction by axis deer and mouflon sheep; competition from a variety of nonnative plant species; depressed reproductive vigor due to a limited local gene pool; and fire (Service 1997; 57 FR 20772).

Bonamia menziesii (NCN)

Bonamia menziesii, a short-lived perennial and a member of the morning-glory family (Convolvulaceae), is a vine with twining branches that are fuzzy when young. This species is the only member of the genus that is endemic to the Hawaiian Islands and differs from other genera in the family by its two styles (narrowed top of ovary), longer stems and petioles (a stalk that supports

a leaf), and rounder leaves (Austin 1999).

Little is known about the life history of *Bonamia menziesii*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Bonamia menziesii* was known from Kauai, Oahu, Molokai, West Maui, and Hawaii. Currently, this species is known from Kauai, Oahu, Maui, Hawaii, and Lanai. On Lanai, the three occurrences, containing a total of 14 individual plants, are found on privately owned land in the Ahakea and Kanepuu Units of Kanepuu Preserve, and on Puhielelu Ridge (GDSI 2000; HINHP Database 2000).

Bonamia menziesii is found in dry *Nestegis sandwicensis-Diospyros sandwicensis* forest and dry *Dodonaea viscosa* shrubland at elevations between 315 and 885 m (1,033 and 2,903 ft). Associated species include *Bohea* sp. (ahakea), *Dianella sandwicensis* (uki uki), *Diospyros sandwicensis*, *Erythrina sandwicensis*, *Hedyotis terminalis*, *Melicope* sp., *Metrosideros polymorpha*, *Myoporum sandwicense* (naio), *Nesoluma polynesianum*, *Nestegis sandwicensis* (olopua), *Pisonia* sp. (papala kepau), *Pittosporum* sp. (hoawa), *Pouteria sandwicensis*, *Psydrax odorata*, or *Rauvolfia sandwicensis* (HINHP Database 2000; 59 FR 56333).

The primary threats to this species on Lanai are habitat degradation and possible predation by mouflon sheep and axis deer; depressed reproductive vigor due to a limited local gene pool; competition with a variety of nonnative plant species, such as *Lantana camara*, *Leucaena leucocephala* or *Schinus terebinthifolius*; and a nonnative beetle (*Physomerus grossipes*) (Service 1999; 59 FR 56333).

Brighamia rockii (pua ala)

Brighamia rockii, a long-lived perennial member of the bellflower family (Campanulaceae), grows as an unbranched stem-succulent with a thickened stem that tapers from the base. This species is a member of a unique endemic Hawaiian genus with only one other species, found on Kauai, from which it differs by the color of its petals, its longer calyx (fused sepals) lobes, and its shorter flower stalks (Lammers 1999).

Observations of *Brighamia rockii* have provided the following information: The reproductive system is protandrous, meaning male flower parts are produced before female parts, in this case, separated by several days; only five

percent of the flowers produce pollen; very few fruits are produced per inflorescence; there are 20 to 60 seeds per capsule; and plants in cultivation have been known to flower at nine months of age. This species was observed in flower during August. Little else is known about the life history of *Brighamia rockii*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (HINHP Database 2000; Service 1996b; 57 FR 46325).

Historically, *Brighamia rockii* ranged along the northern coast of East Molokai from Kalaupapa to Halawa, may possibly have grown on Maui, and was last seen on Lanai in 1911. Currently, it is extant only on Molokai (HINHP Database 2000; Lammers 1999; Service 1996b; 57 FR 46325; K. Wood, *in litt.* 2000).

On Lanai, *Brighamia rockii* occurred on sparsely vegetated ledges of steep, rocky, dry cliffs, at elevations between 119 and 756 m (390 and 2,480 ft) with native grasses, sedges, herbs and shrubs (Service 1996b; 57 FR 46325; J. Lau, pers. comm., 2001).

Threats to *Brighamia rockii* on the island of Lanai included habitat destruction from axis deer and mouflon sheep, competition with nonnative plants, and depressed reproductive vigor due to a limited local gene pool (Service 1996b).

Cenchrus agrimonioides (kamanomano (= sandbur, agrimony))

Cenchrus agrimonioides is a short-lived perennial member of the grass family (Poaceae) with leaf blades that are flat or folded and have a prominent midrib. There are two varieties, *Cenchrus agrimonioides* var. *laysanensis* and *Cenchrus agrimonioides* var. *agrimonioides*. They differ from each other in that var. *agrimonioides* has smaller burs, shorter stems, and narrower leaves. This species is distinguished from others in the genus by the cylindrical to lance-shaped bur and the arrangement and position of the bristles (O'Connor 1999).

Little is known about the life history of *Cenchrus agrimonioides*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown. This species has been observed to produce fruit year-round (Service 1999; 61 FR 53108).

Historically, *Cenchrus agrimonioides* var. *agrimonioides* was known from Oahu, Lanai, Maui, and an undocumented report from the Island of

Hawaii. Historically, *C. agrimonioides* var. *laysanensis* was known from Laysan, Kure, and Midway, all within what is now the Northwestern Hawaiian Islands National Wildlife Refuge. This variety was never known from the island of Lanai. Currently, *Cenchrus agrimonioides* var. *agrimonioides* is known from Oahu and Maui. On Lanai it was last seen in 1915 (HINHP Database 2000; Service 1999; 61 FR 53108).

Cenchrus agrimonioides var. *agrimonioides* was found on slopes in mesic *Metrosideros polymorpha* forest or shrubland at elevations between 583 and 878 m (1,912 and 2,880 ft) (HINHP Database 2000; Service 1999; 61 FR 53108; R. Hobdy, pers. comm., 2001).

The major threats to *Cenchrus agrimonioides* var. *agrimonioides* on Lanai included competition with nonnative plant species; browsing and habitat degradation by axis deer, mouflon sheep, and cattle (*Bos taurus*); and depressed reproductive vigor due to a limited local gene pool (Service 1999; 61 FR 53108).

Centaurium sebaeoides (awiwī)

Centaurium sebaeoides, a member of the gentian family (Gentianaceae), is an annual herb with fleshy leaves and stalkless flowers. This species is distinguished from *Centaurium erythraea*, which is naturalized in Hawaii, by its fleshy leaves and the unbranched arrangement of the flower cluster (Wagner *et al.*, 1999).

Centaurium sebaeoides has been observed flowering in April. Flowering may be induced by heavy rainfall. Occurrences are found in dry areas, and plants are more likely to be found following heavy rains. Little else is known about the life history of *Centaurium sebaeoides*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Centaurium sebaeoides was historically and is currently known from Kauai, Oahu, Molokai, Lanai, and Maui. On Lanai, there is one occurrence containing between 20 and 30 individual plants in Maunalei Valley on privately owned land (HINHP Database 2000).

This species is found on dry ledges at elevations between 39 and 331 m (128 and 1,086 ft). Associated species include *Hibiscus brackenridgei* (HINHP Database 2000).

The major threats to this species on Lanai are competition from nonnative plant species, grazing and habitat destruction caused by axis deer and

mouflon sheep, depressed reproductive vigor, and natural or human-caused environmental disturbance that could easily be catastrophic to the only known population due to the small number of remaining individuals and the limited and scattered distribution of the species (HINHP Database 2000; Service 1999; R. Hobdy *in litt.* 2002).

Clermontia oblongifolia ssp. *mauiensis* (oha wai)

Clermontia oblongifolia ssp. *mauiensis*, a short-lived perennial and a member of the bellflower family (Campanulaceae), is a shrub or tree with oblong to lance-shaped leaves with petioles. *Clermontia oblongifolia* is distinguished from other members of the genus by its calyx and corolla, which are similar in color and are each fused into a curved tube that falls off as the flower ages. *Clermontia oblongifolia* ssp. *mauiensis* is reported from Maui and Lanai, while the other two subspecies of this species are only known from Oahu and Molokai (Lammers 1988, 1999; 57 FR 20772).

Clermontia oblongifolia ssp. *mauiensis* is known to flower from November to July. Little else is known about the life history of *C. oblongifolia* ssp. *mauiensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Rock 1919; Service 1997).

Clermontia oblongifolia ssp. *mauiensis* was historically and is currently known from Lanai and Maui. On Lanai, an unknown number of individuals has been reported from Kaiholena Gulch on privately owned land (HINHP Database 2000; Lammers 1999; 57 FR 20772).

This plant typically grows in gulch bottoms in mesic forests at elevations between 700 and 1,032 m (2,296 and 3,385 ft) (HINHP Database 2000).

The threats to this species on Lanai are its vulnerability to extinction from a single natural or human-caused environmental disturbance; depressed reproductive vigor; and habitat degradation by axis deer and mouflon sheep (Service 1997; 57 FR 20772).

Ctenitis squamigera (pauoa)

Ctenitis squamigera is a short-lived perennial fern and a member of the spleenwort family (Asplenaceae). It has a rhizome (horizontal stem), creeping above the ground and densely covered with scales similar to those on the lower part of the leaf stalk. It can be readily distinguished from other Hawaiian species of *Ctenitis* by the dense covering

of tan-colored scales on its frond (Wagner and Wagner 1992).

Little is known about the life history of *Ctenitis squamigera*. Its reproduction cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Ctenitis squamigera* was recorded from Kauai, Oahu, Molokai, Maui, Lanai, and the island of Hawaii. Currently, it is found on Oahu, Molokai, Maui, and Lanai. On Lanai, there are two occurrences totaling 42 individual plants on privately owned land in the Waiapaa-Kapohaku area on the leeward (southwestern) side of the island, and in the Lopa and Waiopa Gulches on the windward (northeastern) side (GDSI 2000; HINHP Database 2000; 59 FR 49025).

This species is found in the forest understory at elevations between 640 and 944 m (2,099 and 3,096 ft) in diverse mesic forest and scrubby mixed mesic forest. Associated native plant species include *Alyxia oliviformis*, *Antidesma* spp., *Blechnum occidentale* (NCN), *Boehmeria grandis* (akolea), *Carex meyenii* (NCN), *Coprosma* spp., *Cyrtandra* spp., *Doodia* spp., *Freycinetia arborea*, *Melicope* spp., *Metrosideros polymorpha*, *Microlepia* sp. (NCN), *Myrsine* spp., *Nephrolepis* sp. (kupukupu), *Nestegis sandwicensis*, *Peperomia* sp. (ala ala wai nui), *Perrottetia sandwicensis*, *Pipturus albidus*, *Pittosporum* spp., *Pneumatopteris sandwicensis*, *Psychotria* spp., *Sadleria* spp., *Selaginella* sp. (lepelepe a moa), *Syzygium sandwicensis*, *Wikstroemia* spp., or *Xylosma* sp. (HINHP Database 2000; 59 FR 49025).

The primary threats to this species on Lanai are habitat degradation by axis deer and mouflon sheep; competition with nonnative plant species, especially *Psidium cattleianum* and *Schinus terebinthifolius*; fire; decreased reproductive vigor; and extinction from naturally occurring events due to the small number of existing populations and individuals (Culliney 1988; HINHP Database 2000; Service 1998a; 59 FR 49025).

Cyanea grimesiana ssp. *grimesiana* (haha)

Cyanea grimesiana ssp. *grimesiana*, a short-lived perennial and a member of the bellflower family (Campanulaceae), is a shrub with pinnately divided leaves. This species is distinguished from others in this endemic Hawaiian genus by the pinnately lobed leaf margins and the width of the leaf blades. This subspecies is distinguished from the other two subspecies by the

shape and size of the calyx lobes, which overlap at the base (Lammers 1999).

On Molokai, flowering plants have been reported in July and August. Little else is known about the life history of *Cyanea grimesiana* ssp. *grimesiana*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Cyanea grimesiana ssp. *grimesiana* was historically and is currently known from Oahu, Molokai, Lanai, and Maui. Currently on Lanai there are two occurrences with at least three individuals on privately owned land in Kaiholena Gulch and Waiakeakua Gulch (HINHP Database 2000; Service 1999; 61 FR 53108;).

This species is typically found in mesic forest, often dominated by *Metrosideros polymorpha* or *Metrosideros polymorpha* and *Acacia koa* (koa), or on rocky or steep slopes of streambanks, at elevations between 667 and 1,032 m (2,188 and 3,385 ft). Associated native species include *Antidesma* spp., *Bobea* spp., *Myrsine* spp., *Nestegis sandwicensis*, *Psychotria* spp., or *Xylosma* sp. (Service 1999; 61 FR 53108).

The threats to this species on Lanai are habitat degradation and/or destruction caused by axis deer and mouflon sheep; competition with various nonnative plants; random naturally occurring events causing extinction due to the small number of existing individuals; fire; landslides; and predation by rats (*Rattus rattus*) and various species of slugs (Service 1999; 59 FR 53108).

Cyanea lobata (haha)

Cyanea lobata, a short-lived member of the bellflower family (Campanulaceae), is a sparingly branched perennial shrub with smooth to somewhat rough stems and oblong, irregularly lobed leaves. This species is distinguished from other species of *Cyanea* by the size of the flower and the irregularly lobed leaves with petioles (Lammers 1990).

Cyanea lobata is known to flower from August to February, even in individuals as small as 50 cm (20 in) in height. Little else is known about the life history of *Cyanea lobata*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Degener 1936; Rock 1919; Service 1997; 57 FR 20772).

Historically, *Cyanea lobata* was known from Lanai and West Maui. It was last seen on Lanai in 1934 (GDSI

2000; HINHP Database 2000; Service 1997; 57 FR 20772).

This species occurs in gulches in mesic to wet forest and shrubland at elevations between 664 and 1,032 m (2,178 and 3,385 ft) and containing one or more of the following associated native plant species: *Antidesma* spp., *Athyrium* spp. (akolea); *Cyrtandra* spp., *Freycinetia arborea*, *Metrosideros polymorpha*, *Morinda trimera* (noni kuahiwi), *Peperomia* spp., *Pipturus albidus*, *Pleomele fernaldii* (halapepe), *Psychotria* spp., *Touchardia latifolia* (olona), or *Xylosma* spp. (HINHP Database 2000; Service 1997; 57 FR 20772; J. Lau, pers. comm., 2001; and R. Hobdy, pers. comm., 2001).

The threats to this species on Lanai included habitat degradation by axis deer and mouflon sheep (Service 1997; 57 FR 20772).

Cyperus trachysanthos (puukaa)

Cyperus trachysanthos, a member of the sedge family (Cyperaceae), is a short-lived perennial grass-like plant with a short rhizome. The stems are densely tufted, obtusely triangular in cross-section, tall, sticky, and leafy at the base. This species is distinguished from others in the genus by the short rhizome, the leaf sheath with partitions at the nodes, the shape of the glumes (floral bracts), and the length of the stems (Koyama 1999).

Little is known about the life history of *Cyperus trachysanthos*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Cyperus trachysanthos* was known on Niihau and Kauai, and from scattered locations on Oahu, Molokai, and Lanai. Currently it is found on Kauai, Niihau and Oahu. It was last observed on Lanai in 1919 (GDSI 2000; HINHP Database 2000).

Cyperus trachysanthos is usually found in seasonally wet sites (mud flats, wet clay soil, or wet cliff seeps) on seepy flats or talus slopes in *Heteropogon contortus* (pili) grassland at elevations between 0 and 46 m (0 and 151 ft). *Hibiscus tiliaceus* (hau) is often found in association with this species (Koyama 1999; 61 FR 53108; J. Lau and K. Wood, pers. comms., 2001).

On Lanai, the threats to this species included the loss of wetlands and habitat degradation by axis deer and mouflon sheep (Service 1999; 61 FR 53108; R. Hobdy in litt. 2002).

Cyrtandra munroi (haiwale)

Cyrtandra munroi is a short-lived perennial and a member of the African

violet family (Gesneriaceae). It is a shrub with opposite, elliptic to almost circular leaves that are sparsely to moderately hairy on the upper surface and covered with velvety, rust-colored hairs underneath. This species is distinguished from other species of the genus by the broad opposite leaves, the length of the flower cluster stalks, the size of the flowers, and the amount of hair on various parts of the plant (Wagner *et al.*, 1999).

The reproductive biology of some species of *Cyrtandra* has been studied, but not *C. munroi* specifically. The studies of other members of the genus suggest that a specific pollinator may be necessary for successful pollination. Seed dispersal may be via birds, which eat the fruits. Flowering time, longevity of plants and seeds, specific environmental requirements, and other limiting factors are unknown (Service 1995).

Cyrtandra munroi was historically and is currently known from Lanai and Maui. Currently on Lanai there are a total of two occurrences containing 17 individuals on privately owned land in the Kapohaku-Waiapaa area, and in the gulch between Kunoa and Waialala gulches (GDSI 2000; HINHP Database 2000).

The habitat of this species is diverse mesic forest, wet *Metrosideros polymorpha* forest, and mixed mesic *M. polymorpha* forest, typically on rich, moderately steep gulch slopes at elevations between 667 and 1,032 m (2,188 and 3,385 ft). It occurs on soil and rock substrates on slopes from watercourses in gulch bottoms and up the sides of gulch slopes to near ridgetops. Associated native species include *Alyxia oliviformis*, *Bobea elatior*, *Clermontia* spp., *Coprosma* spp., *Cyrtandra grayana*, *Dicranopteris linearis*, *Diospyros sandwicensis*, *Diplopterygium pinnatum*, *Freycinetia arborea*, *Hedyotis acuminata* (au), *Melicope* spp., *Myrsine lessertiana*, *Perrottetia sandwicensis*, *Pipturus albidus*, *Pittosporum confertiflorum*, *Pleomele fernaldii*, *Pouteria sandwicensis*, *Psychotria* spp., *Sadleria cyatheoides*, *Scaevola chamissoniana*, or *Xylosma hawaiiense* (HINHP Database 2000; Service 1995).

The threats to this species on Lanai are browsing and habitat disturbance by axis deer; competition with the nonnative plant species *Leptospermum scoparium*, *Melinis minutiflora* (molasses grass), *Myrica faya*, *Paspalum conjugatum* (Hilo grass), *Pluchea carolinensis*, *Psidium cattleianum*, or *Rubus rosifolius* (thimbleberry); depressed reproductive vigor; and loss

of appropriate pollinators (Service 1995; 57 FR 20772).

Diellia erecta (NCN)

Diellia erecta, a short-lived perennial fern in the spleenwort family (Aspleniaceae), grows in tufts of three to nine lance-shaped fronds emerging from a rhizome covered with brown to dark gray scales. This species differs from other members of the genus in having large brown or dark gray scales, fused or separate sori along both margins, shiny black midribs that have a hardened surface, and veins that do not usually encircle the sori (Degener and Greenwell 1950; Wagner 1952).

Little is known about the life history of *Diellia erecta*. Its reproduction cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Diellia erecta* was known on Kauai, Oahu, Molokai, Lanai, Maui, and the island of Hawaii. Currently, it is known from Oahu, Molokai, Maui, and the island of Hawaii and was recently rediscovered on Kauai. On Lanai it was last seen in 1929 (HINHP Database 2000; Service 1999).

This species is found in brown granular soil with leaf litter and occasional terrestrial moss on north-facing slopes in deep shade and on steep slopes or gulch bottoms in *Pisonia* spp. forest at elevations between 651 and 955 m (2,135 and 3,132 ft). Associated native plant species include native grasses or ferns (HINHP Database 2000; Service 1999; J. Lau and K. Wood, pers. comms., 2001).

The major threats to *Diellia erecta* on Lanai included habitat degradation by axis deer and mouflon sheep, and competition with nonnative plant species (Service 1999; 59 FR 56333).

Diplazium molokaiense (NCN)

Diplazium molokaiense, a short-lived perennial fern and a member of the spleenwort family (Aspleniaceae), has a short prostrate rhizome and green or straw-colored leaf stalks with thin-textured fronds. This species can be distinguished from other species of *Diplazium* in the Hawaiian Islands by a combination of characteristics, including venation pattern, the length and arrangement of the sori, frond shape, and the degree of dissection of the frond (Wagner and Wagner 1992).

Little is known about the life history of *Diplazium molokaiense*. Its reproduction cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Diplazium molokaiense* was found on Kauai, Oahu, Molokai, Lanai, and Maui. Currently, this species is known only from Maui. It was last seen on Lanai in 1914 (HINHP Database 2000).

This species occurs in shady, damp places in wet forests at elevations between 737 and 1,032 m (2,417 and 3,385 ft) (HINHP Database 2000; Service 1998a; J. Lau, pers. comm., 2001).

The primary threats to *Diplazium molokaiense* on Lanai included habitat degradation by axis deer and mouflon sheep, and competition with nonnative plant species (HINHP Database 2000; Service 1998a; 59 FR 49025).

Hedyotis mannii (pilo)

Hedyotis mannii is a short-lived perennial and a member of the coffee family (Rubiaceae). It has smooth, usually erect stems 30 to 60 cm (1 to 2 ft) long, which are woody at the base and four-angled or -winged. It is distinguished from other species by its growth habit, its quadrangular or winged stems, the shape, size, and texture of its leaves, and its dry capsule, which opens when mature (Wagner *et al.*, 1999).

Little is known about the life history of this plant. Reproductive cycles, longevity, specific environmental requirements, and limiting factors are unknown (Service 1996b).

Hedyotis mannii was once widely scattered on Lanai, West Maui, and Molokai. After a hiatus of 50 years, this species was rediscovered in 1987 by Steve Perlman on Molokai. In addition, an occurrence was discovered on Maui and two occurrences, now numbering between 35 and 40 individual plants, were discovered on Lanai in 1991 on privately owned land in Maunalei and Hauola gulches (GDSI 2000; HINHP Database 2000; Service 1996b).

Hedyotis mannii typically grows on dark, narrow, rocky gulch walls and on steep streambanks in wet forests between 711 and 1,032 m (2,332 and 3,385 ft) in elevation. Associated plant species include *Carex meyenii*, *Dryopteris sandwicensis*, *Freycinetia arborea*, *Sadleria* spp., or *Scaevola chamissoniana* (HINHP Database 2000; Service 1996b; J. Lau, pers. comm., 2001).

The primary threats to *Hedyotis mannii* are the limited number of individuals which makes it extremely vulnerable to extinction from random environmental events; habitat degradation caused by axis deer and mouflon sheep; and nonnative plants, such as *Melinis minutiflora*, *Psidium cattleianum*, and *Rubus rosifolius* (57 FR 46325).

Hesperomannia arborescens (NCN)

Hesperomannia arborescens, a long-lived perennial of the aster family (Asteraceae), is a small shrubby tree that usually stands 1.5 to 5 m (5 to 16 ft) tall. This member of an endemic Hawaiian genus differs from other *Hesperomannia* species in having the following combination of characteristics: Erect to ascending flower heads, thick flower head stalks, and usually hairless and relatively narrow leaves (Wagner *et al.*, 1999).

This species has been observed in flower from April through June and in fruit during March and June. Little else is known about the life history of *Hesperomannia arborescens*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998b; 59 FR 14482).

Hesperomannia arborescens was formerly known from Oahu, Molokai, and Lanai. This species is now known from Oahu, Molokai, and Maui. It was last seen on Lanai in 1940 (GDSI 2000; HINHP Database 2000; Service 1998b; 59 FR 14482).

Hesperomannia arborescens is found on slopes or ridges in lowland mesic or wet forest at elevations between 737 and 1,032 m (2,417 and 3,385 ft) and containing one or more of the following associated native plant species:

Antidesma spp., *Bobea* spp., *Cheirodendron* spp. (olapa), *Cibotium* spp. (hapuu), *Clermontia* spp., *Coprosma* spp., *Dicranopteris linearis*, *Freycinetia arborea*, *Isachne distichophylla* (ohe), *Machaerina* spp. (uki), *Melicope* spp., *Metrosideros polymorpha*, *Myrsine sandwicensis* (kolea), *Pipturus albidus*, *Psychotria* spp., *Sadleria* spp. (HINHP Database 2000; Service 1998b; 59 FR 14482; R. Hobdy, pers. comm., 2001).

The major threats to *Hesperomannia arborescens* on Lanai included habitat degradation by axis deer and mouflon sheep, and competition with nonnative plant species (HINHP Database 2000; Service 1998b; 59 FR 14482).

Hibiscus brackenridgei (mao hau hele)

Hibiscus brackenridgei, a short-lived perennial and a member of the mallow family (Malvaceae), is a sprawling to erect shrub or small tree. This species differs from other members of the genus in having the following combination of characteristics: Yellow petals, a calyx consisting of triangular lobes with raised veins and a single midrib, bracts attached below the calyx, and thin stipules (leaf bracts) that fall off, leaving an elliptical scar.

Two subspecies are currently recognized, *Hibiscus brackenridgei* ssp. *brackenridgei* and *H. brackenridgei* ssp. *mokuleianus* (Bates 1999).

Hibiscus brackenridgei is known to flower continuously from early February through late May, and intermittently at other times of year. Intermittent flowering may possibly be related to day length. Little else is known about the life history of this plant. Pollination biology, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Hibiscus brackenridgei* was known from the islands of Kauai, Oahu, Lanai, Maui, Molokai, and the island of Hawaii. *Hibiscus brackenridgei* was collected from an undocumented site on Kahoolawe, though the subspecies has never been determined. Currently, *H. brackenridgei* ssp. *mokuleianus* is only known from Oahu.

Hibiscus brackenridgei ssp. *brackenridgei* is currently known from Lanai, Maui, and the island of Hawaii. On Lanai, there are two occurrences containing an unknown number of individuals on privately owned land; one occurrence is known from Keamuku Road, one from a fenced area on the dry plains of Kaena Point. Outplanted individuals that were initially planted in Kanepuu Preserve now appear to be reproducing naturally (GDSI 2000; HINHP Database 2000; Service 1999; Wesley Wong, Jr., *in litt.* 1998).

Hibiscus brackenridgei ssp. *brackenridgei* occurs in lowland dry to mesic forest and shrubland between 0 and 645 m (0 and 2,116 ft) in elevation. Associated plant species include *Dodonaea viscosa*, *Isachne distichophylla*, *Psydrax odorata*, or *Sida fallax* (HINHP Database 2000; Service 1999).

The primary threats to *Hibiscus brackenridgei* ssp. *brackenridgei* on Lanai are habitat degradation; possible predation by axis deer, mouflon sheep, and rats; competition with nonnative plant species; fire; and susceptibility to extinction caused by naturally occurring events or reduced reproductive vigor (Service 1999; 59 FR 56333; R. Hobdy *in litt.* 2002).

Isodendron pyrifolium (wahine noho kula)

Isodendron pyrifolium, a short-lived perennial of the violet family (Violaceae), is a small, branched shrub with elliptic to lance-shaped leaf blades. The papery-textured blade has moderately hairy veins. Below the petiole are oval, hairy stipules. The fruit is a three-lobed, oval capsule.

Isodendron pyrifolium is distinguished

from other species in the genus by its smaller, green-yellow flowers, and hairy stipules and leaf veins (Wagner *et al.*, 1999).

During periods of drought, this species will drop all but the newest leaves. After sufficient rains, the plants produce flowers with seeds ripening one to two months later. Little else is known about the life history of *Isodendron pyrifolium*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1996a; 59 FR 10305).

Isodendron pyrifolium was historically found on six of the Hawaiian Islands: Niihau, Oahu, Molokai, Lanai, Maui, and the island of Hawaii. Currently it is found only on the island of Hawaii. It was last seen on Lanai in 1870 (GDSI 2000; HINHP Database 2000; Service 1996a; 59 FR 10305).

On Lanai, *Isodendron pyrifolium* occurred in dry shrubland at elevations between 132 and 574 m (433 and 1,883 ft) with one or more of the following associated native plant species: *Dodonaea viscosa*, *Heteropogon contortus*, *Lipochaeta* or *Melanthera* spp. (nehe), or *Wikstroemia oahuensis* (akia) (Service 1996a; 59 FR 10305; J. Lau and R. Hobdy, pers. comms., 2001).

Nothing is known of the threats to *Isodendron pyrifolium* on the island of Lanai because the species was last seen there in 1870.

Mariscus fauriei (NCN)

Mariscus fauriei, a member of the sedge family (Cyperaceae), is a short-lived perennial plant with somewhat enlarged underground stems and three-angled, single or grouped aerial stems 10 to 50 cm (4 to 20 in) tall. This species differs from others in the genus in Hawaii by its smaller size and its more narrow, flattened, and more spreading spikelets (flower clusters) (Koyama 1990; 59 FR 10305).

Little is known about the life history of *Mariscus fauriei*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (USFWS 1996a).

Historically, *Mariscus fauriei* was found on Molokai, Lanai, and the island of Hawaii. It currently occurs on Molokai and the island of Hawaii. It was last seen on Lanai in 1929 (GDSI 2000; HINHP Database 2000; Service 1996a; 59 FR 10305).

Nothing is known of the preferred habitat of or native plant species

associated with *Mariscus fauriei* on the island of Lanai (Service 1996a).

Nothing is known of the threats to *Mariscus fauriei* on the island of Lanai (Service 1996a).

Melicope munroi (alani)

Melicope munroi, a long-lived perennial of the rue (citrus) family (Rutaceae), is a sprawling shrub up to 3 m (10 ft) tall. The new growth of this species has minute hairs. This species differs from other Hawaiian members of the genus in the shape of the leaf and the length of the inflorescence (flower cluster) stalk (Stone *et al.*, 1999).

Little is known about the life history of *Melicope munroi*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 2001).

Historically, this species was known from the Lanaihale summit ridge of Lanai and above Kamalo on Molokai. Currently, *Melicope munroi* is known only from the Lanaihale summit ridge on Lanai. There are two occurrences totaling an estimated 35 individual plants on privately owned land on the Lanaihale summit, head of Hauola gulch, Waialala gulch, and the ridge of Waialala gulch (GDSI 2000; HINHP Database 2000; Service 2001; 64 FR 48307).

Melicope munroi is typically found on slopes in lowland wet shrublands, at elevations of 701 and 1,032 m (2,299 and 3,385 ft). Associated native plant species include *Broussaisia arguta*, *Cheirodendron trigynum*, *Coprosma* spp., *Dicranopteris linearis*, *Diplopterygium pinnatum*, *Machaerina angustifolia*, other *Melicope* spp., or *Metrosideros polymorpha* (HINHP Database 2000; Service 2001).

The major threats to *Melicope munroi* on Lanai are trampling, browsing, and habitat degradation by axis deer and competition with the nonnative plant species *Leptospermum scoparium* and *Psidium cattleianum*. In addition, the limited number of individuals in the two remaining occurrences makes it extremely vulnerable to extinction from random environmental events (HINHP Database 2000; Service 2001; 64 FR 48307).

Neraudia sericea (NCN)

Neraudia sericea, a short-lived perennial member of the nettle family (Urticaceae), is a 3 to 5 m (10 to 16 ft) tall shrub with densely hairy branches. The lower leaf surface is densely covered with irregularly curved, silky gray to white hairs along the veins. *Neraudia sericea* differs from the other

four species of this endemic Hawaiian genus by the density, length, color, and posture of the hairs on the lower leaf surface and by its mostly entire leaf margins (Wagner *et al.*, 1999).

Little is known about the life history of *Neraudia sericea*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999; 59 FR 56333).

Neraudia sericea was historically found on Molokai, Lanai, Maui, and Kahoolawe. Currently, this species is extant on Molokai and Maui. It was last seen on Lanai in 1913 (GDSI 2000; HINHP Database 2000; Service 1999; 59 FR 56333).

Neraudia sericea generally occurs in gulch slopes or gulch bottoms in dry-mesic or mesic forest at elevations between 693 and 869 m (2,273 and 2,850 ft). Associated native species include *Diospyros sandwicensis*, *Dodonaea viscosa*, *Metrosideros polymorpha*, or *Nestegis sandwicensis* (HINHP Database 2000; 59 FR 56333; J. Lau, pers. comm., 2001).

The primary threats to *Neraudia sericea* on Lanai included habitat degradation by pigs (*Sus scrofa*), and goats (currently axis deer and mouflon sheep), and competition with nonnative plant species (Service 1999; 59 FR 56333).

Portulaca sclerocarpa (poe)

Portulaca sclerocarpa of the purslane family (Portulacaceae) is a short-lived perennial herb with a tuberous taproot and has stems up to about 20 cm (8 in) long. The succulent, grayish-green leaves are almost circular in cross-section. The petals are white, pink, or pink with a white base. The hardened capsules open very late or not at all, and contain dark reddish-brown seeds. This species differs from other native and naturalized species of the genus in Hawaii by its woody taproot, its narrow leaves, and the colors of its petals and seeds. Its closest relative, *P. villosa*, differs mainly in its thinner-walled, opening capsule (Wagner *et al.*, 1999).

This species has been observed in flower during March, June, and December. The presence of juveniles indicated that pollination and germination were occurring. Pollination vectors, seed dispersal agents, longevity of plants and seeds, specific environmental requirements, and other limiting factors are unknown (Service 1996a).

Portulaca sclerocarpa was historically and is currently found on the island of Hawaii, and on an islet (Poopoo Islet) off the south coast of the island of Lanai.

The Lanai occurrence on privately owned land contains about 10 plants. Poopoo Islet is a small rocky outcrop, 1 ha (2.4 ac) in area and approximately 200 m (600 ft) from the south shoreline, and is considered part of the island of Lanai (GDSI 2000; HINHP Database 2000; Service 1996a).

This species grows on exposed ledges in thin soil in coastal communities at elevations between 0 and 82 m (0 and 269 ft) (HINHP Database 2000; Wagner *et al.*, 1999).

The major threats to *Portulaca sclerocarpa* on Lanai are herbivory by the larvae of a nonnative sphinx moth (*Hyles lineata*); competition from nonnative plants; and fire (Service 1996a; 59 FR 10305; Frank Howarth, Bishop Museum, *in litt.* 2000).

Sesbania tomentosa (ohai)

Sesbania tomentosa, a member of the pea family (Fabaceae), is typically a sprawling short-lived perennial shrub, but may also be a small tree. Each compound leaf consists of 18 to 38 oblong to elliptic leaflets, which are usually sparsely to densely covered with silky hairs. The flowers are a salmon color tinged with yellow, orange-red, scarlet or, rarely, pure yellow. *Sesbania tomentosa* is the only endemic Hawaiian species in the genus, differing from the naturalized *S. sesban* by the color of the flowers, the longer petals and calyx, and the number of seeds per pod (Geesink *et al.*, 1999).

The pollination biology of *Sesbania tomentosa* has been studied by David Hopper, University of Hawaii. His findings suggest that although many insects visit *Sesbania* flowers, the majority of successful pollination is accomplished by native bees of the genus *Hylaeus*, and that occurrences at Kaena Point on Oahu are probably pollinator-limited. Flowering at Kaena Point is highest during the winter-spring rains, and gradually declines throughout the rest of the year. Other aspects of this plant's life history are unknown (Service 1999).

Currently, *Sesbania tomentosa* occurs on six of the eight main Hawaiian Islands (Kauai, Oahu, Molokai, Kahoolawe, Maui, and Hawaii) and on two islands in the Northwestern Hawaiian Islands (Nihoa and Necker). Although once found on Niihau and Lanai, it is no longer extant on those islands. It was last seen on Lanai in 1957 (GDSI 2000; HINHP Database 2000; 59 FR 56333).

Sesbania tomentosa is found on sandy beaches, dunes, or pond margins at elevations between 44 and 221 m (144 and 725 ft). It commonly occurs in coastal dry shrublands or mixed coastal

dry cliffs with the associated native plant species *Chamaesyce celastroides* (akoko), *Cuscuta sandwichiana* (kaunaoa), *Dodonaea viscosa*, *Heteropogon contortus*, *Myoporum sandwicense*, *Nama sandwicensis* (hinahina kahakai), *Scaevola sericea* (naupaka kahakai), *Sida fallax*, *Sporobolus virginicus* (akiaki), *Vitex rotundifolia* (kolokolo kahakai), or *Waltheria indica* (uhaloa) (HINHP Database 2000; Service 1999; K. Wood, pers. comm., 2001).

The primary threats to *Sesbania tomentosa* on Lanai included habitat degradation caused by competition with various nonnative plant species; lack of adequate pollination; seed predation by rats, mice (*Mus musculus*) and, potentially, nonnative insects; and fire (Service 1999; 59 FR 56333).

Silene lanceolata (NCN)

Silene lanceolata, a member of the pink family (Caryophyllaceae), is an upright, short-lived perennial plant with stems 15 to 51 cm (6 to 20 in) long, which are woody at the base. The flowers are white with deeply lobed, clawed petals. This species is distinguished from *S. alexandri* by its smaller flowers and capsules and its stamens, which are shorter than the sepals (Wagner *et al.*, 1999).

Little is known about the life history of *Silene lanceolata*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1996b; 57 FR 46325).

The historical range of *Silene lanceolata* includes five Hawaiian Islands: Kauai, Oahu, Molokai, Lanai, and Hawaii. *Silene lanceolata* is presently extant on the islands of Molokai, Oahu, and Hawaii. It was last observed on Lanai in 1930 (GDSI 2000; Service 1996b; 57 FR 46325).

Nothing is known of the preferred habitat of or native plant species associated with *Silene lanceolata* on the island of Lanai (Service 1996b).

Nothing is known of the threats to *Silene lanceolata* on the island of Lanai (Service 1996b).

Solanum incompletum (popolo ku mai)

Solanum incompletum, a short-lived perennial member of the nightshade family (Solanaceae), is a woody shrub. Its stems and lower leaf surfaces are covered with prominent reddish prickles or sometimes with yellow fuzzy hairs on young plant parts and lower leaf surfaces. This species differs from other native members of the genus by being generally prickly and having loosely clustered white flowers, curved

anthers about 2 mm (0.08 in) long, and berries 1 to 2 cm (0.4 to 0.8 in) in diameter (Symon 1999).

Little is known about the life history of *Solanum incompletum*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999; 59 FR 56333).

Historically, *Solanum incompletum* was known on Lanai, Maui, and the island of Hawaii. According to David Symon (1999), the known distribution of *Solanum incompletum* also extended to the islands of Kauai and Molokai. Currently, *Solanum incompletum* is only known from the island of Hawaii. It was last seen on Lanai in 1925 (HINHP Database 2000; Service 1999).

On Lanai, *Solanum incompletum* occurred on broad, gently sloping ridges in dry, *Dodonaea viscosa* shrubland, at elevations between 151 and 372 m (495 and 1,220 ft) with one or more of the following associated native plant species: *Heteropogon contortus*, *Lipochaeta* or *Melanthera* spp., or *Wikstroemia oahuensis* (Service 1999; J. Lau, pers. comm., 2001).

On Lanai, the threats to *Solanum incompletum* included habitat destruction by goats and pigs (more recently axis deer) and competition with various nonnative plants (Service 1999).

Spermolepis hawaiiensis (NCN)

Spermolepis hawaiiensis, a member of the parsley family (Apiaceae), is a slender annual herb with few branches. Its leaves are dissected into narrow, lance-shaped divisions. *Spermolepis hawaiiensis* is the only member of the genus native to Hawaii. It is distinguished from other native members of the family by being a non-succulent annual with an umbrella-shaped inflorescence (Constance and Affolter 1999).

Little is known about the life history of *Spermolepis hawaiiensis*. Reproductive cycles, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Spermolepis hawaiiensis* was known from Kauai, Oahu, Lanai, and the island of Hawaii. Based on recent collections, it is now known to be extant on those four islands, Molokai, and Maui. On Lanai, this species is known from three occurrences of 570 to 620 individuals on privately owned land in the southern edge of Kapoho Gulch, Kamiki Ridge, and approximately 274 m (900 ft) downslope of Puu Manu (HINHP Database 2000; Service 1999; 59 FR 56333; R. Hobdy, pers. comm., 2000).

Spermolepis hawaiiensis is known from gulch slopes and ridge tops in dry forests dominated by *Diospyros sandwicensis* or shrublands dominated by *Dodonaea viscosa* at elevations between 402 and 711 m (1,319 and 2,332 ft). Associated native plant species include *Nesoluma polynesianum*, *Nestegis sandwicensis*, *Psydrax odorata*, or *Rauvolfia sandwicensis* (HINHP Database 2000; Service 1999; R. Hobdy, pers. comm., 2000; J. Lau, pers. comm., 2001).

The primary threats to *Spermolepis hawaiiensis* on Lanai are habitat degradation by axis deer, competition with various nonnative plants, such as *Lantana camara*; and erosion, landslides, and rockslides due to natural weathering, which result in the death of individual plants as well as habitat destruction (Service 1999; 59 FR 56333; R. Hobdy, pers. comm., 2000).

Tetramolopium lepidotum ssp. *lepidotum* (NCN)

Tetramolopium lepidotum ssp. *lepidotum*, a member of the aster family (Asteraceae), is an erect shrub 12 to 36 cm (4.7 to 14 in) tall, branching near the ends of the stems. The leaves are lance-shaped and wider at the leaf tip. This species can be distinguished from the other extant species on Oahu by its hermaphroditic disk flowers and its inflorescence of six to 12 heads (Lowrey 1999).

Tetramolopium lepidotum ssp. *lepidotum* is a short-lived perennial that has been observed producing flowers and fruit from April through July. No further information is available on reproductive cycles, longevity, specific environmental requirements, or limiting factors (Service 1998b; 56 FR 55770).

Historically, *Tetramolopium lepidotum* ssp. *lepidotum* was known from Oahu and Lanai. It currently occurs only on Oahu. It was last seen on Lanai in 1928 (Environmental Division of the Army Database 2001; GDSI 2000; HINHP Database 2000; Service 1998b; 56 FR 55770).

Nothing is known of the preferred habitat of or native plant species associated with *Tetramolopium lepidotum* ssp. *lepidotum* on the island of Lanai (Service 1998b).

Nothing is known of the threats to *Tetramolopium lepidotum* ssp. *lepidotum* on the island of Lanai (Service 1998b).

Tetramolopium remyi (NCN)

Tetramolopium remyi, a short-lived perennial member of the sunflower family (Asteraceae), is a many branched, decumbent or occasionally erect shrub up to about 38 cm (15 in) tall. The

stems, leaves, flower bracts, and fruit are covered with sticky hairs.

Tetramolopium remyi has the largest flower heads in the genus. Two other species of the genus are known historically from Lanai, but both have purplish rather than yellow disk florets and from four to 60 rather than one flower head per branch (Lowrey 1999).

Tetramolopium remyi flowers between April and January. Field observations suggest that the population size of the species can be profoundly affected by variability in annual precipitation. The adult plants may succumb to prolonged drought, but apparently there is a seedbank in the soil that can replenish the population during favorable conditions. Such seed banks are of great importance for arid-dwelling plants to have populations to persist through adverse conditions. Success in greenhouse cultivation of these plants with much higher water availability implies that, although these plants are drought-tolerant, perhaps the dry conditions in which they currently exist are not optimum. Individual plants are probably not long-lived. Pollination is hypothesized to be by butterflies, bees, or flies. Seed dispersal agents, environmental requirements, and other limiting factors are unknown (Lowrey 1986; Service 1995).

Historically, the species was known from Maui and Lanai. Currently, *Tetramolopium remyi* is known only from one occurrence on Lanai on privately owned land near Awehi Road, with a total of approximately 150 plants (GDSI 2000; HINHP Database 2000).

Tetramolopium remyi is found in red, sandy, loam soil in dry *Dodonaea viscosa-Heteropogon contortus* communities at elevations between 65 and 485 m (213 and 1,591 ft). Commonly associated native species include *Bidens mauiensis* (kookoolau), *Melanthera lavarum* (nehe), *Waltheria*

indica, or *Wikstroemia oahuensis* (HINHP Database 2000).

Browsing by axis deer and mouflon sheep and competition from nonnative species, primarily *Andropogon virginicus* (broomsedge) and *Panicum maximum* (guinea grass), are the main threats to the species on Lanai. Fire is also a potential threat (Service 1995; 56 FR 47686).

Vigna o-wahuensis (NCN)

Vigna o-wahuensis, a member of the legume family (Fabaceae), is a slender, twining, short-lived perennial herb with fuzzy stems. Each leaf is made up of three leaflets, which vary in shape from round to linear. This species differs from others in the genus by its thin yellowish petals, sparsely hairy calyx, and thin pods, which may or may not be slightly inflated (Geesink *et al.*, 1999).

Little is known about the life history of *Vigna o-wahuensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Vigna o-wahuensis* was known from Niihau, Oahu, and Maui. Based on recent collections, *Vigna o-wahuensis* is now known to be extant on the islands of Molokai, Maui, Lanai, Kahoolawe, and Hawaii. On Lanai, one occurrence with at least one individual is known from Kanepuu on privately owned land (GDSI 2000; HINHP Database 2000; Service 1999; J. Lau, *in litt.* 2000).

On Lanai, *Vigna o-wahuensis* is found in *Nestegis sandwicensis* or *Diospyros sandwicensis* dry forest at elevations between 98 and 622 m (321 and 2,040 ft) (HINHP Database 2000; 59 FR 56333; J. Lau, pers. comm., 2001).

Threats to *Vigna o-wahuensis* on Lanai include habitat degradation by

mouflon sheep and axis deer; competition with various nonnative plant species; fire; and random naturally occurring events causing extinction and or reduced reproductive vigor of the only remaining individual on Lanai (Service 1999).

Zanthoxylum hawaiiense (ae)

Zanthoxylum hawaiiense is a medium-sized tree in the rue (citrus) family (Rutaceae) with pale to dark gray bark, and lemon-scented leaves, composed of three small leaflets. A long-lived perennial tree, *Z. hawaiiense* is distinguished from other Hawaiian members of the genus by several characteristics: Three leaflets all of similar size, one joint on the lateral leaf stalk, and sickle-shaped fruits with a rounded tip (Stone *et al.*, 1999).

Little is known about the life history of *Zanthoxylum hawaiiense*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1996a).

Historically, *Zanthoxylum hawaiiense* was known from five islands: Kauai, Molokai, Lanai, Maui, and the island of Hawaii. Currently, *Zanthoxylum hawaiiense* is found on Kauai, Molokai, Maui, and the island of Hawaii. It was last seen on Lanai in 1947 (GDSI 2000; HINHP Database 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Zanthoxylum hawaiiense* on the island of Lanai (Service 1996a).

Nothing is known of the threats to *Zanthoxylum hawaiiense* on the island of Lanai (Service 1996a).

A summary of occurrences and landownership for the 37 plant species reported from the island of Lanai is given in Table 2.

TABLE 2.—SUMMARY OF EXISTING OCCURRENCES ON LANAI, AND LANDOWNERSHIP FOR 37 SPECIES REPORTED FROM LANAI

Species	Number of current occurrences	Landownership		
		Federal	State	Private
<i>Abutilon eremitopetalum</i>	1	.....	.....	X
<i>Adenophorus periens</i>	0	.....	.....	.....
<i>Bidens micrantha</i>	1	.....	.....	X
<i>Bonamia menziesii</i>	3	.....	.....	X
<i>Brighamia rockii</i>	0	.....	.....	.....
<i>Cenchrus agrimonioides</i>	0	.....	.....	.....
<i>Centaurium sebaeoides</i>	1	.....	.....	X
<i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i>	1	.....	.....	X
<i>Ctenitis squamigera</i>	2	.....	.....	X
<i>Cyanea grimesiana</i> ssp. <i>grimesiana</i>	2	.....	.....	X
<i>Cyanea lobata</i>	0	.....	.....	.....
<i>Cyanea macrostegia</i> ssp. <i>gibsonii</i>	2	.....	.....	X
<i>Cyperus trachysanthos</i>	0	.....	.....	.....
<i>Cyrtandra munroi</i>	2	.....	.....	X

TABLE 2.—SUMMARY OF EXISTING OCCURRENCES ON LANAI, AND LANDOWNERSHIP FOR 37 SPECIES REPORTED FROM LANAI—Continued

Species	Number of current occurrences	Landownership		
		Federal	State	Private
<i>Diellia erecta</i>	0			
<i>Diplazium molokaiense</i>	0			
<i>Gahnia lanaiensis</i>	1			X
<i>Hedyotis mannii</i>	2			X
<i>Hedyotis schlechtendahlia</i> var. <i>remyi</i>	2			X
<i>Hesperomannia arborescens</i>	0			
<i>Hibiscus brackenridgei</i>	3			X
<i>Isodendron pyrifolium</i>	0			
<i>Labordia tinifolia</i> var. <i>lanaiensis</i>	1			X
<i>Mariscus fauriei</i>	0			
<i>Melicope munroi</i>	2			X
<i>Neraudia sericea</i>	0			
<i>Phyllostegia glabra</i> var. <i>lanaiensis</i>	0			
<i>Portulaca sclerocarpa</i>	1			X
<i>Sesbania tomentosa</i>	0			
<i>Silene lanceolata</i>	0			
<i>Solanum incompletum</i>	0			
<i>Spermolepis hawaiiensis</i>	3			X
<i>Tetramolopium lepidotum</i> ssp. <i>lepidotum</i>	0			
<i>Tetramolopium remyi</i>	1			X
<i>Vigna o-wahuensis</i>	1			X
<i>Viola lanaiensis</i>	2			X
<i>Zanthoxylum hawaiiense</i>	0			

Previous Federal Action

Federal action on these plants began as a result of section 12 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), which directed the Secretary of the Smithsonian Institution to prepare a report on plants considered to be endangered, threatened, or extinct in the United States. This report, designated as House Document No. 94–51, was presented to Congress on January 9, 1975. In that document, *Bonamia menziesii*, *Brighamia rockii*, *Cyanea lobata* (as *C. baldwinii*), *Gahnia lanaiensis*, *Hedyotis mannii* (as *H. thyrsoides* var. *thyrsoides*), *Hesperomannia arborescens* (as *H. arborescens* var. *bushiana* and var. *swezeyi*), *Hibiscus brackenridgei* (as *H. brackenridgei* var. *brackenridgei*, var. *mokuleianus*, and var. “from Hawaii”), *Neraudia sericea* (as *N. kahoolawensis*), *Portulaca sclerocarpa*, *Sesbania tomentosa* (as *S. hobdyi* and *S. tomentosa* var. *tomentosa*), *Silene lanceolata*, *Solanum incompletum* (as *S. haleakalense* and *S. incompletum* var. *glabratum*, var. *incompletum*, and var. *mauiensis*), *Tetramolopium lepidotum* ssp. *lepidotum*, *Vigna o-wahuensis* (as *V. sandwicensis* var. *heterophylla* and var. *sandwicensis*), *Viola lanaiensis*, and

Zanthoxylum hawaiiense (as *Z. hawaiiense* var. *citiodora*) were considered endangered; *Cyrtandra munroi*, *Diellia erecta*, *Labordia tinifolia* var. *lanaiensis*, and *Zanthoxylum hawaiiense* (as *Z. hawaiiense* var. *hawaiiense* and var. *velutinosum*) were considered threatened; and *Abutilon eremitopetalum*, *Bidens micrantha* ssp. *kalealaha* (as *B. distans* and *B. micrantha* ssp. *kalealaha*), *Ctenitis squamigera*, *Cyanea macrostegia* ssp. *gibsonii*, *Diplazium molokaiense*, *Isodendron pyrifolium*, *Melicope munroi* (as *Pelea munroi*), *Phyllostegia glabra* var. *lanaiensis*, and *Tetramolopium remyi* were considered to be extinct. On July 1, 1975, we published a notice in the **Federal Register** (40 FR 27823) of our acceptance of the Smithsonian report as a petition within the context of section 4(c)(2) (now section 4(b)(3)) of the Act, and gave notice of our intention to review the status of the plant taxa named therein. As a result of that review, on June 16, 1976, we published a proposed rule in the **Federal Register** (41 FR 24523) to determine endangered status pursuant to section 4 of the Act for approximately 1,700 vascular plant taxa, including all of the above taxa except *Cyrtandra munroi*, *Labordia*

tinifolia var. *lanaiensis*, and *Melicope munroi*. The list of 1,700 plant taxa was assembled on the basis of comments and data received by the Smithsonian Institution and the Service in response to House Document No. 94–51 and the July 1, 1975, **Federal Register** publication (40 FR 27823).

General comments received in response to the 1976 proposal were summarized in an April 26, 1978, **Federal Register** publication (43 FR 17909). In 1978, amendments to the Act required that all proposals over 2 years old be withdrawn. A 1-year grace period was given to proposals already over 2 years old. On December 10, 1979, we published a notice in the **Federal Register** (44 FR 70796) withdrawing the portion of the June 16, 1976, proposal that had not been made final, along with four other proposals that had expired. We published updated Notices of Review for plants on December 15, 1980 (45 FR 82479), September 27, 1985 (50 FR 39525), February 21, 1990 (55 FR 6183), September 30, 1993 (58 FR 51144), and February 28, 1996 (61 FR 7596). We listed the 37 species as endangered between 1991 and 1999. A summary of the listing actions can be found in Table 3(a).

TABLE 3(a).—SUMMARY OF LISTING ACTIONS FOR 37 PLANT SPECIES FROM LANAI

Species	Federal status	Proposed rule		Final rule		Proposed designation or non-designation of critical habitat	
		Date	Federal Register	Date	Federal Register	Date	Federal Register
<i>Abutilon eremitopetalum</i> .	E	09/17/90	55 FR 38236	09/20/91	56 FR 47686	12/27/00	65 FR 82086
<i>Adenophorus periens</i>	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	11/07/00, 12/29/00 ..	65 FR 66808, 65 FR 83158
<i>Bidens micrantha</i> ssp. <i>kalealaha</i> .	E	05/24/91	56 FR 23842	05/15/92	57 FR 20772	12/18/00	65 FR 79192
<i>Bonamia menziesii</i> ...	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	11/7/00, 12/18/00, 12/27/00, 01/28/02.	65 FR 66808, 65 FR 79192, 65 FR 82086, 67 FR 3940
<i>Brighamia rockii</i>	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325	12/29/00	65 FR 83158
<i>Cenchrus agrimonioides</i> .	E	10/02/95	60 FR 51417	10/10/96	61 FR 53108	12/18/00	65 FR 79192
<i>Centaurium sebaeoides</i> .	E	09/28/90	55 FR 39664	10/29/91	56 FR 55770	11/07/00, 12/18/00, 12/27/00, 12/29/00, 01/28/02.	65 FR 66808, 65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 3940
<i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i> .	E	05/24/91	56 FR 23842	05/15/92	57 FR 20772	12/18/00, 12/27/00 ..	65 FR 79192, 65 FR 82086
<i>Ctenitis squamigera</i> ..	E	06/24/93	58 FR 34231	09/09/94	59 FR 49025	12/18/00, 12/27/00, 12/29/00.	65 FR 79192, 65 FR 82086, 65 FR 83158
<i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> .	E	10/02/95	60 FR 51417	10/10/96	61 FR 53108	12/18/00, 12/27/00, 12/29/00.	65 FR 79192, 65 FR 82086, 65 FR 83158
<i>Cyanea lobata</i>	E	05/24/91	56 FR 23842	05/15/92	57 FR 20772	12/18/00	65 FR 79192
<i>Cyanea macrostegia</i> ssp. <i>gibsonii</i> .	E	09/17/90	55 FR 38236	09/20/91	56 FR 47686	12/27/00	65 FR 82086
<i>Cyperus trachysanthos</i> .	E	10/02/95	60 FR 51417	10/10/96	61 FR 53108	11/07/00, 01/28/02 ..	65 FR 66808, 67 FR 3940
<i>Cyrtandra munroi</i>	E	05/24/91	56 FR 23842	05/15/92	57 FR 20772	12/18/00, 12/27/00 ..	65 FR 79192, 65 FR 82086
<i>Diellia erecta</i>	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	11/07/00, 12/18/00, 12/29/00, 01/28/02.	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940
<i>Diplazium molokaiense</i> .	E	06/24/93	58 FR 34231	09/09/94	59 FR 49025	12/18/00	65 FR 79192
<i>Gahnia lanaiensis</i>	E	09/17/90	55 FR 38236	09/20/91	56 FR 47686	12/27/00	65 FR 82086
<i>Hedyotis mannii</i>	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325	12/18/00, 12/27/00, 12/29/00.	65 FR 79192, 65 FR 82086, 65 FR 83158
<i>Hedyotis schlechtendahliana</i> var. <i>remyi</i> .	E	05/15/97	62 FR 26757	09/03/99	64 FR 48307	12/27/00	65 FR 82086
<i>Hesperomannia arborescens</i> .	E	10/14/92	57 FR 47028	03/28/94	59 FR 14482	12/18/00, 12/29/00 ..	65 FR 79192, 65 FR 83158
<i>Hibiscus brackenridgei</i> .	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	12/18/00	65 FR 79192
<i>Isodendron pyriforme</i>	E	12/17/92	57 FR 59951	03/04/94	59 FR 10305	01/28/02	67 FR 3940
<i>Labordia tinifolia</i> var. <i>lanaiensis</i> .	E	05/15/97	62 FR 26757	09/03/99	64 FR 48307	12/27/00	65 FR 82086
<i>Mariscus fauriei</i>	E	12/17/92	57 FR 59951	03/04/94	59 FR 10305	12/29/00	65 FR 83158
<i>Melicope munroi</i>	E	05/15/97	62 FR 26757	09/03/99	64 FR 48307	12/27/00	65 FR 82086
<i>Neraudia sericea</i>	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	12/18/00, 12/29/00 ..	65 FR 79192, 65 FR 83158
<i>Phyllostegia glabra</i> var. <i>lanaiensis</i> .	E	09/17/90	55 FR 38236	09/20/91	56 FR 47686	12/29/00	65 FR 83158
<i>Portulaca sclerocarpa</i>	E	12/17/92	57 FR 59951	03/04/94	59 FR 10305	12/27/00	65 FR 82086
<i>Sesbania tomentosa</i>	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	11/07/00, 12/18/00, 12/29/00, 01/28/02.	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940
<i>Silene lanceolata</i>	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325	12/29/00	65 FR 83158
<i>Solanum incompletum</i> .	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	01/28/02	67 FR 3940

TABLE 3(a).—SUMMARY OF LISTING ACTIONS FOR 37 PLANT SPECIES FROM LANAI—Continued

Species	Federal status	Proposed rule		Final rule		Proposed designation or non-designation of critical habitat	
		Date	Federal Register	Date	Federal Register	Date	Federal Register
<i>Spermolepis hawaiiensis.</i>	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	11/07/00, 12/18/00, 12/27/00, 12/29/00, 01/28/02.	65 FR 66808, 65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 3940
<i>Tetramolopium lepidotum</i> ssp. <i>lepidotum.</i>	E	09/28/90	55 FR 39664	10/29/91	56 FR 55770		
<i>Tetramolopium remyi</i>	E	09/17/90	55 FR 38236	09/20/91	56 FR 47686	12/27/00	65 FR 82086
<i>Vigna o-wahuensis</i> ...	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333	12/18/00, 12/29/00 ..	65 FR 79192, 65 FR 83158
<i>Viola lanaiensis</i>	E	09/17/90	55 FR 38236	09/20/91	56 FR 47686	12/27/00	65 FR 82086
<i>Zanthoxylum hawaiiense.</i>	E	12/17/92	57 FR 59951	03/04/94	59 FR 10305	11/07/00, 12/18/00, 12/29/00, 01/28/02.	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940

Key: E= Endangered.

At the time each plant was listed, we found that designation of critical habitat was prudent for three of these plants (*Hedyotis schlechtendahlia* var. *remyi*, *Labordia tinifolia* var. *lanaiensis*, and *Melicope munroi*) and not prudent for the other 34 plants because it would not benefit the plant or would increase the degree of threat to the species. The not prudent findings for these species, along with others, were challenged in *Conservation Council for Hawaii v. Babbitt*, 2F. Supp. 2d 1280 (D. Haw. 1998). On March 9, 1998, the United States District Court for the District of Hawaii directed us to review the prudency findings for 245 listed plant species in Hawaii, including 34 of the 37 species reported from Lanai. Among other things, the court held that in most cases we did not sufficiently demonstrate that the species are threatened by human activity or that such threats would increase with the designation of critical habitat. The court also held that we failed to balance any risks of designating critical habitat against any benefits (*id.* at 1283–85).

Regarding our determination that designating critical habitat would have no additional benefits to the species above and beyond those already provided through the section 7 consultation requirement of the Act, the court ruled that we failed to consider the specific effect of the consultation requirement on each species (*id.* at 1286–88). In addition, the court stated that we did not consider benefits outside of the consultation requirements. In the court’s view, these potential benefits include substantive and procedural protections. The court held that, substantively, designation

establishes a “uniform protection plan” prior to consultation and indicates where compliance with section 7 of the Act is required. Procedurally, the court stated that the designation of critical habitat educates the public, State, and local governments and affords them an opportunity to participate in the designation (*id.* at 1288). The court also stated that private lands may not be excluded from critical habitat designation even though section 7 requirements apply only to Federal agencies. In addition to the potential benefit of informing the public, State, and local governments of the listing and of the areas that are essential to the species’ conservation, the court found that there may be Federal activity on private property in the future, even though no such activity may be occurring there at the present (*id.* at 1285–88).

On August 10, 1998, the court ordered us to publish proposed critical habitat designations or non-designations for at least 100 species by November 30, 2000, and to publish proposed designations or non-designations for the remaining 145 species by April 30, 2002 (*Conservation Council for Hawaii v. Babbitt*, 24 F. Supp. 2d 1074 (D. Haw. 1998)).

At the time we listed *Hedyotis schlechtendahlia* var. *remyi*, *Labordia tinifolia* var. *lanaiensis*, and *Melicope munroi* (64 FR 48307), we found that designation of critical habitat was prudent and stated that we would develop critical habitat designations for these three taxa, along with seven others, by the time we completed designations for the other 245 Hawaiian plant species. This timetable was challenged in *Conservation Council for*

Hawaii v. Babbitt, Civ. No. 99–00283 HG (D. Haw. Aug. 19, 1999, Feb. 16, 2000, and March 28, 2000). The court agreed, however, that it was reasonable for us to integrate these ten Maui Nui (Maui, Lanai, Molokai, and Kahoolawe) plant taxa into the schedule established for designating critical habitat for the other 245 Hawaiian plants, and ordered us to publish proposed critical habitat designations for the ten Maui Nui species with the first 100 plants from the group of 245 by November 30, 2000, and to publish final critical habitat designations by November 30, 2001.

On November 30, 1998, we published a notice in the **Federal Register** requesting public comments on our reevaluation of whether designation of critical habitat is prudent for the 245 Hawaiian plants at issue (63 FR 65805). The comment period closed on March 1, 1999, and was reopened from March 24, 1999, to May 24, 1999 (64 FR 14209). We received more than 100 responses from individuals, non-profit organizations, the State Division of Forestry and Wildlife (DOFAW), county governments, and Federal agencies (U.S. Department of Defense—Army, Navy, Air Force). Only a few responses offered information on the status of individual plant species or on current management actions for one or more of the 245 Hawaiian plants. While some of the respondents expressed support for the designation of critical habitat for 245 Hawaiian plants, more than 80 percent opposed the designation of critical habitat for these plants. In general, these respondents opposed designation because they believed it would cause economic hardship, discourage cooperative projects, polarize

relationships with hunters, or potentially increase trespass or vandalism on private lands. In addition, commenters also cited a lack of information on the biological and ecological needs of these plants which, they suggested, may lead to designation based on guesswork. The respondents who supported the designation of critical habitat cited that designation would provide a uniform protection plan for the Hawaiian Islands, promote funding for management of these plants, educate the public and State government, and protect partnerships with landowners and build trust.

In early February 2000, we hand-delivered a letter to representatives of the private landowner on Lanai requesting any information considered germane to the management of any of the 37 plants on the island, and containing a copy of the November 30, 1998, **Federal Register** notice, a map showing the general locations of the plants on Lanai, and a handout containing general information on critical habitat. On April 4, 2000, we met with representatives of the landowner to discuss their current land management activities. In addition, we met with Maui County DOFAW staff and discussed their management activities on Lanai.

On December 27, 2000, we published the third of the court-ordered proposed critical habitat designations or non-designations for 18 Lanai plants (65 FR 82086). The prudence determinations and proposed critical habitat designations for Kauai and Niihau plants were published on November 7, 2000 (65 FR 66808), for Maui and Kahoolawe plants on December 18, 2000 (65 FR 79192), and for Molokai plants on December 29, 2000 (65 FR 83158). All of these proposed rules were sent to the **Federal Register** by or on November 30, 2000, as required by the court orders.

In those proposals, we proposed that critical habitat was prudent for 33 species (*Abutilon eremitopetalum*, *Adenophorus perianth*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonoides*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyperus trachysanthos*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahlia* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Labordia tinifolia* var. *lanaiensis*, *Mariscus fauriei*, *Melicope munroi*, *Neraudia sericea*, *Portulaca*

sclerocarpa, *Sesbania tomentosa*, *Silene lanceolata*, *Spermolepis hawaiiensis*, *Tetramolopium remyi*, *Vigna o-wahuensis*, *Viola lanaiensis*, and *Zanthoxylum hawaiiense*) that are reported from Lanai as well as on Kauai, Niihau, Maui, Kahoolawe, and Molokai. We proposed that critical habitat was not prudent for one species, *Phyllostegia glabra* var. *lanaiensis*, because it had not been seen recently in the wild, and no genetic material of this species is known to exist.

On December 27, 2000, we proposed designation of critical habitat on approximately 1,953 ha (4,826 ac) of land on the island of Lanai. The publication of the proposed rule opened a 60-day public comment period, which closed on February 26, 2001. On February 22, 2001, we published a notice (66 FR 11133) announcing the reopening of the comment period until April 2, 2001, on the proposal to designate critical habitat for plants from Lanai and a notice of a public hearing. On March 22, 2001, we held a public hearing at the Lanai Public Library Meeting Room, Lanai. On April 6, 2001, we published a notice (66 FR 18223) announcing corrections to the proposed rule. These corrections included changes to the map of general locations of units and new Universal Transverse Mercator (UTM) coordinates and increased the total proposed critical habitat to 2,034 ha (5,027 ac).

On October 3, 2001, we submitted a joint stipulation with Earthjustice (representing the plaintiffs in *Hawaii Conservation Council v. Babbitt*) requesting extension of the court order for the final rules to designate critical habitat for plants from Kauai and Niihau (July 30, 2002), Maui and Kahoolawe (August 23, 2002), Lanai (September 16, 2002), and Molokai (October 16, 2002), citing the need to revise the proposals to incorporate or address new information and comments received during the comment periods. The joint stipulation was approved and ordered by the court on October 5, 2001. On January 28, 2002, in the Kauai revised proposal, we proposed that designation of critical habitat was prudent for *Isodendron pyriformium* and *Solanum incompletum*, two species reported from Lanai as well as Kauai, Maui, and Molokai.

On March 4, 2002, we published a revised proposed rule for the 37 plant species from Lanai (67 FR 9806). Critical habitat for 32 (*Abutilon eremitopetalum*, *Adenophorus perianth*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonoides*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*,

Ctenitis squamigera, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyperus trachysanthos*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahlia* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Labordia tinifolia* var. *lanaiensis*, *Mariscus fauriei*, *Melicope munroi*, *Neraudia sericea*, *Portulaca sclerocarpa*, *Sesbania tomentosa*, *Silene lanceolata*, *Spermolepis hawaiiensis*, *Tetramolopium remyi*, *Vigna o-wahuensis*, and *Viola lanaiensis*) of the 37 plant species from the island of Lanai was proposed on approximately 7,853 ha (19,504 ac) of land (67 FR 9806). Critical habitat was not proposed for *Mariscus fauriei*, *Phyllostegia glabra* var. *lanaiensis*, *Silene lanceolata*, *Tetramolopium lepidotum* ssp. *lepidotum*, and *Zanthoxylum hawaiiense* on the island of Lanai because these plants no longer occur on Lanai and we were unable to determine habitat which is essential to their conservation on this island.

The publication of the revised proposed rule opened a 60-day public comment period, which closed on May 3, 2002. On July 15, 2002, we published a notice (67 FR 46450) announcing the reopening of the comment period until August 30, 2002, and a notice of a public hearing. On July 16, 2002, we published a notice announcing the availability of the draft economic analysis on the proposed critical habitat (67 FR 46626). On July 22, 2002, we held a public information meeting at the Lanai Senior Center, Lanai. On August 1, 2002, we held a public hearing at the Lanai Public Library Meeting Room, Lanai. On July 11, 2002, we submitted joint stipulations with Earthjustice requesting extension of the court orders for the final rules to designate critical habitat for plants from Lanai (December 30, 2002), Kauai and Niihau (January 31, 2003), Molokai (February 28, 2003), Maui and Kahoolawe (April 18, 2003), Oahu (April 30, 2003), the Northwestern Hawaiian Islands (April 30, 2003), and the island of Hawaii (May 30, 2003), citing the need to conduct additional review of the proposals, address comments received during the public comment periods, and to conduct a series of public workshops on the proposals. The joint stipulations were approved and ordered by the court on July 12, 2002. On November 15, 2002, we published in the **Federal Register** (67 FR 69176) a notice reopening the public comment period for the proposed rule.

Summary of Comments and Recommendations

In the proposed rule published on March 4, 2002 (67 FR 9806), we requested that all interested parties submit written comments on the proposal. We also contacted all appropriate Federal, State, and local agencies, scientific organizations, and other interested parties and invited them to comment. We received one request for a public hearing. We announced the date and time of the public hearing in letters to all interested parties, appropriate State and Federal agencies, county governments, and elected officials, and in notices published in the *Honolulu Advertiser* and the *Maui News* on March 19, 2002. A transcript of the hearing held in Lanai City, Lanai on August 1, 2002, is available for inspection (see ADDRESSES section).

We received individually written letters from 19 parties, including three designated peer reviewers, four State agencies, and 12 individuals, and testimony from three individuals at the August 1, 2002, public hearing. Approximately 275 additional letters were submitted as part of a mailing campaign. Of the 22 parties who did not respond as part of the mailing campaign, five supported the proposed designation, eight were opposed, and nine expressed neither support nor opposition. The eight commenters who opposed the proposal specifically opposed designation of critical habitat on lands they own or manage, and requested that these areas be excluded from critical habitat designation.

We reviewed all comments received for substantive issues and new information regarding critical habitat for *Abutilon eremitopetalum*, *Adenophorus periens*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonoides*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyperus trachysanthos*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Gahnia lanaiensis*, *Hedyotis manni*, *Hedyotis schlehtendahlana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyrifolium*, *Labordia tinifolia* var. *lanaiensis*, *Mariscus fauriei*, *Melicope munroi*, *Neraudia sericea*, *Phyllostegia glabra* var. *lanaiensis*, *Portulaca sclerocarpa*, *Sesbania tomentosa*, *Silene lanceolata*, *Solanum incompletum*, *Spermelepis hawaiiensis*, *Tetramolopium lepidotum* ssp. *lepidotum*, *Tetramolopium remyi*,

Vigna o-wahuensis, *Viola lanaiensis*, and *Zanthoxylum hawaiiense*. Similar comments were grouped into general issues and are addressed in the following summary.

Issue 1: Biological Justification and Methodology

(1) *Comment:* One reviewer questioned whether loss of wetlands is a threat to *Cyperus trachysanthos* because wetlands are not known to exist on Lanai.

Our Response: Because *Cyperus trachysanthos* requires seasonally wet soils, we feel that the lack of such soils on Lanai does constitute a threat to the species. However, based on information received during the public comment period, we have revised the proposed critical habitat for *C. trachysanthos*. We are no longer proposing critical habitat for this species on Lanai because of the absence of wetland habitat.

Furthermore, we were able to locate sites on other islands that: (1) Contain the primary constituent elements that are essential to the conservation of the species, (2) are within historical range, and (3) accommodate our recovery goals of 8–10 populations.

(2) *Comment:* One reviewer stated that deer and mouflon sheep are threats to *Centaurium sebaeoides*, *Cyperus trachysanthos*, and *Sesbania tomentosa*, and that mouflon sheep, not goats and pigs, are a threat to *Hibiscus brackenridgei*.

Our Response: Goats and pigs were replaced with mouflon sheep and axis deer as current threats throughout the “Discussion of plant taxa” section. Goats and pigs are no longer present on Lanai and were mistakenly included as current threats.

(3) *Comment:* One peer reviewer suggested that high nutrient runoff from a nearby golf course be included as a threat to Unit G.

Our Response: Unit G has been modified to exclude inland areas that do not contain the primary constituent elements for *Portulaca sclerocarpa*. Critical habitat is now proposed only for the cliff faces along the shore. These areas are not at risk of nutrient runoff from the nearby golf course.

(4) *Comment:* Several commenters expressed concern that *Phyllostegia glabra* var. *lanaiensis* be assumed extinct, as it is common for Hawaiian plant species that have not been seen for decades to be rediscovered. The recent rediscoveries of *Asplenium fragile* var. *insulare* on Maui and of *Phyllostegia waimeae* on Kauai are cases in point. Critical habitat should be designated for this species.

Our Response: We continue to believe that it would not be prudent to designate critical habitat for *Phyllostegia glabra* var. *lanaiensis*, a species known only from Kaiholena on Lanai. The species has not been seen on Lanai for over 80 years. This species was last observed on Lanai at Kaiholena in 1914. A report of this plant from the early 1980s was probably erroneous and should be referred to as *P. glabra* var. *glabra* (R. Hobdy, pers. comm., 1992). In addition, this species is not known to be in storage or under propagation. Given these circumstances, we have determined that designation of critical habitat for *P. glabra* var. *lanaiensis* is not prudent because such designation would not be beneficial to the species. If this species is rediscovered, we may reconsider designating critical habitat for this species as new information becomes available (see 16 U.S.C. 1532(5)(B); 50 CFR 424.13(f)).

(5) *Comment:* The Service should not designate critical habitat for *Adenophorus periens*, which was last seen on Lanai in the 1860s, because nothing is known about its threats. The Service must prove that the designated areas for critical habitat are essential to the conservation of *A. periens* before designating critical habitat.

Our Response: The Service believes that designation of critical habitat for *Adenophorus periens* is prudent because information about the habitat requirements of *A. periens* exists in the historical literature and, unlike the case of *Phyllostegia glabra*, individuals of this species are currently in cultivation, allowing populations to be restored. According to recovery goals, reestablishment of wild populations within historical range is essential to the recovery of this species (USFWS 1999). However, the Service excluded proposed unit Lanai D, proposed in part as critical habitat for *A. periens* because we believe the benefits of exclusion outweigh the benefits of inclusion. The landowner has entered into a voluntary memorandum of agreement with the Service to manage the lands in proposed Unit D, as well as adjacent lands, for the conservation benefit of the 28 listed species for which it was proposed as critical habitat. We believe the benefits of these management actions would not occur if critical habitat is designated, are greater than the benefits of including the area as critical habitat. See *Exclusions Under Section 4(b)(2)* for a more detailed discussion of the exclusions. Critical habitat for *A. periens* has been proposed within historical range on Kauai, Molokai, Hawaii, and Oahu.

(6) *Comment:* One peer reviewer suggested that a recommendation to

discontinue federally supported hunting programs and remove nonnative animals, particularly axis deer, be incorporated into the proposal.

Our Response: The Service recognizes that populations of many game mammal species affect the distribution and abundance of many listed endangered plant and animal species to varying degrees, either directly or indirectly. We also recognize that game mammal hunting is a highly valued activity to a portion of the present-day Hawaiian culture. We recognize hunting as an important tool to manage wild populations of game and support hunting as a recreational activity and the maintenance of game mammal hunting programs within the state of Hawaii. However, Federal and state law dictate that hunting programs must be designed and executed in a way that is compatible with endangered species conservation. Game mammal hunting programs must not only prevent extinction, but allow for the recovery of federally listed endangered and threatened species.

Under the Endangered Species Act, a critical habitat designation establishes a geographic area that is important for the conservation of a threatened or endangered species and may require special management considerations. However, a designation does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other special conservation area. It does not allow government or public access to private lands and will not result in closure of the area to all access or use. A critical habitat designation does not constitute a land management plan. Rather, it triggers the requirement that Federal agencies must consult with the Service on activities they take or fund that might affect critical habitat.

(7) *Comment:* Critical habitat designation should consider the following: (1) The importance of designating the best remaining elements of ecosystems for multi-species recovery, (2) the practicality of managing and protecting scattered units without apparent physical boundaries, and (3) the importance of public/private partnerships for species recovery.

Our Response: We agree that all these factors are important for the conservation of listed species. We have sought to designate only areas that are essential for the conservation of the species, and which contain primary constituent elements within the best remaining habitats. We also agree that public/private partnerships are often essential for species recovery. As an example, the Service is excluding proposed unit Lanai D, an area proposed

as critical habitat for 28 species, because the landowner has entered into a voluntary memorandum of agreement with the Service to manage the lands for the conservation benefit of 28 listed species. We believe there is a higher likelihood of beneficial conservation activities occurring on Lanai without designated critical habitat than there would be with designated critical habitat in this location. See *Exclusions Under Section 4(b)(2)* for a more detailed discussion of the excluded areas.

(8) *Comment:* One peer reviewer commented that the requirement that 1,000 m separate populations is adequate for small-scale disturbance events, but is inadequate for large-scale disturbances. However, the use of multiple populations with a 1,000-m separation is a good balance between protecting against catastrophes and avoiding isolation of populations. Another peer reviewer commented that although a 1,000-m separation seems a bit arbitrary, it is workable. A third peer reviewer disagreed with the identification of populations as discrete units due to the lack of barriers to breeding on Lanai.

Our Response: We acknowledge the difficulty in identifying a discrete, quantitative distance between populations, but in the absence of more specific information indicating the appropriate distance to assure limited cross-pollination, we believe that a distance of 1,000 m (3,281 ft) is scientifically reasonable based on our review of current literature (Barret and Kohn 1991; Fenster and Dudash 1994; Havens 1998; Schierup and Christiansen 1996).

(9a) *Comment:* Two peer reviewers commented that the multi-population approach is essential to the successful recovery of Hawaiian species, but that 8 to 10 populations may be too low a goal in some cases. Eight to 10 populations should be considered the low end of what is needed for recovery; species that characteristically have numerous populations containing small numbers of individuals require special consideration. (9b) *Comment:* Another peer reviewer suggested that 8 to 10 populations *on each island* would be most appropriate for multi-island species.

Our Response: The Service acknowledges that, in general, identification of more than 8 to 10 areas for recovery would improve the likelihood of recovery. However, absent any quantitative scientific modeling for the species, the service concludes that 8 to 10 populations is a goal that has a

reasonable likelihood of meeting recovery goals.

(10) *Comment:* It is difficult to comment in an informed manner on critical habitat for species occurring on more than one island because the proposed rule did not provide information on critical habitat proposed on other islands for multi-island species.

Our Response: For this reason, the Service gave notice on August 20, 2002, reopening simultaneous comment periods for the proposed designations and non-designations of critical habitat for plant species on the islands of Kauai, Niihau, Molokai, Maui, Kahoolawe, and the northwestern Hawaiian Islands until September 30, 2002, and for plant species on the islands of Hawaii, and Oahu until November 30, 2002. The new comment periods allowed all the interested parties to review all the proposals together and submit written comments. The comment period for the proposed designations and non-designations of critical habitat for plant species on Lanai opened on August 15, 2002, and closed on August 30, 2002, overlapping with the reopened comment periods for Kauai, Niihau, Molokai, Maui, Kahoolawe, the northwestern Hawaiian Islands, Hawaii and Oahu.

(11a) *Comment:* Two peer reviewers stated that degraded habitat should only be excluded from critical habitat if it lacks the potential to become appropriate habitat in the future or if enough less degraded areas exist to make retention of degraded areas unnecessary. (11b) *Comment:* A third peer reviewer feels that degraded sites should still be included as critical habitat, at the very least as buffer zones and ideally as areas for expansion. (11c) *Comment:* Two peer reviewers commented that excluding degraded areas from critical habitat tends to encourage landowners to let areas decline to the point where they will not be selected as critical habitat.

Our Response: The Service agrees that "degraded" areas may be necessary for recovery of the species. We have included areas that are "degraded" only if such areas contain the primary constituent elements for the species; we considered if they are able to eventually regain those missing primary constituent elements if properly managed for restoration and no other suitable habitat for the species is available. We revised proposed critical habitat for many species in the proposed rule because we were able to reach our recovery goal of 8 to 10 populations for a species in intact areas within its

historical range that contain the primary constituent elements.

(12) *Comment:* One commenter was concerned about the designation of units containing “a badly degraded habitat.” The reviewer criticizes designation of such areas because it is not economically efficient to control threats such as feral ungulates, weeds, and fire. Such designation will create a regulatory burden and restrict future management options for landowners and the State. Another suggested that some species may be endangered because they exist in marginal habitat and that designating more marginal habitat will not improve a species’ chance of survival.

Our Response: We agree that it is in a species’ best interest to designate critical habitat in the least degraded areas containing primary constituent elements within historical range. However, in order to reach our recovery goal of 8 to 10 populations for a species within historical range it was sometimes necessary to include “degraded” areas when other less degraded areas were not available for the species.

(13a) *Comment:* One peer reviewer stated that it is unlikely that enough land has been identified for the long-term conservation of multiple populations; however, given the need to compromise, the proposed units are reasonable. Peer reviewers stated that the areas seem suitable in size and are ecologically appropriate, provided: (1) They are protected from their primary threats, (2) excluded lands are properly managed and of large enough size to be ecologically sustainable, (3) proposed units E1–3 are consolidated into a single unit and proposed unit D is retained as an entire unit, or the Service can explain why fragmentation and edge-effects are not threats to the species and why there is adequate mid-elevation habitat available in other areas for target species. (13b) *Comment:* Critical habitat for *Hibiscus brackenridgei*, *Tetramolopium remyi*, and *Sesbania tomentosa* should be larger due to their formerly extensive range. (13c) *Comment:* One peer reviewer stated that removal of significant portions of any of the critical habitat units in the proposed rule is likely to prevent the recovery of, or lead to the extinction of, listed species.

Our Response: We did not include additional lands in proposed critical habitat because, at the time of the proposal and revised proposal, we concluded that those lands were not essential for the conservation of the 37 Lanai plant species, based on available information concerning status of the species in specific areas and level of

habitat degradation. In this final rule, several units and parts of units proposed as critical habitat have been excluded because they are not essential for the conservation of the species or because there are alternatives to a critical habitat designation. We determined them to be non-essential due to their lacking primary constituent elements, or having primary constituent elements but there are other places for these species that have more primary constituent elements, are less degraded, are already undergoing restoration, or are within a partnership, Natural Area Reserve, TNCH preserve, or on a refuge. A sufficient number (as defined in our recovery plans) of other, more appropriate areas are being designated or proposed as critical habitat within historical range on other islands. In other cases, the Service decided that the benefits of excluding critical habitat outweighed the benefits of including critical habitat. See the descriptions of exclusion of critical habitat under Exclusions Under Section 4(b)(2), below.

(14) *Comment:* One peer reviewer noted that one of the keys to a plant’s survival is having the appropriate microclimate, which is created by other plant species in a large enough aggregation to alter the environment. Because of the strong, harsh winds on Lanai, it is essential that critical habitat units, such as proposed units A, B, and C, are large enough to provide habitat for a complete plant community that can provide shelter from the winds.

Our Response: We agree and have sought to designate critical habitat units that are large enough to accommodate the needs of the species within those units. However, based on information received during the public comment period, we have revised the proposed critical habitat units and have excluded proposed units A, B, and C because they are not essential for the conservation of *Hibiscus brackenridgei*, *Cyperus trachysanthos*, *Tetramolopium remyi*, and *Sesbania tomentosa*. Although they possess some of the primary constituent elements for these species, their habitat is largely degraded. We were able to identify an adequate number of sites within the historical range containing more appropriate and less degraded habitat, and/or that are already slated for conservation management and restoration.

(15a) *Comment:* Several commenters, including one peer reviewer, felt that the proposed rule was improved by incorporating clear methodology to designate appropriate unoccupied habitat for plant recovery. (15b)

Comment: The Service should not

designate unoccupied habitat. One commenter stated that the Service is acting outside its authority in designating unoccupied habitat because almost any area in Hawaii is capable of supporting one or more protected species, and the entire State would have to be designated if unoccupied habitat is included. (15c) *Comment:* Unoccupied habitat outside of the Conservation District should not be designated because it is degraded.

Our Response: Our recovery plans for these species identify the need to expand existing populations and reestablish wild populations within the historical range. Because of the very limited current range of these species, designating only occupied areas would not meet the conservation requirements of the species. Occupied areas, as well as the similar habitat around them within the designated units of critical habitat that may be occupied in the future, provide the essential life-cycle needs of the species and provide some or all of the habitat components essential for the conservation (primary constituent elements) of these species. We have revised the December 27, 2000, proposal to designate critical habitat for 18 species from Lanai to incorporate new information and/or address comments and new information received during the comment periods, including information on areas of potentially suitable unoccupied habitat for some of these species. Expansion of some of these species to areas that were likely to have been historically occupied is essential to the conservation of the species.

When designating unoccupied habitat for these species, we first evaluated lands that are suitable for each species. Of this suitable habitat, we determined what areas are essential for the conservation of each species using the guidelines outlined in the recovery plans (*i.e.*, areas that contain one or more of the primary constituent elements, are either in good condition for recovery efforts or could be made good through appropriate management actions), and would provide space needed by the species to reach our recovery goals of 8 to 10 populations with a minimum of 100 mature reproducing individuals per population for long-lived perennials, 300 mature reproducing individuals per population for short-lived perennials, and 500 mature reproducing individuals per population for annuals.

We disagree that all areas outside the Conservation District are degraded and inappropriate for these species. Areas that contain one or more of the primary constituent elements, are either in good

condition for recovery efforts or could be made good through appropriate management actions, and would provide space needed by the species to reach our recovery goals of 8 to 10 populations with a minimum number of mature reproducing individuals as specified above, were determined to be essential for the conservation of each species, regardless of land-use zoning.

(16a) *Comment:* One peer reviewer praised the Service for its logical and reasonable methodology and for using the best available science, including information such as elevation range, vegetation type, associated species, physical location and community type for determining critical habitat on Lanai. Another reviewer expressed appreciation for the extensive work and review of Lanai data by the Service.

(16b) *Comment:* Other reviewers felt that the Service did not adequately consider recovery science and management in its proposed critical habitat designations and did not have adequate information relating to each species' primary constituent elements.

Our Response: When developing the proposed rule to designate critical habitat for 32 plants from Lanai, we used the best scientific and commercial data available at the time, including but not limited to, information from the known locations, site-specific species information from the HINHP database and our own rare plant database; species information from the Center for Plant Conservation's (CPC) rare plant monitoring database; the final listing rules for these species; information received during the public comment periods and the informational meetings and public hearings held on Lanai on July 22, 2002, and August 1, 2002; recent biological surveys and reports; our recovery plans for these species; GIS information (e.g., vegetation, soils, annual rainfall, elevation contours, landownership); information received in response to outreach materials and requests for species and management information we sent to all landowners, land managers, and interested parties on the island of Lanai; discussions with botanical experts; and recommendations from the Hawaii Pacific Plant Recovery Coordinating Committee (CPC, *in litt.* 1999, HINHP database 2000; HPPRC 1998; Service 1994, 1995, 1996, 1997, 1998a, 1998c, 1999).

In accordance with our policy on peer review published on July 1, 1994 (59 FR 34270), we solicited the expert opinions of appropriate and independent specialists regarding the proposed rule. The purpose of this peer review was to ensure that our designation methodology of critical habitat of Lanai

plants was based on scientifically sound data, assumptions, and analysis. The comments of all of the peer reviewers were taken into consideration in the development of this final designation. We are required under a court-approved settlement agreement to finalize this designation by December 30, 2002. If provided with new information, we may revise the critical habitat designation in the future.

(17) *Comment:* One commenter asked why other federally listed plants on Lanai and historically listed plants were not included in the critical habitat proposal. A peer reviewer asked why critical habitat was not proposed for *Gardenia mannii* when it appears that the proposed critical habitat may provide adequate habitat for the recovery of that species.

Our Response: The proposed rule to designate critical habitat for 32 species found on Lanai was prepared in response to a lawsuit (see "Previous Federal Action" section above). Species listed prior to 1991, such as *Gardenia mannii*, were not covered by this lawsuit and thus not addressed in the proposed rule. Additionally, certain species were not included in the proposed rule because historical records were incomplete and biological experts were unable to provide information about their habitat requirements. These species are: *Mariscus fauriei*, *Silene lanceolata*, *Tetramolopium lepidotum* ssp. *lepidotum*, and *Zanthoxylum hawaiiense*.

(18) *Comment:* One commenter stated that critical habitat for *Tetramolopium lepidotum* ssp. *lepidotum* should be included in the final rule, if such habitat is present on Lanai.

Our Response: Historical records are incomplete and biological experts were unable to provide information about the habitat requirements of *Tetramolopium lepidotum* ssp. *lepidotum* on Lanai. *Tetramolopium lepidotum* ssp. *lepidotum* is currently found on Oahu and we have proposed critical habitat for this species on that island.

Issue 2: Effects of Designation

(19) *Comment:* One landowner commented that critical habitat should be consistent with current and ongoing conservation efforts in priority areas so that resources are not directed elsewhere in an uncoordinated manner. This reviewer stated that the Service and landowner should work together to develop an approach that is more likely to lead to species recovery, rather than a passive designation lacking management.

Our Response: We agree and recognize that the ultimate purpose of

critical habitat is to contribute to the conservation of listed species, a purpose that can be best reached by cooperation between the Service and the community. As an example, the Service excluded proposed unit D, proposed for 28 species, from critical habitat designation because we believe the benefits of exclusion outweigh the benefits of inclusion. The landowner entered into a voluntary memorandum of agreement with the Service to manage the lands in proposed unit Lanai D, as well as adjacent lands, for the conservation benefit of the 28 listed species for which it was proposed as critical habitat. We believe the benefits of these management actions, which would not occur if critical habitat is designated, are greater than the benefits of including the area as critical habitat. See *Exclusions Under Section 4(b)(2)* for a more detailed discussion of the exclusions.

(20) *Comment:* One reviewer commented that the designation of critical habitat alone will not prevent the loss of remaining natural habitats and that funds would be better spent on natural resource management activities. Another reviewer stated that if management is not realistic, it makes little sense to designate critical habitat.

Our Response: Critical habitat designation is one of a number of conservation tools established in the Act that can play an important role in the recovery of a species. For a Federal action to adversely modify critical habitat, the action would have to adversely affect the critical habitat's constituent elements or their management in a manner likely to appreciably diminish or preclude the conservation of the species. Designation of critical habitat is a way to guide Federal agencies in evaluating their actions, in consultation with the Service, such that their actions do not hamper conservation of listed species. There also are educational or informational benefits to the designation of critical habitat. Educational benefits include the notification of landowners, land managers, and the general public about the importance of protecting the habitat of these species and dissemination of information regarding their essential habitat requirements.

(21) *Comment:* One peer reviewer noted that it appears that there is an assumption that "natural" areas in the recent past were not impacted by humans. It is unlikely that there was any place in the major Hawaiian Islands that was not at least nominally altered by Hawaiians. There should therefore be a slated role for the Hawaiian

community in the proposed conservation zones.

Our Response: We agree that Hawaiians may have impacted natural areas prior to European settlement. Further, we believe that native Hawaiians can play an important role in species recovery. We do not anticipate that the critical habitat designation will affect their role in species recovery efforts, and we believe it is likely to be compatible with many of the land management goals of native Hawaiians.

(22) *Comment:* Critical habitat must accommodate the traditional cultural gathering rights of native Hawaiians as reflected in Article XII of the State constitution and upheld by the Hawaii Supreme Court in the Public Access Shoreline Hawaii and Ka Paakai o Ka Aina decisions.

Our Response: Critical habitat designation does not affect activities, including human access, on State or private lands unless some kind of Federal permit, license, or funding is involved and the activities may affect the species. It imposes no regulatory prohibitions on state or other non-Federal lands, nor does it impose any restrictions on State or non-Federal activities that are not funded or authorized by any Federal agencies. Access to Federal lands that are designated as critical habitat is not restricted unless access is determined to result in the destruction or adverse modification of the critical habitat. If we determine that access will result in adverse modification of the critical habitat, we will suggest reasonable or prudent alternatives that allow the proposed activities to proceed. Activities of the State or private landowner or individual, such as farming, grazing, logging, and gathering generally are not affected by a critical habitat designation, even if the property is within the geographical boundaries of the critical habitat, unless there is Federal nexus to the activity. A critical habitat designation has no regulatory effect on access to State or private lands. Recreational, commercial, and subsistence activities, including hunting, on non-Federal lands are not regulated by this critical habitat designation, and may be impacted only where there is Federal involvement in the action and the action is likely to destroy or adversely modify critical habitat.

(23) *Comment:* One native Hawaiian commenter stated that the critical habitat proposal is crucial in guardianship and preservation of not only native plants, but the native species that thrive in such protected habitat.

Our Response: We agree that conservation of native plants is consistent with the land management goals of many native Hawaiians. Though not intended to replace on the ground management, we agree that critical habitat designation plays a role in the protection of native species. Designation of critical habitat is a way to guide Federal agencies in evaluating their actions, in consultation with the Service, such that their actions do not hamper conservation of listed species.

There also are educational or informational benefits to the designation of critical habitat. Education benefits include the notification of landowners, land managers, and the general public of the importance of protecting the habitat of these species and dissemination of information regarding their essential habitat requirements.

Issue 3: Site-Specific Biological Comments

(24) *Comment:* The exclusion of Kanepuu Preserve needs to be reassessed because the string of small preserves may not be adequate to provide for the long-term maintenance of habitat. Critical habitat may need to be established around these preserves in order to sustain native plant communities. One peer reviewer was concerned that, given the exclusion of Kanepuu Preserve, *Bonamia menziesii* may not have enough suitable lowland dry forest designated as critical habitat.

Our Response: We reassessed the exclusion of Kanepuu Preserve and determined that it should be excluded because, in addition to having ongoing management, it is not essential for the conservation of *Bonamia menziesii* or *Hibiscus brackenridgei*. We were able to locate sites on other islands for those two species that: (1) Contain at least one of the primary constituent elements that are essential to the conservation of the species, (2) are within historical range, and (3) accommodate our recovery goals of 8–10 populations.

(25a) *Comment:* One peer reviewer noted that as long as the units are protected from major threats, adequate, although not ideal, habitat is designated within proposed unit A for species recovery. (25b) *Comment:* Other commenters recommended removing unit A from the proposed designation, citing the following reasons: (1) *Hibiscus brackenridgei* is represented by only one individual in the unit, the unit has a small amount of suitable soil, it has habitat proposed in unit D, habitats exist on other islands, and the species has been extensively cultivated *ex situ*; (2) the physical attributes of Kaena Iki have changed substantially over time,

the ground water spring dried up and seasonally wet soil habitat is no longer present, making it unsuitable habitat for *Cyperus trachysanthos*; (3) the historical location for *C. trachysanthos* is somewhat ambiguous because “Kaena” is also the name of a locality 2.5 miles to the east-northeast outside proposed unit A; and (4) the former population of *C. trachysanthos* within proposed unit A was likely very small and may be considered an unusual occurrence. (25c) *Comment:* Another reviewer suggested reducing the size of proposed unit A to less than 275 acres in the upper portion of the site near the existing populations of *H. brackenridgei*. The unit should be designed to accommodate just one of the 8 to 10 populations needed statewide.

Our Response: Unit A was proposed as critical habitat for two species, *Cyperus trachysanthos* and *Hibiscus brackenridgei*. We excluded the proposed critical habitat for *C. trachysanthos* from the final rule because this area no longer contains the suitable habitat of seasonally wet soils. The water source has permanently dried up due to alterations in the watershed properties of the island. Also, this area is not essential for the conservation of *C. trachysanthos*, a multi-island species, because we were able to locate sites on other islands that: (1) Contain at least one of the primary constituent elements that are essential to the conservation of the species, (2) are within historical range, and (3) accommodate our recovery goals of 8 to 10 populations.

Based on information received during the public comment period, we have also excluded unit A as critical habitat for *H. brackenridgei*, a multi-island species. We determined that this area is not essential for the conservation of the species because there are at least eight other places for this species that have more primary constituent elements, are less degraded, are already undergoing restoration, or are within a partnership, Natural Area Reserve, TNCH preserves, or on a refuge. More appropriate areas on other islands, within historical range, and that provide habitat for 10 populations, are proposed as critical habitat for *H. brackenridgei*.

(26a) *Comment:* One peer reviewer noted that, as long as the units are protected from major threats, adequate, though not ideal, habitat is designated within proposed unit B for species recovery. (26b) *Comment:* Proposed unit B should not be removed from critical habitat designation because recent surveys found no individuals of *Tetramolopium remyi* present in fenced areas, despite favorable environmental conditions. (26c) *Comment:* Proposed unit B should be reduced to less than

235 acres in the upper portion of the site near the existing population. Proposed unit D provides better habitat for many populations of *T. remyi* and recovery is much more likely in this unit.

Our Response: Unit B was proposed as critical habitat for *Tetramolopium remyi*. Modifications were made to this unit to exclude areas not essential to the conservation of this species. The area is highly degraded and is in a game management area where one of the threats (axis deer) is being managed for hunting purposes by the State. The remaining area designated as critical habitat for the multi-island species *T. remyi* provides habitat within its historical range for one population of the 8 to 10 outlined in the recovery plan for this species. The designated area is situated around the recently extirpated known individuals, contains at least one of the primary constituent elements, and most likely contains a viable seed bank due to the recent existence of mature, seed-bearing individuals of this species in the area. This unit was renamed Lanai 1—*Tetramolopium remyi*.

(27) *Comment:* Two commenters suggested that proposed unit C be removed from critical habitat designation for *Sesbania tomentosa*, citing the following reasons: (1) The species does not currently occur on Lanai; (2) natural recruitment from inter-island dispersal is unlikely; (3) it is not economically efficient to manage the threats in these areas; (4) the historical Lanai population may have been genetically distinct and propagules are not available from the historical population; and (5) suitable unoccupied habitat exists in proposed unit D.

Our Response: Unit C was proposed as critical habitat for the multi-island species *Sesbania tomentosa*. We have excluded this unit from critical habitat because it is not essential for the conservation of the species because there are at least eight other places for this species that have more primary constituent elements or are less degraded, are already undergoing restoration, or are within a partnership, Natural Area Reserve, TNCH preserve, or on a refuge. More appropriate areas on other islands, within the historical range, and that provide habitat for 10 populations, are proposed as critical habitat for *S. tomentosa*.

(28a) *Comment:* Commenters, including peer reviewers, supported the designation of critical habitat in proposed unit D because: (1) This area contains the best remaining habitat on Lanai, (2) supports high rare species diversity, and (3) has existing programs for native species management at Lanaihale. (28b) *Comment:* One

reviewer commented that the extension of critical habitat for *Centaurium sebaeoides* into the Lanai Cooperative Game Management Area is reasonable because the habitat in this area is similar to the species' current habitat on Lanai. (28c) *Comment:* Two peer reviewers questioned the removal of the middle portion of proposed unit D, especially when edge effects should be minimized. (28d) *Comment:* Proposed unit D should be divided into three subunits (D-1, D-2, and D-3) in order to make the unit manageable in a practical sense. (27e) *Comment:* D-1 (Lanaihale area) should be removed from critical habitat designation because it is already being managed in a cooperative agreement between the Service and Castle and Cooke Resorts, LLC.

Our Response: Lanai D was proposed as critical habitat for 28 species: *Abutilon eremitopetalum*, *Adenophorus periens*, *Bonamia menziesii*, *Brighamia rockii*, *Centaurium sebaeoides*, *Cenchrus agrimonioides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiensis*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlehtendahlana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyrifolium*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Neraudia sericea*, *Solanum incompletum*, *Spermolepis hawaiiense*, *Tetramolopium remyi*, *Vigna o-wahuensis* and *Viola lanaiensis*.

Based on additional information and discussions with the landowner, the Service has decided not to designate critical habitat for these species on Lanai. The unit was excluded from critical habitat under section 4(b)(2) of the Act because the landowner entered into a voluntary memorandum of agreement with the Service to manage the lands in proposed unit Lanai D, as well as adjacent lands, for the conservation benefit of the 28 listed species for which it was proposed as critical habitat. We believe the benefits of these management actions, which would not occur if critical habitat is designated, are greater than the benefits of including the area as critical habitat. See *Exclusions Under Section 4(b)(2)* for a more detailed discussion of the exclusions.

(29a) *Comment:* All commenters agreed that at least portions of proposed units E1-3 are appropriate for critical habitat designation due to the likely presence of many species within the unit. (29b) *Comment:* One peer reviewer

argued for consolidation of proposed units E1-E3 in order to reduce edge effect and fragmentation, and remove barriers to gene flow. (29c) *Comment:* Only the upper portions of proposed units E should be included as critical habitat for *Bidens micrantha* because the remainder of proposed unit E is not essential to the conservation of the species.

Our Response: We acknowledge the potential negative impacts of edge effects on the habitat for *Bidens micrantha*. However, this species' primary constituent elements are found only within ridge habitat and the three proposed E units are actually three ridges. Consolidating the units would add the gulch areas between the ridges that lack the primary constituent elements for *B. micrantha*.

No changes were made to these proposed units and they are designated as critical habitat for *Bidens micrantha* ssp. *kalealaha*. They have been renamed units Lanai 2—*Bidens micrantha* ssp. *kalealaha*—North, Lanai 3—*Bidens micrantha* ssp. *kalealaha*—Middle, and Lanai 4—*Bidens micrantha* ssp. *kalealaha*—South.

(30) *Comment:* Two reviewers suggested removing proposed unit F as critical habitat for *Hibiscus brackenridgei* due to its degraded habitat, marginal soil and rainfall, and physical characteristics that are different from those at currently extant populations. One reviewer believed that designation of such sites is not economically efficient and would create a regulatory burden and restrict future management options for landowners and the State.

Our Response: This unit was proposed as critical habitat for the multi-island species *Hibiscus brackenridgei*. Based on information received during the public comment period, we have revised the proposed critical habitat for this species. We have excluded proposed unit F because it does not contain the primary constituent elements essential for the conservation of this species. An adequate amount of critical habitat for *Hibiscus brackenridgei* is proposed within historical range on other islands.

(31) *Comment:* One peer reviewer expressed concern that proposed unit G is downslope from a golf course and the high nutrient runoff from the golf course may encourage nonnative plants and threaten the survival of native species within the proposed unit. Three commenters suggested removing proposed unit G as critical habitat for *Portulaca sclerocarpa* because: (1) The species does not occur at this site currently, (2) historical records of its

occurrence at this site are lacking, (3) since the species is confined to vertical cliffs, habitat above the cliff is inappropriate, (4) few available niches exist for this species along the cliffs, (5) the species was likely always rare in this area, and (6) the cliffs are already protected under applicable shoreline setback laws.

Our Response: Lanai G was proposed as critical habitat for the multi-island species *Portulaca sclerocarpa*. Modifications were made to this unit to exclude inland areas that do not contain the primary constituent elements. Although there are no historical records for this species on the main island of Lanai, we believe the species did historically occur there as plants continue to survive just off shore on Poopoo Islet. Poopoo Islet is a small rocky outcrop approximately 200 m (600 ft) from the south shoreline. It is likely that the species disappeared from the main island Lanai as a result of the threats there prior to adequate surveys being conducted. Further, the areas designated as critical habitat on Lanai proper contain one or more of the primary constituent elements and provide additional area for one of the 8 to 10 populations needed for the recovery of this species as outlined in the recovery plan. Critical habitat designated for *P. sclerocarpa* includes only cliff faces along the shore. While it is true the cliffs are already protected under applicable State shoreline setback laws, the specific habitat features for this species are not directly protected by those laws. Actions taken adjacent to the cliffs, which may not be affected by State laws, could appreciably alter the ability of the habitat to support a population of this species. This unit was renamed Lanai 5—*Portulaca sclerocarpa*—Coast.

(32) *Comment:* Commenters supported the designation of critical habitat for *Portulaca sclerocarpa* at proposed unit H. One commenter noted that although surveys found no evidence of the species in proposed unit H, the islets' cliff faces remain appropriate for a species that was likely naturally rare due to the area's few suitable niches.

Our Response: We agree this species is rare, but this unit continues to support the one extant colony of this species on Lanai. No changes were made to this unit and it is designated as critical habitat for *Portulaca sclerocarpa*. It has been renamed Lanai 6—*Portulaca sclerocarpa*—Isle.

Issue 4: Mapping

(33) *Comment:* The Service should define affected property lines in a

manner that allows for the descriptions to be used in real property conveyance documents in the State of Hawaii.

Our Response: The maps in the **Federal Register** are meant to provide the general location and shape of critical habitat. The legal descriptions are readily plotted and transferable to a variety of mapping formats and were made available electronically upon request for use with GIS programs. At the public hearing, the maps were expanded to wall-size to assist the public in better understanding the proposal. These larger scale maps were also provided to individuals upon request. Furthermore, we provided direct assistance in response to written or telephone questions with regard to mapping and landownership within the proposed designation.

(34) *Comment:* The final proposal should map or identify how many populations are being accommodated in each unit and the acreage allotted for each population.

Our Response: The final rule identifies the number of populations accommodated in each unit. We do not have the scientific information to precisely identify how many acres each population requires. We did, however, ensure that each population is separated by 1,000 meters or by some distinct geologic feature.

Issue 5: Economic Issues

(35) *Comment:* The Draft Economic Analysis (DEA) fails to consider economic impacts of listing and critical habitat that result through interaction with State law, specifically Hawaii's Endangered Species Act. The commenter suggested that *New Mexico Cattlegrowers Association v. U.S. Fish and Wildlife Service* requires consideration of the impact of listing as well as the impact of designating an area as critical habitat. Instead, the analysis is expressly limited to the impact of Federal agency consultation under the jeopardy standard. However, since Federal listing triggers listing under State law, the Service must consider the impact of take prohibitions under State law (and consequently Federal law, which prohibits destruction of plants in knowing violation of State law).

Our Response: Possible costs resulting from interplay of the Federal Endangered Species Act and Hawaii State law are discussed in the economic analysis under indirect costs (e.g., possible conservation management mandate for the private landowner and reduction in game mammal populations). The economic analysis considers the economic impacts of section 7 consultations related to critical

habitat even if they are attributable co-extensively to the listed status of the species. In addition, the economic analysis examines any indirect costs of critical habitat designation, such as where critical habitat triggers the applicability of a State or local statute. However, where it is the listing of a species that prompts action at the State or local level (e.g., further regulating the take of federally listed species), the impacts are not attributable to critical habitat designation and are not appropriately considered in the economic analysis of critical habitat designation. Take prohibitions under Hawaii law are tied to the Federal listing of the species and do not co-extensively occur because of critical habitat designations. However, our analysis did consider the other ways in which the Federal Endangered Species Act and Hawaii State law may interplay.

(36) *Comment:* Two commenters stated that the DEA fails to consider economic impacts of critical habitat that result through interaction with Hawaii's Land Use Law. Critical habitat could result in changes to zoning under State law. HRS § 205-2(e) states that Conservation Districts shall include areas necessary for conserving endangered species. HRS 195D-5.1 states that DLNR shall initiate amendments in order to include the habitat of rare species. Even if DLNR does not act, the Land Use Commission may initiate such changes, or they may be forced by citizen lawsuits. Areas for endangered species are placed in the protected subzone with the most severe restrictions. While existing uses can be grandfathered in, downzoning will prevent landowners from being able to shift uses in the future, will reduce market value, and make the land unmortgageable.

Our Response: As indicated in the final addendum to the DEA (Addendum), about 362.4 ac of agricultural lands and 8 ac of rural lands are included in the final designation. No agricultural or ranching activities take place on these agricultural lands. Assuming a worst-case scenario, one which is not envisioned, reduction in land values due to redistricting land from the Agricultural or Rural District to Conservation District could range from \$50,736 to \$163,080 (\$140 to \$450 per acre) for agricultural lands and \$1.3 million to \$2.7 million (\$160,000 to \$334,000 per acre) for rural lands. Under this scenario, even if a landowner has no plans to sell the land, the loss in land value could reduce potential mortgage financing. However, the likelihood of redistricting is not certain and could be small. The State's history

supports the unlikelihood of rezoning or redistricting land based on evaluations of biological value.

(37) *Comment:* The DEA fails to consider economic impacts of critical habitat that result through interaction with State law, specifically Hawaii's Environmental Impact Statement Law. HRS 343-5 applies to any use of conservation land, and a full Environmental Impact Statement is required if any of the significance criteria listed in HAR 11-200-12 apply. One of these criteria is that an action is significant if it "substantially affects a rare, threatened or endangered species or its habitat." This will result in costly procedural requirements and delays. However, the DEA does not acknowledge that any impact on endangered species habitat will be deemed to be "significant." Multiple commenters stated that the DEA fails to evaluate the practical effect critical habitat designation will have on development. Special Management Area permits administered by Maui County as required by Hawaii's Coastal Zone Management Act, will be harder to get, will result in delays, will cause a decline in property values and may make land impossible to develop.

Our Response: Adverse impacts on development, including delays for additional studies and agency reviews, increased costs for environmental studies, increased risk of project denials, increased risk of costly mitigation measures, and increased risk of litigation over approvals, are not expected since no known development plans exist for the areas proposed for designation, as modified. Furthermore, the following factors make future development projects within critical habitat highly unlikely: (1) As modified, approximately 53 percent of the critical habitat is in the Conservation District where development is severely limited; (2) approximately 46 percent of the critical habitat is in the Agricultural District, but because the land includes gulches, it does not host any ranching or agricultural activities; (3) less than one percent of the proposed designation encompasses land in the Rural District with no known development plans; and (4) as modified, the cliffs along the southern shore are the only critical habitat area that is in the Special Management Area. (The percentages given here are different from those in the addendum because of the Service's decision to exclude Lanai Unit D (see *Exclusions Under Section 4(b)(2)*)

(38) *Comment:* The DEA fails to consider economic impacts of critical habitat that result through interaction with State law, specifically the State

Water Code. HRS 174C-2 states that "adequate provision shall be made for protection of fish and wildlife". HRS 174C-71 instructs the Commission of Water Resource Management to establish an instream use protection program to protect fish and wildlife. Since landowners may depend on water pumped from other watersheds, these effects can be far-reaching. It is impossible to tell from the descriptions in the proposal whether any water diversions will have to be reduced as a result of listing and critical habitat designation. The Service has an obligation to thoroughly investigate this issue and refrain from designating critical habitat until it has determined whether its actions will affect water use and balance this against any benefit to the species.

Our Response: No costs are expected to occur from such impacts, because none of the listed plants are stream-dependent for their survival and therefore critical habitat designation would not cause a reduction in existing water diversions.

(39) *Comment:* One commenter stated that the cost of potential citizen lawsuits preventing certain activities or requiring some sort of management in critical habitat was not discussed in the DEA. Another commenter stated that critical habitat designation will bring unnecessary and costly litigation. One commenter stated that proposed critical habitat could entail considerable cost to both the State and private landowners. One commenter stated that critical habitat designation could indirectly result in limitations or special management requirements (such as fencing or control of invasive species) being established on private lands. The DEA estimates that the Palila court decision may be interpreted to mandate private conservation and could cost Lanai landowners up to \$800,000 per year, or \$8 million over ten years. However, Table VI-3 of the Addendum dismisses these costs as minor and does not add them to the total cost estimate. These costs should be considered.

Our Response: The Act does not obligate landowners to manage their land to protect critical habitat, nor would landowners and managers be obligated under the Act to participate in projects to recover a species for which critical habitat has been designated. However, the DEA does discuss the potential mandate for conservation management pursuant to litigation and the resulting costs for the proposed designation on Lanai. Specifically, adverse impacts on development, including delays for additional studies and agency reviews, increased costs for

environmental studies, increased risk of project denials, increased risk of costly mitigation measures, and increased risk of litigation over approvals, are not expected since there are no known development plans within the areas proposed for designation, as modified. Furthermore, the following factors make future development projects within critical habitat highly unlikely: (1) As modified, approximately 53 percent of the proposed critical habitat is in the Conservation District where development is already limited; (2) approximately 46 percent of the critical habitat is in the Agricultural District, but because the land includes gulches, it does not host any ranching or agricultural activities; (3) less than one percent of the designation encompasses land in the Rural District with no known development plans; and (4) as modified, the cliffs along the southern shore are the only critical habitat area that is in the Special Management Area.

Thus, while it is conceivable that there may initially be an increase in subsequent lawsuits related to the critical habitat designation, it is not possible to predict their number, degree of complexity, or any other associated effect on project delays due to scant historical evidence regarding the Lanai plants.

(40) *Comment:* One commenter stated that the DEA lacks a thorough benefits analysis. It does not include the benefits of watershed protection and improvement, protection of other stream and riparian biota, and the value of the plants as an indicator of ecological health. Other commenters stated that the DEA ignored the benefit of keeping other native species off the endangered species list, of maintaining water quality and quantity, of promoting ground water recharge, and of preventing siltation of the marine environment, thus protecting coral reefs. Another commenter noted that additional benefits of critical habitat include combating global warming, providing recreational opportunities, attracting ecotourism, and preserving Hawaii's natural heritage. The Service must use the tools available, such as a study by the University of Hawaii (UH) Secretariat for Conservation Biology that estimated the value of ecosystem service, to determine the benefits of critical habitat. Another commenter stated that the DEA overestimates economic benefits and many of the alleged benefits are entirely speculative, unquantifiable or lack any commercial value.

Our Response: The DEA discussed these potential benefits. However, the DEA also indicated that these benefits

are not quantified due to lack of information available on: (1) Quantified data on the value of the Lanai species; and (2) quantified data on the change in the quality of the ecosystem and the species as a result of the designation. Although the UH study does value ecosystem services, it has limited applicability for valuing the benefits of the critical habitat designation for the plants for a number of reasons. First, the UH study had a different purpose, which was to estimate the total value of environmental benefits provided by the entire Koolau Mountains on the island of Oahu. Consistent with its purpose, the UH study provides no estimates of the changes in environmental conditions resulting from changes in land and stream management due to critical habitat designation. Furthermore, many of the assumptions and much of the analysis in the UH study are not transferable to the economic analysis for the critical habitat of the Lanai plants. For example, the value of water recharge in the UH study reflects projected water supply and demand conditions on Oahu, an island three times the size of Lanai, but with a population of more than 360 times that of Lanai. Also, the UH benefit analysis of reducing soil runoff is unique to three valleys that drain through partially channelized streams in urban areas into the manmade Ala Wai Canal. Since this canal was designed with inadequate flushing from stream or ocean currents, it functions as an unintended settling basin, so must be dredged periodically. In addition, the recreational and ecotourism values provided in the UH study apply to areas that are accessible to most hikers, which is not the case with most of the Lanai critical habitat. Most of the critical habitat units designated on Lanai are either in mountainous areas with steep slopes and difficult access or on coastal cliffs.

(41) *Comment:* Existence values should be quantified. Studies referenced in the DEA analysis contain information about how much people would be willing to pay to save various species. Even assuming plants are noncharismatic and therefore would justify lower values, there would still be a value of \$6 per household per year. If the study is able to take values for a day of hunting from the State of Idaho and apply them to Hawaii, it should be equally able to take values from studies which have looked at other species to get some sense of what people would pay to make sure these species recover and do not go extinct.

Our Response: As discussed in the Addendum, when primary research is

not feasible, economists frequently rely on the method of benefits transfer. Benefits transfer involves the application of results of existing valuation studies to a new policy question. Two core principals of defensible benefits transfer are: (1) The use of studies that apply acceptable techniques to generate welfare values, and (2) similarity between the good being valued in the literature and the good being valued in the policy context to which the transfer is being made (*i.e.*, the protection afforded the Lanai plants by critical habitat). As noted above, no known studies exist with quantified data on the value of plants or the change in the quality of the ecosystem and the species as a result of the designation. Therefore, applying results of existing valuation studies on non-plants to Lanai plant critical habitat is not feasible.

(42) *Comment:* The conclusion under E.O. 12866 that the rule will not have an annual economic effect of \$100 million or more, or adversely affect in a material way any sector of the economy or State or local governments or communities, is flawed because it does not consider the major adverse impacts from secondary effects.

Our Response: For the reasons explained in the DEA, this rule is not expected to have an annual economic effect of \$100 million or more. Both the DEA and the Addendum provide analysis of the indirect costs associated with designation of critical habitat for the Lanai plants in terms of land management, loss in property values and investigative costs. These indirect costs are considered and those costs that can be quantitatively estimated are addressed in the DEA and Addendum. Some potential costs are not estimated because the likelihood of actually incurring the cost is considered to be extremely remote.

(43) *Comment:* The designation of critical habitat will have direct and substantial impacts on private property because large areas will be unavailable for productive use and land values will be substantially diminished. The Service must take these into account and weigh them against the speculative protections that would accrue from designation. The DEA correctly recognizes that perceptions and uncertainty of the economic impact of critical habitat designation can cause temporary reductions in land value as long as those perceptions persist and until information is distributed. These impacts, however, need to be analyzed. The DEA should examine true appraised values, rather than relying on "GIS analysis of land value," which is not explained, with and without critical

habitat designation and as it may be perceived by buyers and lenders. In addition to the reduction in land value itself, the DEA should investigate whether these losses in property value may be long-term, because the consequences of critical habitat are yet to be determined and will likely be the subject of extensive and costly litigation that will take years to resolve. The DEA should also recognize that land use values may be used as collateral for loans supporting commercial operations and assess the potential impact critical habitat designations may have on these transactions.

Our Response: The DEA did indeed estimate land values associated with the different land use districts using GIS analysis. This technique assesses large parcels as a group, rather than as specific parcels, due to lack of obtaining information on land values for specific locations. However, during the comment period, Castle and Cooke Resorts, LLC, provided location-specific land value information for the areas in the proposed units. Therefore, the Addendum relied on those figures to recalculate the decrease in property value in the worst-case scenario. According to Castle and Cooke Resorts, LLC, the agricultural lands included in the designation should be valued at \$390 to over \$1,000 per acre; rural lands at \$160,000 to over \$335,000 per acre; and conservation lands at \$250 to over \$550 per acre (based on an appraisal of similar lands). Based on these figures, the decrease in property value of agricultural lands could range from \$50,811 to \$163,323 million [(((\$390 - \$250) × 362.94), ((\$1,000 - \$550) × 362.94)]. The decrease in value for rural lands may range from \$1.2 million to \$2.7 million [(((\$160,000 - 250) × 8), ((\$335,000 - 550) × 8)]. As noted above, this scenario is not expected to occur, and ensuring that clear and correct information is available to all potential buyers will further reduce the potential for such a scenario.

(44) *Comment:* It is not adequate to state, without any analysis, that any reduction in property value to agricultural lands proposed in units E and F is expected to be small because many of the lands are categorized as open space by the county to limit development. Agricultural lands such as those on Lanai have been appraised from \$390 to \$1,000 an acre. The DEA should examine the effects by using appraised values before and after critical habitat designation. The DEA also states that rural land on Lanai is valued at approximately \$44,000 per acre, even though nearby house lots in the Manele

Project district range up to \$15 million. If the entire Manele Project district is not excluded in the final rule, the DEA will have failed to analyze one of the most substantial impacts of critical habitat on Lanai. Even if excluded, proposed unit G includes approximately 110 ac of rural lands, and the DEA has undervalued these lands greatly. The undeveloped rural land in proposed unit G is adjacent to already developed infrastructure in the Manele Project district.

Our Response: The Service has removed proposed unit F and modified proposed unit G to exclude all but the cliffs in this final designation. As modified, about 8 ac of rural lands remain in the designation. However, no known plans exist for development on this rural land and the cliff areas are likely unable to be developed. As noted above, using figures provided by Castle and Cooke Resorts, LLC, the Addendum estimated that the decrease in value for those rural lands may range from \$1.2 million to \$2.7 million.

(45) *Comment:* The DEA underestimates the economic costs because they are limited to what is likely to occur within ten years even though critical habitat designation is permanent and not automatically revised if there is new evidence of the benefits of non-designation, or if the species is delisted.

Our Response: As indicated by the DEA, the landowner does not have specific development plans for the proposed designated areas for the next ten years. As such, no maps, permit applications, or other documents are available to serve as the basis for an estimate of possible impact of the designation.

A listed species is delisted when it is recovered or has gone extinct. Recovery is defined as no longer needing the protections provided by the Act, including critical habitat. Thus, when a species is delisted, critical habitat for that species would no longer be in effect.

(46) *Comment:* The DEA grossly generalizes that all land in the Conservation District is "not suitable for development due to poor access and terrain." This statement is not true for all or even most of such lands. The DEA should have a unit-by-unit review of the actual lands designated to determine whether this is the case.

Our Response: In the final designation, only about 373 ac of proposed unit B (now Lanai 1—*Tetramolopium remyi*) and the cliffs of proposed unit G (now Lanai 5—*Portulaca sclerocarpa*-Coast) are lands in the Conservation District. Lanai 1—

Tetramolopium remyi is in the State hunting unit on the mountain flanks. Lanai 5—*Portulaca sclerocarpa*-Coast is limited to the steep cliffs of southern coast, only accessible by a guided tour on a rocky trail. Therefore, we believe the lands in the Conservation District that are included in this final designation are in fact unsuitable for development. Other lands in the Conservation District that were included in the proposed designation have not been included in this final critical habitat designation.

(47) *Comment:* The economic analysis is wrong in identifying the impacts on State and county development approvals as major. The analysis completely fails to take into account the benefits of having this information and enabling State and county agencies to make better land use decisions. This benefit should be quantified and discussed in the analysis.

Our Response: The DEA concluded that the possible quarry site for proposed unit F may undergo more stringent State and county development approval because of the designation and, therefore, may result in major impacts. However, such impacts are no longer expected since we have removed proposed unit F from this final designation for scientific reasons. In addition, State and county agencies may gain better knowledge of land resources because of the critical habitat designation. However, the extent to which this may help their land-use decisions is unknown. For example, State and county agencies may need to spend less time surveying lands for natural resources, but it is not feasible to estimate to what extent the designation would reduce the number of hours or the amount of effort involved in determining the sensitivity of an area. Furthermore, it is also impossible to determine how much of the benefit is attributable to the designation alone.

(48) *Comment:* Proposed critical habitat units A, B, C, F and a small portion of D are in the Lanai Cooperative Game Management Area lease. One commenter stated that critical habitat management and game management activities are not compatible. As a result, the commenter indicated that the worst-case scenario would be for the public hunting program to be eliminated entirely, which would have an economic impact on Lanai, and that this was not reflected in the DEA. Alternatively, another commenter stated that the Service should not base its economic analysis on unlikely worst-case scenarios, but, rather, on likely scenarios. For example, this commenter indicated that the

requirement to fence all of the critical habitat areas within hunting management areas is the worst case. Further it was noted, that the more likely situation would be that the State would forego Federal funding for game mammal programs on Lanai and use State funds, in which case fencing would not be required. Therefore, the commenter indicated that at most, the cost would be those portions of the program that the State would not receive because of critical habitat. The commenter further questioned how much of this to attribute to critical habitat, because history shows us that the State has already foregone some funds due to listing, not critical habitat. Lastly, the commenter noted that there also may be some ecosystem benefits to the State from fencing that are not reflected in the analysis.

Our Response: Although DLNR does discuss the possibility of shutting down the State hunting program on Lanai in its comment to the proposed rule, the agency also states that avoiding a Federal nexus is the likely alternative. The DEA recognizes that DLNR is likely to avoid a Federal nexus by finding alternative non-Federal funds to manage State hunting units on Lanai. Therefore, in a conservative estimate of possible impacts to game management activities on Lanai, the DEA considered the worst-case scenario to be the building an enclosure fence around the proposed critical habitat that overlaps with State hunting units. It is important to note, however, that the Service has removed and modified some of these units in this final rule. As such, the Addendum has revisited the impacts on game management discussed in the DEA and revised the estimated costs according to the modification.

(49) *Comment:* Given the size of the designated areas, the vagueness of the regulatory exclusion, and the real costs of obtaining development approvals, the estimate of 15 to 24 hours is too low.

Our Response: To address these concerns, the Addendum revisited the hours estimates presented in the DEA. The DEA indicated that the landowner may want to learn how the designation may affect: (1) The use of his land (either through restrictions or new obligations) and (2) the value of his land. Since commenters did not provide an estimate of time or cost incurred in order to investigate the implications of critical habitat, the Addendum conservatively doubled the hours spent by the landowner and/or his attorneys or professional staff on investigating the issues. As described in the Addendum, using these new assumptions, the analysis estimated that total section 7

costs range from \$4,900 to \$11,500, all of which are attributable to critical habitat.

(50) *Comment:* Designation will have a huge impact on a new quarry site, the probable source for rock for improvements to the breakwater at Kaunalapau Harbor by the Corps, which will in turn have a material adverse impact on planned development of essential improvements to the harbor. The Service cannot assume that the section 7 costs would be minor because stone could be obtained from another location within the quarry. Private actions in critical habitat within the Conservation District, such as construction of a new quarry in proposed unit F, could require a full EIS at an additional cost.

Our Response: Such impacts are not expected since the Service has removed proposed unit F completely from this final rule.

(51) *Comment:* Designation will create uncertainties which will deter investment and potential agricultural and irrigation water resource development.

Our Response: As noted above, no agricultural or ranching activities take place within the designated critical habitat. Furthermore, potential agricultural or ranching activities on these agricultural lands in the future are also unlikely due to their remote location (mostly on gulch lands) and rugged terrain. Therefore, such impacts are not expected to occur as a result of the designation.

(52) *Comment:* The DEA must take into account the unique local circumstances of land ownership and limited economic base of Lanai, which are especially susceptible to detrimental impacts of regulations.

Our Response: The DEA examined potential impacts on small entities (small businesses, small organizations, and small governmental jurisdictions) under the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. The DEA concluded that a significant economic impact on a substantial number of small entities would not result from the proposed critical habitat designation. However, the DEA also concluded that small businesses on Lanai that cater to hunters could be indirectly affected by the designation in the unlikely event that DLNR builds enclosure fences around the designated critical habitat. As stated above, this final rule designates fewer areas within State hunting areas than did the proposed rule.

Issue 6: Policy and Regulations

(53) *Comment:* One commentor stated the proposal fails to properly consider the importance of cooperation and goodwill between the Service and private landowners, and the impact critical habitat designations will have in discouraging voluntary partnerships on private lands.

Our Response: The Service recognizes the importance of landowner cooperation for recovery of listed species. This is especially true for the island of Lanai which is under private ownership. We also recognize that critical habitat designations may have a negative impact on voluntary partnerships with private landowners. Conservation of the Lanai plant species requires control of threats from alien species and fire, and translocation of species that have been extirpated from the wild. Castle and Cooke Resorts, LLC, owner of the lands proposed as critical habitat, has cooperated with the Service, the State of Hawaii, and other organizations to implement voluntary conservation activities on their lands that have resulted in tangible conservation benefits to the species. In addition, Castle and Cooke Resorts, LLC has agreed to expand the existing conservation measures to address the threats to all of the species in proposed unit Lanai D. They also indicated that including the area in a critical habitat designation would have a negative impact on their existing and future voluntary conservation efforts on Lanai. After weighing the benefits of including unit Lanai D as critical habitat with the benefits of excluding it, we concluded that the designation of critical habitat would have a net negative conservation effect on the recovery and conservation of the species included in the unit, and thus excluded unit Lanai D from the final designation of critical habitat.

(54) *Comment:* The Service did not adequately address the takings of private property as a result of designating critical habitat for endangered plants on Lanai. If the critical habitat proposal would require reducing water diversions from any stream, the Service should investigate whether that would take anyone's vested water rights. In addition, if the proposed designation of critical habitat precipitates conversion of agricultural lands to conservation land that has no economically beneficial use, then the Federal and State governments will have taken private property.

Our Response: We have assessed the takings implications of this rule in accordance with Executive Order 12630 and have concluded that this rule does

not pose significant takings implications. Because no critical habitat unit boundaries are located in existing diversions, no requirements to reduce out-of-stream water use will arise as a result of this rule. Furthermore, none of the plants are stream-dependent for their survival and therefore would not cause a reduction in water diversion. According to the State, land classification would not be changed based on the designation of critical habitat alone, and private lands are rarely changed to conservation. In addition, although the 366 acres within unit Lanai E is zoned for agriculture, the land within this unit is on and/or near mountain flanks lined with gulches, and neither farming nor ranching takes place in the unit.

(55) *Comment:* Prudence cannot be determined without an analysis of the economic impacts of critical habitat. The prudence of critical habitat designation is a final conclusion based on weighing all relevant factors, including economic factors. While the Service promised to complete its economic impact analysis before it promulgates its final determination of critical habitat, it risks putting the decision before the analysis. The prior determination that critical habitat is prudent and is therefore required, is treated as a given, even though it ignored economic factors.

Our Response: First, the Service did not make a final conclusion regarding prudence in the proposed rule; in fact, the proposed rule specifically requested public comment on the reasons why habitat is prudent or not prudent. Second, the commentor is conflating the two steps of the process. As defined by regulation, prudence looks at whether critical habitat would harm or benefit the species. See 50 CFR 424.12(a)(1). If critical habitat is prudent, we look at all of the impacts of designating specific areas as critical habitat to see if the benefits of designation outweigh the benefits of excluding an area from critical habitat. Third, this does not mean we ignored the requirement to consider economic and other impacts of critical habitat designation. To the contrary, a draft economic analysis was prepared, comments were solicited, and an addendum was completed. Furthermore, we have excluded a significant portion of the proposed designation based on negative impacts to important private conservation efforts.

(56) *Comment:* While the Service has stated that critical habitat affects only activities that require Federal permits or funding, and does not require landowners to carry out special

management or restrict use of their land, this fails to address the breadth of federal activities that affect private property in Hawaii and the extent to which private landowners are required to obtain Federal approval before they can use their property. These requirements extend to all State agencies using Federal funds in connection with a proposed action and community actions for which Federal approval or review is necessary. The requirements also extend to loan and grant programs such as National Resources Conservation Service loans and grants. In addition, the Service has taken the position in other States that it has a right to intervene in local land use proceedings if they affect endangered species on private property, as evidenced by the Service petition to the local zoning board in Arizona to postpone approval of a rezoning petition pending a survey to determine the extent to which an endangered plant was present on the property even though no Federal approval was being sought.

Our Response: Private landowners are not required to obtain Federal approval before using their property. When State or private landowners seek a Federal permit or Federal funding, the Federal agency must consult with the Service on actions that may affect listed species or designated critical habitat. The draft Economic Analysis identifies the potential Federal actions that may result in consultations on listed plants and critical habitat on Lanai over the next ten years. Finally, the Service has never intervened in local land use proceedings in the State of Hawaii and does not anticipate doing so in the future.

(57) *Comment:* One commenter said that the Service failed to give the public adequate opportunity to comment on the memorandum of agreement (MOA) draft being used to possibly form the basis of a decision to exclude proposed unit Lanai D from the final critical habitat.

Our Response: The Service posted a notice of availability of the draft MOA in the **Federal Register** on November 15, 2002. Letters were sent to interested parties that same day, notifying the recipients of the availability of the draft MOA at the Honolulu office of the Service. Electronic versions of the draft agreement were also available upon request. The comment period was opened for 10 days to allow the public to make comments.

(58) *Comment:* One commenter said that the draft MOA made available for comment is non-binding and only in draft form with vague terms. He said the draft does not make clear what the

species in question would receive *in lieu* of critical habitat protection. He also said that the draft MOA does not require any real financial commitments on the part of Castle and Cooke Resorts, LLC, relying, instead on in-kind contributions, nor would any new funds be committed to conservation efforts during the first nine years of the agreement.

Our Response: Much planning is necessary to execute successful plant restoration efforts of the type and scale covered by the draft MOA. The area covered by the draft MOA is a large, rugged terrain covering thousands of acres where no one has worked before. The development of precise propagation and planting plans will require site-specific and species-specific evaluations and require consultation and additional input of expert biologists. Some efforts will also likely involve experimentation, for example investigating plant survival in certain areas, the feasibility of providing water to a particular site, or a test of deer hunting methods in different terrains. It is difficult to set specific numeric targets of plants propagated and reintroduced without first conducting the necessary evaluation of specific landscape conditions and logistical constraints and opportunities. More precise goal-setting is appropriate after these more basic planning activities are completed. The draft MOA references the Service's recovery plans and the actions called for therein; these plans will provide the basic guidance for these draft MOA future actions, with adaptive management. The draft MOA makes it clear that the company will be implementing conservation actions that benefit all these listed species, e.g. putting up enclosure fences around more than just the proposed plant critical habitat area, they will be removing ungulates, and they will be planting native plants (including listed species). It is impossible to provide precise figures on these actions at this point. But given the past positive record of action by the company in fulfilling voluntary agreements, we believe it is reasonable to expect these overall commitments will be met.

In reference to the funding portion of the draft MOA, it is a longstanding policy of the Service to accept and encourage in-kind contributions for our cost-share partnership programs. These type of contributions provide local, on-the-ground expertise; they encourage greater local "ownership" in a successful outcome; and many partners often provide greater in-kind services than for which they receive credit. The commenter is correct that there are no

explicit guarantees regarding exactly how much the company would spend over the life of this agreement, but this is a voluntary agreement based on good faith, past performance, and a reasonable expectation of future performance.

Preserving Castle and Cooke Resorts, LLC's current commitment to voluntary conservation is one of our fundamental goals in the critical habitat exclusion. Regardless of any additional commitments from the company, this accomplishment alone establishes an important benefit of approval of the draft MOA and excluding proposed Lanai Unit D, when compared with a critical habitat designation. In our opinion, loss of these existing voluntary commitments, which is made more likely by a critical habitat designation, would have a much greater negative impact on these plants than would the proposed critical habitat exclusion. These plants are benefitting more from these ongoing, interventionist actions than they would from the critical habitat designation. We have outlined our reasoning for excluding land from critical habitat below (see *Exclusions Under Section 4(b)(2)*).

(59) *Comment:* One commenter stated that the draft MOA stipulation that Castle and Cooke Resorts, LLC would not seek Federal assistance and/or authorization from any Federal agency for activities that may adversely affect habitat found in some areas of proposed unit Lanai D falls short of protection that critical habitat provides. He also stated that even if Castle and Cooke Resorts, LLC does not apply for Federal assistance and/or authorization, that does not mean that the Federal government would not initiate any projects on Lanai that may affect the proposed critical habitat that may be excluded from final designation and designation would provide more protection under the Act.

Our Response: To improve the current condition of the endangered and threatened species on Lanai, it is insufficient simply to prohibit harmful activities. Rather, it is necessary to carry out active management measures to confer a positive benefit on the species of concern, such as habitat manipulation, exotic species control, or simply allowing access for the purposes of reintroduction (Bean 2002). We feel the likelihood of federally-initiated projects on Lanai that may affect listed species is very low, and therefore critical habitat would have little regulatory benefit to the species other than those listed below in section *Exclusions Under Section 4(b)(2)*.

Peer Review

In accordance with our policy published on July 1, 1994 (59 FR 34270), we solicited independent opinions from 12 knowledgeable individuals with expertise in one or several fields, including familiarity with the species, familiarity with the geographic region that the species occurs in, and familiarity with the principles of conservation biology. We received comments from three. All three generally supported our methodology and conclusion, but none supported or opposed the proposed critical habitat designations. Comments received from the peer reviewers were summarized in the previous section and considered in developing the final rule.

Summary of Changes From the Revised Proposed Rule

Based on a review of public comments received on the proposed determinations of critical habitat, we have reevaluated our proposed designations and included several changes to the final designations of critical habitat. These changes include the following:

(1) The scientific names were changed for the following associated species found in the "Supplementary Information: Discussion of the Plant Taxa" section: *Styphelia tameiameia* changed to *Leptecophylla tameiameia* in the discussion of *Gahnia lanaiensis*, *Hedyotis schlehtendahlia* var. *remyi*, and *Viola lanaiensis*; *Odontosoria chinensis* changed to *Sphenomeris chinensis* in the discussion of *G. lanaiensis* and *H. schlehtendahlia*

var. *remyi*; *Diospyros ferrea* changed to *D. sandwicensis* in the discussion of *Abutilon eremitopetalum*.

(2) We removed *Sapindus oahuensis* from the list of associated species in the "Supplementary Information: Discussion of the Plant Taxa" section for *Bonamia menziesii*; added gulch bottoms to habitat in the species description section for *Abutilon eremitopetalum*; and throughout the species description section removed goats and pigs and replaced them with mouflon sheep and axis deer as current threats. Goats and pigs are no longer present on Lanai and were mistakenly included as current threats.

(3) We received new information on the presence of *Bidens micrantha* ssp. *kalealaha* in Waiapaa Gulch. For *Tetramolopium remyi*, we updated the two occurrences to one occurrence, updated the number of plants to 150 and updated "Table 2.—Summary of existing occurrences on Lanai, and landownership for 37 species reported from Lanai." This new information did not affect our decisions in designating critical habitat for these species. Waiapaa Gulch was proposed as critical habitat for *B. micrantha* ssp. *kalealaha* and the loss of a population of *T. remyi* is a recent extirpation and the habitat once occupied is still considered essential to the recovery of that species. We believe that its recent presence indicates a high likelihood of a seed bank in the area.

(4) We changed "flowering cycles, pollination vectors, seed dispersal agents" to "reproduction cycles, dispersal agents" in the life history portion of the "Supplementary

Information: Discussion of the Plant Taxa" section for the fern species *Ctenitis squamigera*, *Diellia erecta*, and *Diplazium molokaiense*.

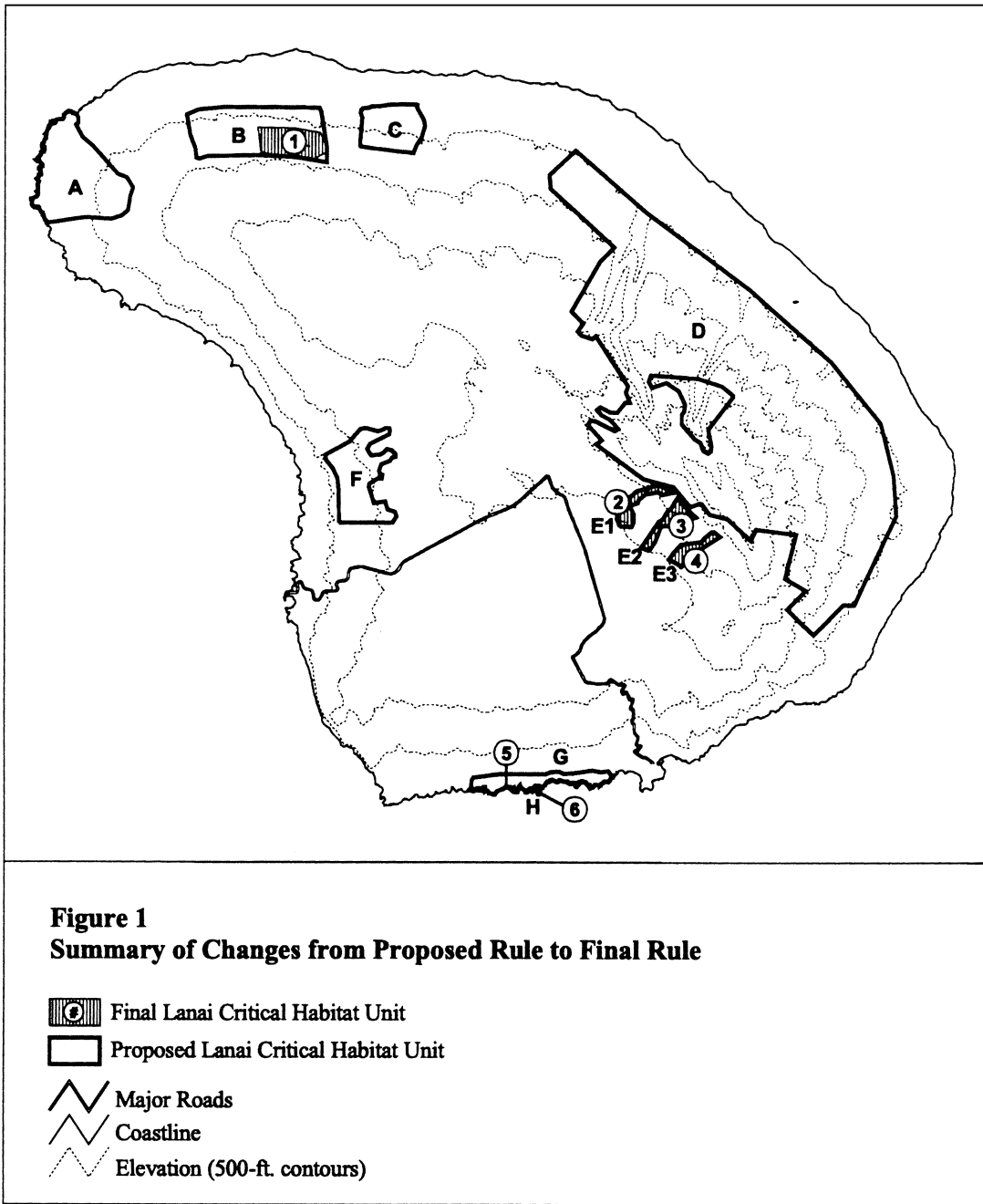
(5) We revised the list of manmade features that are excluded from the designation in order to exclude additional features based on information received during the public comment periods. The revised list is described in the "Criteria Used to Identify Critical Habitat" and in regulatory language for section 17.96 "Critical habitat—plants" described at the end of this document.

(6) We revised our decision on the essentiality of Kanepuu Preserve for the conservation of *Bonamia menziesii* (see "Managed Lands").

(7) We made revisions to the unit boundaries based on information supplied by commenters, as well as information gained from field visits to some of the sites, that indicated that the primary constituent elements were not present in certain portions of the proposed unit, that certain changes in land use had occurred on lands within the proposed critical habitat that would preclude those areas from supporting the primary constituent elements, or that the areas were not essential to the conservation of the species in question. In addition, an area was excluded based on weighing the benefits of inclusion versus exclusion pursuant to section 4(b)(2) of the Act (see "Economic Analysis").

A brief summary of the modifications made to each unit is given below (see also Figure 1).

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(8) In accordance with the revisions described in (7) above, we revised section 17.12 “*Endangered and threatened plants*” to include only *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi* (see “*Economic Analysis*”).

(9) In accordance with the revisions described in (7) above, we revised section 17.96 “*Critical Habitat—plants*” to include only *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi* and updated their elevation ranges, based on information received during the public comment periods.

Lanai A

This unit was proposed as critical habitat for two species, *Cyperus trachysanthos* and *Hibiscus brackenridgei*. We excluded the proposed critical habitat for *C. trachysanthos* from the final rule because this area no longer contains the suitable habitat of seasonally wet soils. The water source has permanently dried up due to alterations in the watershed properties of the island. Also, this area is not essential for the conservation of *C. trachysanthos*, a multi-island species, because we have proposed adequate habitat on other islands within its historical range.

We excluded the proposed critical habitat for *Hibiscus brackenridgei*, a multi-island species. This area is not essential for the conservation of the species because the area lacks sufficient suitable soil and there are at least eight other places for this species that have the primary constituent elements, are less degraded, are already undergoing restoration, or are within a partnership, TNCH preserve or other reserve. Other areas on other islands within its historical range are proposed as critical habitat that provide habitat for 10 populations.

Exclusion of this unit from critical habitat for *Cyperus trachysanthos* and *Hibiscus brackenridgei* resulted in the overall reduction of 574 ha (1,418 ac) of critical habitat on the island of Lanai.

Lanai B

This unit was proposed as critical habitat for *Tetramolopium remyi*, a multi-island species. Modifications were made to this unit to exclude areas not essential to the conservation of this species (*i.e.* areas that are highly degraded). The area designated as critical habitat for *T. remyi* provides habitat within its historical range for one population. The designated area is situated around the recently extirpated known individuals and contains the

primary constituent elements. In addition, this area most likely contains a viable seed bank because of the recent existence of mature, seed-bearing individuals in this area and because plants from drought-prone sites tend to survive through the existence of seed banks. This modification resulted in the reduction from 551 ha (1,363 ac) to 151 ha (373 ac). This unit was renamed Lanai 1—*Tetramolopium remyi*.

Lanai C

This unit was proposed as critical habitat for the multi-island species *Sesbania tomentosa*. This unit was excluded from critical habitat because it is not essential for the conservation of the species and there are at least eight other places for this species that have more primary constituent elements, are less degraded, are already undergoing restoration, or are within a partnership, TNCH preserve, or other reserve. Other areas on other islands within the historical range of *S. tomentosa* are being designated or proposed as critical habitat and provide habitat for 10 populations.

Exclusion of this unit from critical habitat for *Sesbania tomentosa* resulted in the overall reduction of 222 ha (549 ac) of critical habitat on the island of Lanai.

Lanai D

Lanai D was proposed as critical habitat for 28 species: *Abutilon eremitopetalum*, *Adenophorus periens*, *Bonamia menziesii*, *Brighamia rockii*, *Centaurium sebaeoides*, *Cenchrus agrimonioides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiensis*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahliana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyriformium*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Neraudia sericea*, *Solanum incompletum*, *Spermolepis hawaiiense*, *Tetramolopium remyi*, *Vigna o-wahuensis* and *Viola lanaiensis*.

This unit was excluded from critical habitat under section 4(b)(2) of the Act for the reasons described in the “*Economic Analysis*” section below. Exclusion of this unit from critical habitat for the 28 species listed above resulted in the overall reduction of 5,861 ha (14,482 ac) of critical habitat on the island of Lanai.

Lanai E1, E2 and E3

No changes were made to these units and they are designated as critical

habitat for *Bidens micrantha* ssp. *kalealaha*. They have been renamed units Lanai 2—*Bidens micrantha* ssp. *kalealaha*—North (53 ha (132 ac)), Lanai 3—*Bidens micrantha* ssp. *kalealaha*—Middle (60 ha (148 ac)), and Lanai 4—*Bidens micrantha* ssp. *kalealaha*—South (49 ha (120 ac)).

Lanai F

This unit was proposed as critical habitat for the multi-island species *Hibiscus brackenridgei*. This unit was excluded from critical habitat because it is not essential for the conservation of the species because it is highly degraded. Other areas on other islands, within the species’ historical range, are being proposed as critical habitat that provide habitat for 10 populations.

Exclusion of this unit from critical habitat for *Hibiscus brackenridgei* resulted in the overall reduction of 331 ha (818 ac) of critical habitat on the island of Lanai.

Lanai G

Lanai G was proposed as critical habitat for the multi-island species *Portulaca sclerocarpa*. Modifications were made to this unit to exclude inland areas that do not contain the primary constituent elements. Critical habitat for *P. sclerocarpa* includes only cliff faces along the shore. This modification resulted in the reduction from 151 ha (373 ac) to 7 ha (17 ac). This unit was renamed Lanai 5—*Portulaca sclerocarpa*—Coast.

Lanai H

No changes were made to this unit and it is designated as critical habitat for *Portulaca sclerocarpa*. It has been renamed Lanai 6—*Portulaca sclerocarpa*—Isle, consists of Poopoo Islet, and contains 1 ha (2 ac).

Critical Habitat

Critical habitat is defined in section 3 of the Act as: (i) The specific areas within the geographic 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 (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and, (ii) specific areas outside the geographic 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 by the Act, means the use of all methods and procedures that are necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. Section 7 also requires conferences on Federal actions that are likely to result in the destruction or adverse modification of proposed critical habitat. In our regulations at 50 CFR 402.02, we define destruction or adverse modification as “* * * the direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.” The relationship between a species survival and its recovery has been a source of confusion to some in the past. We believe that a species’ ability to recover depends on its ability to survive into the future when its recovery can be achieved; thus, the concepts of long-term survival and recovery are intricately linked. However, in the March 15, 2001, decision of the United States Court of Appeals for the Fifth Circuit (*Sierra Club v. U.S. Fish and Wildlife Service et al.*, 245 F.3d 434) regarding a not prudent finding, the Court found our definition of destruction or adverse modification as currently contained in 50 CFR 402.02 to be invalid. In response to this decision, we are reviewing the regulatory definition of adverse modification in relation to the conservation of the species.

In order to be included in a critical habitat designation, the habitat must first be “essential to the conservation of the species.” Critical habitat designations identify, to the extent known, using the best scientific and commercial data available, habitat areas that provide essential life-cycle needs of the species (*i.e.*, areas on which are found the primary constituent elements, as defined at 50 CFR 424.12(b)).

Section 4 requires that we designate critical habitat for a species, to the extent such habitat is determinable, at the time of listing. When we designate critical habitat at the time of listing or under short court-ordered deadlines, we may not have sufficient information to identify all the areas essential for the conservation of the species or alternatively, we may inadvertently include areas that later will be shown to be nonessential. Nevertheless, we are required to designate those areas we know to be critical habitat, using the best information available to us.

Within the geographic areas occupied by the species, we will designate only areas currently known to be essential. Essential areas should already have some of the features and habitat characteristics that are necessary to sustain the species. We will not speculate about what areas might be found to be essential if better information became available, or what areas may become essential over time. If the information available at the time of designation does not show that an area provides essential life cycle needs of the species, then the area should not be included in the critical habitat designation.

Our regulations state that “The Secretary shall designate critical habitat outside the geographic areas presently occupied by the species only when a designation limited to its present range would be inadequate to ensure the conservation of the species” (50 CFR 424.12(e)). Accordingly, when the best available scientific and commercial data do not demonstrate that the conservation needs of the species require designation of critical habitat outside of occupied areas, we will not designate critical habitat in areas outside the geographic area occupied by the species.

Our Policy on Information Standards Under the Endangered Species Act, published in the **Federal Register** on July 1, 1994 (59 FR 34271), provides criteria, establishes procedures, and provides guidance to ensure that our decisions represent the best scientific and commercial data available. It requires our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, a primary source of information should be the listing package for the species. Additional information may be obtained from recovery plans, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, and biological assessments or other unpublished materials.

It is important to clearly understand that critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery. Areas outside the critical habitat designation will continue to be subject to conservation actions that may be implemented under section 7(a)(1) and to the regulatory protections afforded by the Act’s 7(a)(2) jeopardy standard and section 9

prohibitions, as determined on the basis of the best available information at the time of the action. We specifically anticipate that federally funded or assisted 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 new information available to these planning efforts calls for a different outcome. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species.

A. Prudency

We originally proposed that designation of critical habitat was prudent for six plants (*Abutilon eremitopetalum*, *Cyanea macrostegia* ssp. *gibsonii*, *Gahnia lanaiensis*, *Portulaca sclerocarpa*, *Tetramolopium remyi*, and *Viola lanaiensis*) from the island of Lanai on December 27, 2000 (65 FR 82086). In that same proposal, we incorporated by reference the proposed prudency analysis for 13 other plants (*Bonamia menziesii*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyrtandra munroi*, *Hedyotis mannii*, *Hedyotis schlehtendahlia* var. *remyi*, *Hibiscus brackenridgei*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Spermolepis hawaiiensis*, and *Vigna o-wahuensis*) that are reported from Lanai as well as from Kauai, Niihau, Maui, or Kahoolawe (64 FR 48307, 65 FR 66808, 65 FR 79192, and 65 FR 82086). No change was made to the proposed prudency findings for the 19 plants in the revised proposal published on March 4, 2002, and they were incorporated by reference (67 FR 9806). In addition, in the December 27, 2000, proposal, we proposed that designation of critical habitat was not prudent for *Phyllostegia glabra* var. *lanaiensis*, and no change was made to this proposed prudency finding in the March 4, 2002, revised proposal (65 FR 82086 and 67 FR 9806). In the March 4, 2002, revised proposal no change was made to the proposed prudency analysis published in other proposed rules for 16 plants (*Adenophorus periens*, *Bidens micrantha* ssp. *kalealaha*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Cyanea lobata*, *Cyperus trachysanthos*, *Diellia erecta*, *Diplazium molokaiense*,

Hesperomannia arborescens, *Isodendron pyriformum*, *Mariscus fauriei*, *Neraudia sericea*, *Sesbania tomentosa*, *Silene lanceolata*, *Solanum incompletum*, and *Zanthoxylum hawaiiense*) that no longer occur on Lanai but are reported from one or more other islands, and they were incorporated by reference (65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940, and 67 FR 9806). In the March 4, 2002, revised proposal, we proposed that designation of critical habitat was prudent for *Tetramolopium lepidotum* ssp. *lepidotum*, a species for which a prudency finding had not been made previously, and that no longer occurs on Lanai but is reported only from Oahu (67 FR 9806).

We believe that designation of critical habitat is prudent for 36 species (*Abutilon eremitopetalum*, *Adenophorus periens*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyperus trachysanthos*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahliana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyriformum*, *Labordia tinifolia* var. *lanaiensis*, *Mariscus fauriei*, *Melicope munroi*, *Neraudia sericea*, *Portulaca sclerocarpa*, *Sesbania tomentosa*, *Silene lanceolata*, *Solanum incompletum*, *Spermolepis hawaiiensis*, *Tetramolopium lepidotum* ssp. *lepidotum*, *Tetramolopium remyi*, *Vigna o-wahuensis*, *Viola lanaiensis*, and *Zanthoxylum hawaiiense*) from the island of Lanai.

We analyzed the potential threats and benefits for each species in accordance with the court's order and have not, at this time, found specific evidence of taking, vandalism, collection, or trade of these species or of similarly situated species. Consequently, while we remain concerned that these activities could potentially threaten these 36 plant species in the future, consistent with applicable regulations (50 CFR 424.12(a)(1)(i)) and the court's discussion of these regulations, we do not find that any of these species are currently threatened by taking or other human activity, which threats would be exacerbated by the designation of critical habitat. The potential benefits to designation of critical habitat for these 36 species include: (1) Triggering section 7 consultation in new areas it would not otherwise occur; (2) focusing conservation activities on the most

essential area; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species. Therefore we believe that the designation of critical habitat for these 36 species is prudent because the potential benefits of critical habitat designation outweigh the potential threats.

Designation of critical habitat is not prudent for *Phyllostegia glabra* var. *lanaiensis* because such designation would be of no benefit to this species. *Phyllostegia glabra* var. *lanaiensis* has not been seen on Lanai since 1914. In addition, this plant is not known to be in storage or under propagation. If this species is relocated, we may revise this final rule to incorporate or address new information becomes available (see 16 U.S.C. 1532(5)(B); 50 CFR 424.13(f)).

B. Methods

As required by the Act and regulations (section 4(b)(2) and 50 CFR 424.12) we used the best scientific information available to determine areas that contain the physical and biological features that are essential for the conservation of *Abutilon eremitopetalum*, *Adenophorus periens*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyperus trachysanthos*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahliana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyriformum*, *Labordia tinifolia* var. *lanaiensis*, *Mariscus fauriei*, *Melicope munroi*, *Neraudia sericea*, *Portulaca sclerocarpa*, *Sesbania tomentosa*, *Silene lanceolata*, *Solanum incompletum*, *Spermolepis hawaiiensis*, *Tetramolopium lepidotum* ssp. *lepidotum*, *Tetramolopium remyi*, *Vigna o-wahuensis*, *Viola lanaiensis*, and *Zanthoxylum hawaiiense*. This information included the known locations, site-specific species information from the HINHP database and our own rare plant database; species information from the Center for Plant Conservation's (CPC's) rare plant monitoring database housed at the University of Hawaii's Lyon Arboretum; island-wide Geographic Information System (GIS) coverages (e.g., vegetation, soils, annual rainfall, elevation contours, landownership); the final listing rules for these 36 species; the December 27, 2000, proposal; the March

4, 2002, revised proposal; information received during the public comment periods and public hearings; recent biological surveys and reports; our recovery plans for these species; information received in response to outreach materials and requests for species and management information that we sent to all landowners, land managers, and interested parties on the island of Lanai; discussions with botanical experts; and recommendations from the Hawaii and Pacific Plant Recovery Coordinating Committee (HPPRCC) (see also the discussion below) (CPC *in litt.* 1999; GDSI 2000; HINHP Database 2000; HPPRCC 1998; Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001; 65 FR 82086).

In 1994, the HPPRCC initiated an effort to identify and map habitat it believed to be important for the recovery of 282 endangered and threatened Hawaiian plant species. The HPPRCC identified these areas on most of the islands in the Hawaiian chain, and in 1999, we published them in our *Recovery Plan for the Multi-Island Plants* (Service 1999). The HPPRCC expects there will be subsequent efforts to further refine the locations of important habitat areas and that new survey information or research may also lead to additional refinement of identifying and mapping of habitat important for the recovery of these species.

The HPPRCC identified essential habitat areas for all listed, proposed, and candidate plants and evaluated species of concern to determine if essential habitat areas would provide for their habitat needs. However, the HPPRCC's mapping of habitat is distinct from the regulatory designation of critical habitat as defined by the Act. More data have been collected since the recommendations made by the HPPRCC in 1998. Much of the area that was identified by the HPPRCC as inadequately surveyed has now been surveyed to some degree. New location data for many species have been gathered. Also, the HPPRCC identified areas as essential based on species clusters (areas that included listed species as well as candidate species, and species of concern) while we have only delineated areas that are essential for the conservation of the specific listed species at issue. As a result, the critical habitat designations in this rule include not only some habitat that was identified as essential in the 1998 recommendations but also habitat that was not identified as essential in those recommendations.

C. Primary Constituent Elements

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

Much of what is known about the specific physical and biological requirements of *Abutilon eremitopetalum*, *Adenophorus perians*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyperus trachysanthos*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Gahnia lanaiensis*, *Hedyotis manni*, *Hedyotis schlechtendahlana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyrifolium*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Neraudia sericea*, *Portulaca sclerocarpa*, *Sesbania tomentosa*, *Solanum incompletum*, *Spermolepis hawaiiensis*, *Tetramolopium remyi*, *Vigna o-wahuensis*, and *Viola lanaiensis* is described above in the "Background" section of this final rule. We are unable to identify these features for *Mariscus fauriei*, *Silene lanceolata*, *Tetramolopium lepidotum* ssp. *lepidotum* and *Zanthoxylum hawaiiense*, which no longer occur on the island of Lanai, because information on the physical and biological features (i.e., the primary constituent elements) that are considered essential to the conservation of these four species on Lanai is not known (see 67 FR 9806).

All areas designated as critical habitat are within the historical range of the three species at issue and contain one or more of the physical or biological

features (primary constituent elements) essential to the conservation of the species.

As described in the discussions for each of the three species for which we are designating critical habitat, we are defining the primary constituent elements on the basis of the habitat features of the areas from which the plant species are reported, as described by the type of plant community (e.g., mesic *Metrosideros polymorpha* forest), associated native plant species, locale information (e.g., steep rocky cliffs, talus slopes, gulches, streambanks), and elevation. The habitat features provide the ecological components required by the plant. The type of plant community and associated native plant species indicate specific microclimate (localized climatic) conditions, retention and availability of water in the soil, soil microorganism community, and nutrient cycling and availability. The locale indicates information on soil type, elevation, rainfall regime, and temperature. Elevation indicates information on daily and seasonal temperature and sun intensity. Therefore, the descriptions of the physical elements of the locations of each of these species, including habitat type, plant communities associated with the species, location, and elevation, as described in the **SUPPLEMENTARY INFORMATION: Discussion of the Plant Taxa** section above, constitute the primary constituent elements for these species on the island of Lanai.

D. Criteria Used To Identify Critical Habitat

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

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

The overall recovery goal stated in the recovery plans for each of these species includes the establishment of 8 to 10 populations with a minimum of 100 mature, reproducing individuals per population for long-lived perennials; 300 mature, reproducing individuals per population for short-lived perennials; and 500 mature, reproducing individuals per population for annuals. There are some specific exceptions to this general recovery goal of 8 to 10 populations for species that are believed to be very narrowly distributed on a single island, but that does not apply to the three species. To be considered recovered, the populations of a multi-island species should be distributed among the islands of its known historic range (Service 1995, 1996a, 1997). A population, for the purposes of this discussion and as defined in the recovery plans for these species, is a unit in which the individuals could be regularly cross-pollinated and influenced by the same small-scale events (such as landslides), and which contains a minimum of 100, 300, or 500 mature, reproducing individuals, depending on whether the species is a long-lived perennial, short-lived perennial, or annual.

By adopting the specific recovery objectives enumerated above, the adverse effects of genetic inbreeding and random environmental events and catastrophes, such as landslides, hurricanes or tsunamis, that could destroy a large percentage of a species at any one time, may be reduced (Menges 1990; Podolsky 2001). These recovery objectives were initially developed by the HPPRCC and are found in all of the recovery plans for these species. While they are expected to be further refined as more information on the population biology of each species becomes available, the justification for these objectives is found in the current conservation biology

literature addressing the conservation of rare and endangered plants and animals (Beissinger and Westphal 1998; Burgman *et al.* 2001; Falk *et al.* 1996; Ginzburg *et al.* 1990; Hendrix and Kyhl 2000; Karieva and Wennergren 1995; Luijten *et al.* 2000; Meffe and Carroll 1996; Menges 1990; Murphy *et al.* 1990; Podolsky 2001; Quintana-Ascencio and Menges 1996; Taylor 1995; Tear *et al.* 1995; Wolf and Harrison 2001). The overall goal of recovery in the short-term is a successful population that can carry on basic life-history processes, such as establishment, reproduction, and dispersal, at a level where the probability of extinction is low. In the long-term, the species and its populations should be at a reduced risk of extinction and be adaptable to environmental change through evolution and migration.

The long-term objectives, as reviewed by Pavlik (1996), require from 50 to 2,500 individuals per population, based largely on research and theoretical modeling on endangered animals, since much less research has been done on endangered plants. Many aspects of species life history are typically considered to determine guidelines for species' interim stability and recovery, including longevity, breeding system, growth form, fecundity, ramet (a plant that is an independent member of a clone) production, survivorship, seed longevity, environmental variation, and successional stage of the habitat. Hawaiian species are poorly studied, and the only one of these characteristics that can be uniformly applied to all Hawaiian plant species is longevity (*i.e.*, long-lived perennial, short-lived perennial, and annual). In general, long-lived woody perennial species would be expected to be viable at population levels of 50 to 250 individuals per population, while short-lived perennial species would be viable at population levels of 1,500 to 2,500 individuals or more per population. These population numbers were refined for Hawaiian plant species by the HPPRCC (1994) due to the restricted distribution of suitable habitat typical of Hawaiian plants and the likelihood of smaller genetic diversity of several species that evolved from one single introduction. For recovery of Hawaiian plants, the HPPRCC recommended a general recovery guideline of 100 mature, reproducing individuals per population for long-lived perennial species, 300 mature, reproducing individuals per population for short-lived perennial species, and 500 mature, reproducing individuals per population for annual species.

The HPPRCC also recommended the conservation and establishment of 8 to 10 populations to address the numerous risks to the long-term survival and conservation of Hawaiian plant species. Although absent the detailed information inherent to the types of Population Viability Analysis models described above (Burgman *et al.* 2001), this approach employs two widely recognized and scientifically accepted goals for promoting viable populations of listed species: (1) Creation or maintenance of multiple populations so that a single or series of catastrophic events cannot destroy the entire listed species (Luijten *et al.* 2000; Menges 1990; Quintana-Ascencio and Menges 1996); and (2) increasing the size of each population in the respective critical habitat units to a level where the threats of genetic, demographic, and normal environmental uncertainties are diminished (Hendrix and Kyhl 2000; Luijten *et al.* 2000; Meffe and Carroll 1996; Podolsky 2001; Service 1997; Tear *et al.* 1995; Wolf and Harrison 2001). In general, the larger the number of populations and the larger the size of each population, the lower the probability of extinction (Meffe and Carroll 1996; Raup 1991). This basic conservation principle of redundancy applies to Hawaiian plant species. By maintaining 8 to 10 viable populations in several critical habitat units, the threats represented by a fluctuating environment are alleviated and the species has a greater likelihood of achieving long-term survival and recovery. Conversely, loss of one or more of the plant populations within any critical habitat unit could result in an increase in the risk that the entire listed species may not survive and recover.

Due to the reduced size of suitable habitat areas for these Hawaiian plant species, they are now more susceptible to the variations and weather fluctuations affecting quality and quantity of available habitat, as well as direct pressure from hundreds of species of non-native plants and animals. Establishing and conserving 8 to 10 viable populations on one or more islands within the historic range of the species will provide each species with a reasonable expectation of persistence and eventual recovery, even with the high potential that one or more of these populations will be eliminated by normal or random adverse events, such as the hurricanes which occurred in 1982 and 1992 on Kauai, fires, and nonnative plant invasions (HPPRCC 1994; Luijten *et al.* 2000; Mangel and Tier 1994; Pimm *et al.* 1998; Stacey and

Taper 1992). We conclude that designation of adequate suitable habitat for 8 to 10 populations as critical habitat is essential to give the species a reasonable likelihood of long-term survival and recovery, based on currently available information.

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

In this rule, we have defined the primary constituent elements based on the general habitat features of the areas from which the plants are reported, such as the type of plant community, the associated native plant species, the physical location (*e.g.*, steep rocky cliffs, talus slopes, streambanks), and elevation. The areas we are designating as critical habitat provide some or all of the habitat components essential for the conservation of the three plant species.

Our approach to delineating critical habitat units was applied in the following manner:

1. We focused on designating units representative of the known current and historical geographic and elevational range of each species; and
2. Critical habitat units were designed to allow for expansion of existing wild populations and reestablishment of wild populations within the historic range, as recommended by the recovery plans for each species.

The proposed critical habitat units were delineated by creating rough units for each species by screen digitizing polygons (map units) using ArcView (Environmental Systems Research Institute, Inc.), a computer GIS program. The polygons were created by overlaying current and historic plant location points onto digital topographic maps of each of the islands.

The resulting shape files (delineating historic elevational range and potential, suitable habitat) were then evaluated. Elevation ranges were further refined and land areas identified as not suitable

for a particular species (*i.e.*, not containing the primary constituent elements) were avoided. The resulting shape files for each species were then considered to define all suitable habitat on the island, including occupied and unoccupied habitat.

These shape files of suitable habitat were further evaluated. Several factors were used to delineate the proposed critical habitat units from these land areas. We reviewed the recovery objectives as described above and in recovery plans for each of the species to determine if the number of populations and population size requirements needed for conservation would be available within the suitable habitat units identified as containing the appropriate primary constituent elements for each species. If more than the area needed for the number of recovery populations was identified as potentially suitable, only those areas within the least disturbed suitable habitat were designated as proposed critical habitat. A population for this purpose is defined as a discrete aggregation of individuals located a sufficient distance from a neighboring aggregation such that the two are not affected by the same small-scale events and are not believed to be consistently cross-pollinated. In the absence of more specific information indicating the appropriate distance to assure limited cross-pollination, we are using a distance of 1,000 m (3,280 ft) based on our review of current literature on gene flow (Barret and Kohn 1991; Fenster and Dudash 1994; Havens 1998; Schierup and Christiansen 1996). The resulting critical habitat units were further refined by using satellite imagery and parcel data to eliminate areas that did not contain the appropriate vegetation or associated native plant species, as well as features such as cultivated agriculture fields, housing developments, and other areas that are unlikely to contribute to the conservation of one or more of the 32 plant species for which critical habitat was proposed on March 4, 2002. Geographic features (*e.g.*, ridge lines, valleys, streams, coastlines, *etc.*) or manmade features (*e.g.*, roads or obvious land use) that created an obvious boundary for a unit were used as unit area boundaries.

Following publication of the proposed critical habitat rules for 255 Hawaiian plants (67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 34522, 67 FR 36968, 67 FR 37108), we reevaluated proposed critical habitat, State-wide, for each of the multi-island species using the recovery guidelines (8 to 10 populations with a minimum of 100

mature, reproducing individuals per population for long-lived perennial species; 300 mature, reproducing individuals per population for short-lived perennial species; and 500 mature, reproducing individuals per population for annual species) to determine if we had inadvertently proposed for designation too much or not enough habitat to meet the essential recovery goals of 8 to 10 populations per species distributed among the islands of the species' known historic range (HINHP Database 2000, 2001; Wagner *et al.* 1990, 1999). For each multi-island species, we then further evaluated areas of the proposed critical habitat for the existing quality of the primary constituent elements (*i.e.*, intact native plant communities, predominance of associated native plants versus nonnative plants) and potential as a recovery area. We selected adequate area for our recovery goals of 8 to 10 populations distributed among the islands of each species' historical range. Of the proposed critical habitat for a species, areas that did not meet these criteria and that may provide habitat for populations above the recovery goal of 8 to 10, were determined not essential for the conservation of the species and were excluded from the final designation.

For the species endemic to Lanai, we modified the boundaries of proposed critical habitat using additional information from botanical experts and comments on the proposed rule. We excluded areas that do not contain one or more of the primary constituent elements or were not essential for the conservation of the species because: (1) The area is highly degraded and may not be restorable; (2) the area has some of the primary constituent elements but there are at least eight other places for the species that have more primary constituent elements or are less degraded or are already undergoing restoration or are within a partnership, Natural Area Reserve, TNCH preserve, or refuge; or (3) the threats to the species are uncontrollable in this area. In addition, some areas were excluded under section 4(b)(2) of the Act for economic or other reasons (See "Exclusions Under Section 4(b)(2)"). The specific modifications are described above in the "Summary of Changes from the Revised Proposed Rule." The boundaries of the final critical habitat units are described by their UTMs.

Within the critical habitat boundaries, section 7 consultation is generally necessary and adverse modification could occur only if the primary constituent elements are affected. Therefore, not all activities within

critical habitat would trigger an adverse modification conclusion. In selecting areas of designated critical habitat, we made an effort to avoid developed areas, such as towns and other similar lands, that are unlikely to contribute to the conservation of the three species. However, the minimum mapping unit that we used to approximate our delineation of critical habitat for these species did not allow us to exclude all such developed areas from the maps. In addition, existing manmade features and structures within the boundaries of the mapped unit, such as buildings; roads; aqueducts and other water system features—including, but not limited to, pumping stations, irrigation ditches, pipelines, siphons, tunnels, water tanks, gaging stations, intakes, and wells; telecommunications towers and associated structures and equipment; electrical power transmission lines and associated rights-of-way; radars; telemetry antennas; missile launch sites; arboreta and gardens; heiau (indigenous places of worship or shrines); airports; other paved areas; and other rural residential landscaped areas do not contain one or more of the primary constituent elements and are therefore excluded under the terms of this regulation. Federal actions limited to those areas would not trigger a section 7 consultation unless they affect the species or primary constituent elements in adjacent critical habitat.

In summary, for these species we utilized the approved recovery plan guidance to identify appropriately sized land units containing essential occupied and unoccupied habitat. Based on the best available information, we believe these areas constitute the habitat necessary on Lanai to provide for the recovery of *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi*.

Managed Lands

Currently occupied and historically known sites containing one or more of the primary constituent elements considered essential to the conservation of these 32 plant species were examined to determine if additional special management considerations or protection are required above those currently provided. We reviewed all available management information on these plants at these sites, including published reports and surveys; annual performance and progress reports; management plans; grants; memoranda of understanding and cooperative agreements; DOFAW planning documents; internal letters and memos; biological assessments and environmental impact statements; and

section 7 consultations. Additionally, we contacted the major private landowner on Lanai by mail and we met with the landowner's representatives in April 2000 and August 2002 to discuss their current management for the plants on their lands. We also met with Maui County DOFAW office staff to discuss management activities they are conducting on Lanai. In addition, we reviewed new biological information and public comments received during the public comment periods and at the public hearings.

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

In determining whether a management plan or agreement provides a conservation benefit to the species, we considered the following:

(1) The factors that led to the listing of the species, as described in the final rules for listing each of the species. Effects of clearing and burning for agricultural purposes and of invasive non-native plant and animal species have contributed to the decline of nearly all endangered and threatened plants in Hawaii (Cuddihy and Stone 1990; Howarth 1985; Loope 1998; Scott *et al.* 1986; Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001; Smith 1985;

Stone 1985; Vitousek 1992; Wagner *et al.* 1985).

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

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

(3) The management actions needed for assurance of survival and ultimate recovery of Hawaii's endangered plants. These actions are described in our recovery plans for these 32 species (Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001), in the 1998 HPPRCC report to us, and in various other documents and publications relating to plant conservation in Hawaii (Cuddihy and Stone 1990; Mueller-Dombois 1985; Smith 1985; Stone 1985; Stone *et al.* 1992). In addition to monitoring the plant populations, these actions include, but are not limited to: (1) Feral ungulate control; (2) nonnative

plant control; (3) rodent control; (4) invertebrate pest control; (5) fire management; (6) maintenance of genetic material of the endangered and threatened plant species; (7) propagation, reintroduction, and augmentation of existing populations into areas deemed essential for the recovery of these species; (8) ongoing management of the wild, outplanted, and augmented populations; and (9) habitat management and restoration in areas deemed essential for the recovery of these species.

In general, taking all of the above recommended management actions into account, the following management actions are ranked in order of importance: Feral ungulate control; wildfire management; non-native plant control; rodent control; invertebrate pest control; maintenance of genetic material of the endangered and threatened plant species; propagation, reintroduction, and augmentation of existing populations into areas deemed essential for the recovery of the species; ongoing management of the wild, outplanted, and augmented populations; maintenance of natural pollinators and pollinating systems, when known; habitat management and restoration in areas deemed essential for the recovery of the species; monitoring of the wild, outplanted, and augmented populations; rare plant surveys; and control of human activities/access (Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001). On a case-by-case basis, some of these actions may rise to a higher level of importance for a particular species or area, depending on the biological and physical requirements of the species and the location(s) of the individual plants.

As shown in Table 2, the 32 species of plants are found on private lands on the island of Lanai. Information received in response to our public notices; meetings with representatives of the landowner and Maui County DOFAW staff; the December 27, 2000, and March 4, 2002, proposals; public comment periods; and the March 22, 2001, and August 1, 2002, public hearings, as well as information in our files, indicated that there is limited ongoing conservation management action for these plants, except as noted below. Without management plans and assurances that the plans will be implemented, we are unable to find that the land in question does not require special management or protection.

Private Lands

Two species (*Bonamia menziesii* and *Hibiscus brackenridgei*) are reported from The Nature Conservancy of

Hawaii's (TNCH) Kanepuu Preserve, which is located in the northeast-central portion of Lanai (GDSI 2000; HINHP Database 2000; TNCH 1997). This preserve was established by a grant of a perpetual conservation easement from the private landowner to TNCH and is included in the State's Natural Area Partnership (NAP) program, which provides matching funds for the management of private lands that have been permanently dedicated to conservation (TNCH 1997).

Under the NAP program, the State of Hawaii provides matching funds on a two-to-one basis for management of private lands dedicated to conservation. In order to qualify for this program, the land must be dedicated in perpetuity through transfer of fee title or a conservation easement to the State or a cooperating entity. The land must be managed by the cooperating entity or a qualified landowner according to a detailed management plan approved by the Board of Land and Natural Resources. Once approved, the six-year partnership agreement between the State and the managing entity is automatically renewed each year so that there are always six years remaining in the term, although the management plan is updated and funding amounts are re-authorized by the board at least every six years. By April 1 of any year, the managing partner may notify the State that it does not intend to renew the agreement; however, in such case, the partnership agreement remains in effect for the balance of the existing six-year term, and the conservation easement remains in full effect in perpetuity. The conservation easement may be revoked by the landowner only if State funding is terminated without the concurrence of the landowner and cooperating entity. Prior to terminating funding, the State must conduct one or more public hearings. The NAP program is funded through real estate conveyance taxes which are placed in a Natural Area Reserve Fund. Participants in the NAP program must provide annual reports to the State Department of Land and Natural Resources (DLNR), and DLNR makes annual inspections of the work in the reserve areas. See Haw. Rev. Stat. Secs. 195-1-195-11, and Hawaii Administrative Rules Sec. 13-210.

The management program within Kanepuu Preserve is documented in long-range management plans and yearly operational plans. These plans detail management measures that protect, restore, and enhance the rare

plant and its habitat within the preserve (TNCH 1997, 1998, 1999). These management measures address the factors which led to the listing of *Bonamia menzeisii* and *Hibiscus brackenridgei* including control of non-native species of ungulates, rodents, weeds, and fire control. In addition, habitat restoration and monitoring are also included in these plans.

The primary goals within Kanepuu Preserve are to: (1) Control non-native species; (2) suppress wildfires; and (3) restore the integrity of the dryland forest ecosystem through monitoring and research. Specific management actions to address feral ungulates include the replacement of fences around some of the management units with Benzinal-coated wire fences as well as staff hunting and implementation of a volunteer hunting program with the DLNR. Additionally, a small mammal control program has been established to prevent small nonnative mammals (e.g., rats) from damaging rare native species and limit their impact on the preserve's overall native biota.

To prevent further displacement of native vegetation by non-native plants, a non-native plant control plan has been developed, which includes monitoring of previously treated areas, and the control of non-native plants in management units with restoration projects.

The fire control program focuses on suppression and pre-suppression. Suppression activities consist of coordination with State and county fire-fighting agencies to develop a Wildfire Management Plan for the preserve (TNCH 1998). Pre-suppression activities include mowing inside and outside of the fence line to minimize fuels for fires.

A restoration, research, and monitoring program has been developed at Kanepuu Preserve to create a naturally regenerating *Nestegis sandwicensis-Diospyros sandwicensis* dryland forest, and expand the current range of native-dominated vegetation. Several years of casual observation indicate that natural regeneration is occurring within native forest patches in the deer-free units (TNCH 1999). A draft of the Kanepuu Restoration Plan was completed in June 1999. This plan identifies sites for rare plant outplanting and other restoration activities.

Monitoring is an important component to measure the success or failure rate of the animal and weed control programs. Management of these non-native species control programs is regularly amended

to preserve the ecological integrity of the preserve.

Comments received on the proposed rule and a site visit by Service staff revealed that Kanepuu Preserve does not contain as many of the primary constituent elements for *Bonamia menzeisii* and *Hibiscus brackenridgei* as previously thought or that exist in other areas of the State of Hawaii proposed as critical habitat for these species. The other areas proposed for these species are occupied, contain intact native habitat, are being managed for these species, and provide adequate area for the 8 to 10 populations needed to reach our recovery goals for these species. It is our belief that this area is not essential for the conservation of these species for the above stated reasons. We were able to find enough better quality habitat for 8 to 10 populations needed to reach our recovery goals on this and other Hawaiian islands. Though it is occupied by *Bonamia menzeisii* and *Hibiscus brackenridgei* and should continue to be managed for these and other species, this area was not considered essential to the conservation of any of the 37 species covered by this rule.

The critical habitat areas described below constitute our best assessment of the physical and biological features needed for the conservation of *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi*, and the special management needs of these species, and are based on the best scientific and commercial information available and described above. We publish this final rule acknowledging that we have incomplete information regarding many of the primary biological and physical requirements for these species. However, both the Act and the relevant court orders require us to proceed with designation at this time based on the best information available. As new information accrues, we may consider reevaluating the boundaries of areas that warrant critical habitat designation.

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

Critical habitat includes habitat for these three species in the northwestern, central, and southern portions of Lanai. Lands designated as critical habitat have been divided into six units. A brief description of each unit is presented below.

TABLE 4.—APPROXIMATE CRITICAL HABITAT DESIGNATED AREA BY UNIT AND LANDOWNERSHIP OR JURISDICTION, MAUI COUNTY, HAWAII

Unit name	State/local	Private	Federal	Total
Lanai 1— <i>Tetramolopium remyi</i>	151 ha (373 ac) .....	.....	151 ha (373 ac)
Lanai 2— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —North.	53 ha (131 ac) .....	.....	53 ha (131 ac)
Lanai 3— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —Middle.	60 ha (148 ac) .....	.....	60 ha (148 ac)
Lanai 4— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —South.	48 ha (118 ac) .....	.....	48 ha (118 ac)
Lanai 5— <i>Portulaca sclerocarpa</i> —Coast	7 ha (17 ac) .....	.....	7 ha (17 ac)
Lanai 6— <i>Portulaca sclerocarpa</i> —Isle	1 ha (2 ac) .....	.....	1 ha (2 ac)
Grand Total	320 ha (789 ac) .....	.....	320 ha (789 ac)

Descriptions of Critical Habitat Units

Lanai 1—*Tetramolopium remyi*

This unit is critical habitat for *Tetramolopium remyi* and is 151 ha (373 ac) on privately owned land. It lies approximately between 182 m (600 ft) and 274 m (900 ft) elevation, is slightly east of Puumaiekahi Gulch, contains a portion of Lapaiki Gulch and is completely in a conservation district (limited use). Awalua Road runs through the western portion of this unit. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial and is currently unoccupied. The habitat features contained in this unit that are important for this species include, but are not limited to, predominantly red sandy loam in a *Dodonaea viscosa*-*Heteropogon contortus* community. In addition, this area is the most likely to contain a viable seed bank on the north side of the island because of the existence within the past year of mature, seed-bearing individuals in this area and because plants from drought-prone sites tend to survive through the existence of seed banks. The State of Hawaii is managing a small portion of this unit by fencing the area to control feral ungulates around the recently extirpated known individuals. This unit provides for one population within this multi-island species' historical range on Lanai.

Lanai 2—*Bidens micrantha* ssp. *kalealaha*—North

This unit is critical habitat for *Bidens micrantha* ssp. *kalealaha* and is 53 ha (131 ac) on privately owned land. This unit lies west of Lanai 3 and includes most of Kapohaku Gulch. This unit provides habitat for one population of 300 mature, reproducing individuals of this short-lived perennial and is currently unoccupied. The habitat features contained in this unit that are important for this species include, but

are not limited to, gulch slopes in dry *Dodonaea viscosa* shrubland. This critical habitat unit provides area for one population within the historical range of this multi-island species and is in the gulch adjacent to the occupied unit Lanai 3—*Bidens micrantha* ssp. *kalealaha*—Middle. It is geographically separated (by a ridge) from other designated critical habitat units on this and other islands in order to avoid all populations from being destroyed by one naturally occurring catastrophic event.

Lanai 3—*Bidens micrantha* ssp. *kalealaha*—Middle

This unit is critical habitat for *Bidens micrantha* ssp. *kalealaha* and is 60 ha (148 ac) on privately owned land. This unit lies between Lanai 2 and Lanai 4 and includes most of Waiapaa Gulch and Waiakaiole Gulch. This unit provides habitat for one population of 300 mature, reproducing individuals of this short-lived perennial and is currently occupied by less than 20 individuals. This unit is important to the conservation of the species because it supports the one extant colony of this species on Lanai. This unit also includes habitat that is important for the expansion of the present population. The habitat features contained in this unit that are important for this species include, but are not limited to, gulch slopes in dry *Dodonaea viscosa* shrubland. This critical habitat unit provides area for one population within the historical range of this multi-island species. It is geographically separated by a ridge from other designated critical habitat units on this and other islands in order to avoid all populations from being destroyed by one naturally occurring catastrophic event.

Lanai 4—*Bidens micrantha* ssp. *kalealaha*—South

This unit is critical habitat for *Bidens micrantha* ssp. *kalealaha* and is 48 ha

(118 ac) on privately owned land. This unit lies east of Lanai 3 and includes most of Paliakoe Gulch. This unit provides habitat for one population of 300 mature, reproducing individuals of this short-lived perennial and is currently unoccupied. The habitat features contained in this unit that are important for this species include, but are not limited to, gulch slopes in dry *Dodonaea viscosa* shrubland. This critical habitat unit provides area for one recovery population within the historical range of this multi-island species and is in a gulch adjacent to the occupied unit Lanai 3—*Bidens micrantha* ssp. *kalealaha*—Middle. It is geographically separated by a ridge from other designated critical habitat units on this and other islands in order to avoid all populations from being destroyed by one naturally occurring catastrophic event.

Lanai 5—*Portulaca sclerocarpa*—Coast

This unit is critical habitat for *Portulaca sclerocarpa* and is 7 ha (17 ac) on privately owned land. This unit lies along the shore between Anapuka in the west and Huawai Bay in the east. This unit provides habitat for one population (combined with Lanai 6—*Portulaca sclerocarpa*—Isle) of 300 mature, reproducing individuals of this short-lived perennial and is currently unoccupied. The habitat features contained in this unit that are important for this species include, but are not limited to, exposed ledges in thin soil in coastal communities. This coastal habitat is unique to Lanai for this species; on the island of Hawaii, this species grows on weathered soils, cinder cones, or geologically young lava; in montane dry shrubland; often on bare cinder; near steam vents; or in open *Metrosideros polymorpha*-dominated woodlands, away from coastal areas. This critical habitat unit provides area for one recovery population within the historical range of this multi-island

species and is adjacent to the currently occupied habitat in Unit 6—*Portulaca sclerocarpa*—Isle. It is geographically separated from other designated critical habitat on the island of Hawaii in order to avoid all populations from being destroyed by one naturally occurring catastrophic event.

Lanai 6—*Portulaca sclerocarpa*—Isle

This unit is critical habitat for *Portulaca sclerocarpa* and is 1 ha (2 ac) on privately owned land. This unit comprises all of Poopoo Islet. This unit provides habitat for one population (combined with Lanai 5—*Portulaca sclerocarpa*—Coast) of 300 mature, reproducing individuals of this short-lived perennial and is currently occupied by about 10 plants. This unit is important to the conservation of the species because it supports the one extant colony of this species on Lanai. This unit also includes habitat that is important for the expansion (combined with Lanai 5—*Portulaca sclerocarpa*—Coast) of the present population. The habitat features contained in this unit that are important for this species include, but are not limited to, exposed ledges in thin soil in coastal communities. This coastal habitat is unique to Lanai for this species; on the island of Hawaii, this species grows on weathered soils, cinder cones, or geologically young lava; in montane dry shrubland; often on bare cinder; near steam vents; or in open *Metrosideros polymorpha*-dominated woodlands, away from coastal areas. This critical habitat unit provides area for one population within the historical range of this multi-island species. It is geographically separated from other designated critical habitat units on the island of Hawaii to prevent all populations from being destroyed by one naturally occurring catastrophic event.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical habitat. Destruction or adverse modification of critical habitat occurs when a Federal action directly or indirectly alters critical habitat to the extent that it appreciably diminishes the value of critical habitat for the conservation of the species. Individuals, organizations, States, local governments, and other non-Federal entities are affected by the designation of critical habitat when their actions occur on

Federal lands, require a Federal permit, license, or other authorization, or involve Federal funding.

Section 7(a)(1) of the Act requires Federal agencies, including the Service, to use their authorities to carry out programs for the conservation of any species that is proposed or listed as endangered or threatened. Section 7(a)(4) of the Act requires Federal agencies (action agency) to confer with us on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402.

If a species is listed or critical habitat is designated, section 7(a)(2) of the Act requires Federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal action agency must enter into consultation with us. Through this consultation, the action agency would ensure that the permitted actions do not destroy or adversely modify critical habitat.

Regulations at 50 CFR 402.16 require Federal agencies to reinstate consultation on previously reviewed actions under certain circumstances, including instances where critical habitat is subsequently designated and the Federal agency has retained discretionary involvement, or control has been retained or is authorized by law. Consequently, some Federal agencies may request reinstatement of consultation or conferencing with us on actions for which formal consultation has been completed, if those actions may affect designated critical habitat or adversely modify or destroy proposed critical habitat.

If we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we also provide “reasonable and prudent alternatives” to the project, if any are identifiable. Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency’s legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid the likelihood of the destruction or adverse

modification of 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.

Activities on Federal lands that may affect critical habitat of *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, or *Tetramolopium remyi* will require section 7 consultation. Activities on private or State lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act (33 U.S.C. 1344 *et seq.*), the Department of Housing and Urban Development, or an incidental take permit under section 10(a)(1)(B) of the Act from us; or some other Federal action, including funding (e.g., from the Federal Highway Administration, Federal Aviation Administration (FAA), Federal Emergency Management Agency (FEMA), Environmental Protection Agency (EPA), or Department of Energy); regulation of airport improvement activities by the FAA; and construction of communication sites licensed by the Federal Communications Commission will also continue to be subject to the section 7 consultation process. Federal actions not affecting critical habitat and actions on non-Federal lands that are not federally funded, authorized, or permitted do not require section 7 consultation.

Section 4(b)(8) of the Act requires us to briefly describe and evaluate in any proposed or final regulation that designates critical habitat those activities (whether public or private) that may adversely modify such habitat or that may be affected by such designation. We note that such activities may also jeopardize the continued existence of the species.

Activities that, when carried out, funded, or authorized by a Federal agency, may directly or indirectly destroy or adversely modify critical habitat include, but are not limited to:

(1) Activities that appreciably degrade or destroy the primary constituent elements including, but not limited to: Overgrazing; maintenance of feral ungulates; clearing or cutting of native live trees and shrubs, whether by burning or mechanical, chemical, or other means (e.g., woodcutting, bulldozing, construction, road building, mining, herbicide application); introducing or enabling the spread of non-native species; and taking actions that pose a risk of fire;

(2) Activities that alter watershed characteristics in ways that would appreciably reduce groundwater recharge or alter natural, dynamic wetland or other vegetative communities. Such activities may include manipulation of vegetation such as timber harvesting, residential and commercial development, and grazing of livestock that degrades watershed values;

(3) Rural residential construction that includes concrete pads for foundations and the installation of septic systems in wetlands where a permit under section 404 of the Clean Water Act would be required by the Corps;

(4) Recreational activities that appreciably degrade vegetation;

(5) Mining of sand or other minerals;

(6) Introducing or encouraging the spread of non-native plant species into critical habitat units; and

(7) Importation of non-native species for research, agriculture, and aquaculture, and the release of biological control agents that would have unanticipated effects on the listed species and the primary constituent elements of their habitats.

If you have questions regarding whether specific activities will likely constitute adverse modification of critical habitat, contact the Field Supervisor, Pacific Islands Ecological Services Field Office (see **ADDRESSES** section). Requests for copies of the regulations on listed plants and animals, and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Branch of Endangered Species/Permits, 911 N.E. 11th Ave., Portland, OR 97232-4181 (telephone 503/231-2063; facsimile 503/231-6243).

Exclusions Under Section 4(b)(2)

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific and commercial information available, and to consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude areas from critical habitat when the exclusion will result in the extinction of the species concerned.

Economic Impacts

Following the publication of the proposed critical habitat designation, a draft economic analysis was conducted to estimate the potential economic impact of the designation, in accordance with the recent decision in the *N.M.*

Cattlegrowers Ass'n v. U.S. Fish and Wildlife Serv., 248 F.3d 1277 (10th Cir. 2001). The draft analysis was made available for review on August 16, 2002 (67 FR 46626). We accepted comments on the draft analysis until the comment period closed on August 30, 2002, and again from November 15, 2002 to November 25, 2002 (67 FR 69176).

We have not excluded or modified critical habitat units from the proposed rule based on economic impacts. Our draft economic analysis evaluated the potential future section 7 effects, including indirect effects, associated with designating critical habitat for 32 species (*Abutilon eremitopetalum*, *Adenophorus periens*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamiger*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyperus trachysanthos*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Gahnia lanaiensis*, *Hedyotis manni*, *Hedyotis schlehtendahlana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyriform*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Neraudia sericea*, *Portulaca sclerocarpa*, *Sesbania tomentosa*, *Solanum incompletum*, *Spermolepis hawaiiensis*, *Tetramolopium remyi*, *Vigna o-wahuensis*, and *Viola lanaiensis*) on Lanai. However, given the difficulty of determining precisely what section 7 impacts should be attributed alone to critical habitat, we have analyzed the total section 7 impacts as well.

The categories of potential costs considered in the analysis included the costs associated with: (1) Conducting section 7 consultations associated with the listing or with the critical habitat, including incremental consultations and technical assistance; (2) modifications to projects, activities, or land uses resulting from the section 7 consultations; (3) potential delays associated with reinitiating completed consultations after critical habitat is finalized; (4) uncertainty and public perceptions resulting in loss of land value from the designation of critical habitat; (5) potential effects on property values including potential indirect costs resulting from the loss of hunting opportunities and increased regulation related costs due to the interaction of State and local laws; and (6) potential offsetting benefits associated with critical habitat, including educational benefits. The most likely economic effects of critical habitat designation are

on activities funded, authorized, or carried out by a Federal agency.

Following the close of the comment period on the draft economic analysis, a final addendum was completed that incorporated public comments on the draft analysis and made other changes in the draft, for example, to account for changes in unit boundaries due to the receipt of information during the comment period indicating that certain areas do not contain the necessary primary constituent elements or were not essential to the conservation of the species. Together, the draft analysis as modified by the addendum constitute our final economic analysis. The final economic analysis estimates that, over the next 10 years, the designation may result in potential economic effects ranging from approximately \$450,000 to \$530,000 in quantifiable costs, and concludes that economic impacts from the designation of critical habitat would not be significant. This is a reduction of approximately \$1.7 million from the costs estimated in the draft economic analysis, and is due to the exclusion of proposed units Lanai A, Lanai C, and Lanai F from final designation and the significant reduction in size to proposed units Lanai B and Lanai G (designation of 6,181 ha (15,271 ac) versus the 7,853 ha (19,405 ac) proposed as critical habitat, a reduction of approximately 1,672 ha (4,134 ac)). As described in the analysis, direct costs result from conservation projects and secondary costs result from investigations of the implications of critical habitat designation. Indirect costs attributed to critical habitat that were considered major in the draft economic analysis are avoided by the modifications made to units based on new biological information (*i.e.*, excluding unit F and removing much of the land zoned as rural). The Addendum to the economic analysis states that the indirect cost of reduction in property values is not expected to occur, and ensuring that clear and correct information on the effects of a critical habitat designation is available to all potential buyers will further reduce the potential for such a scenario. A more detailed discussion of our economic analysis is contained in the draft economic analysis and the addendum. Both documents are included in our administrative record and are available for inspection at the Pacific Islands Fish and Wildlife Office (see **ADDRESSES** section).

Other Impacts

As described above, section 4(b)(2) of the Act requires us to consider other relevant impacts, in addition to economic impacts, of designating

critical habitat. A proposed critical habitat unit, Lanai D, located on the central-eastern side of the island, was excluded from designation because we believed that doing so would further the goal of encouraging private landowners to undertake voluntary conservation activities, which will be necessary to achieve species recovery. The proposed 5,861 ha (14,482 ac) unit is on private lands owned by Castle and Cooke Resorts, LLC. Castle and Cooke Resorts, LLC—which owns 99 percent of the island—is currently undertaking voluntary conservation activities within and adjacent to this unit, and has recently entered into an agreement with the Service for future activities (MOA, 2002), as well.

The proposed unit Lanai D is occupied habitat for 17 species: *Abutilon eremitopetalum*, *Bonamia menziesii*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyrtandra munroi*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahlia* var. *remyi*, *Hibiscus brackenridgei*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Spermolepis hawaiiense*, *Tetramolopium remyi*, and *Viola lanaiensis*. It is unoccupied habitat for 11 species: *Adenophorus periens*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Cyanea lobata*, *Diellia erecta*, *Diplazium molokaiensis*, *Hesperomannia arborescens*, *Isodendron pyriformium*, *Neraudia sericea*, *Solanum incompletum*, and *Vigna o-wahuensis*.

According to our published recovery plans, recovery of these species will require reproducing, self-sustaining populations located in a geographic array across the landscape, with population numbers and population locations of sufficient robustness to withstand periodic threats due to natural disaster or biological threats (Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001). The highest priority recovery tasks include active management such as plant propagation and reintroduction, fire control, alien species removal, and ungulate fencing. Failure to implement these active management measures, all of which require voluntary landowner support and participation, virtually assures the extinction of these species. Many of these types of conservation actions in this area of Lanai are carried out as part of the Lanai Forest and Watershed Partnership and by actions taken on the landowner's initiative in areas outside the watershed partnership area. These activities, which are described in more

detail below, require substantial voluntary cooperation by Castle and Cooke Resorts, LLC.

The following analysis describes the likely conservation benefits of a critical habitat designation compared to the negative impacts of a critical habitat designation. The Service paid particular attention to the following issues: Whether critical habitat designation would confer regulatory conservation benefits on these species; whether the designation would educate members of the public such that conservation efforts would be enhanced; and whether a critical habitat designation would have a positive, neutral, or negative impact on voluntary conservation efforts on this privately-owned island.

If excluding an area from a critical habitat designation will provide substantial conservation benefits, and at the same time including the area fails to confer a counter-balancing positive regulatory or educational benefit to the species, then the benefits of excluding the area from critical habitat outweigh the benefits of including it. The results of this type of evaluation will vary significantly depending on the landowners, geographic areas, and species involved.

(1) Benefits of Inclusion

Critical habitat in Lanai D was proposed for the following species: *Abutilon eremitopetalum*, *Adenophorus periens*, *Bonamia menziesii*, *Brighamia rockii*, *Centaurium sebaeoides*, *Cenchrus agrimonioides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiensis*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahlia* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyriformium*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Neraudia sericea*, *Solanum incompletum*, *Spermolepis hawaiiense*, *Tetramolopium remyi*, *Vigna o-wahuensis*, and *Viola lanaiensis*. The primary direct benefit of inclusion of the proposed unit Lanai D as final critical habitat would result from the requirement under section 7 of the Act that Federal agencies consult with us to ensure that any proposed Federal actions do not destroy or adversely modify critical habitat.

Historically, we have conducted only seven informal consultations under section 7 on Lanai, and only one consultation involved any of the 28 species associated with proposed unit D. We do not expect further

consultations in unit Lanai D for several reasons. Unit Lanai D is privately owned and does not contain any wetlands (the major reason for Federal permits). The landowner does not plan on applying for Federal funds (other than for habitat restoration) and does not foresee any reason to obtain federal permits that may create a federal nexus. Any funds received by the landowner for habitat restoration will require internal consultations, but will not likely adversely affect listed plant species or involve other Federal agencies. The majority of the land in proposed unit Lanai D is zoned as Conservation¹ (71 percent). Any lands zoned as Agriculture² (27 percent) in this area are not currently used for agricultural purposes and are currently fallow. Likely future use by the landowner of this area is as watershed protection (MOA, 2002). As stated in the economic analysis, future development in this area is not expected over the long term. Past uses of this area include marginal agriculture (primarily grazing). For these specific reasons, we do not expect future consultations in proposed unit Lanai D.

Although we believe the likelihood of a consultation is small, in the unlikely event that the landowner began using Federal funds or permits for projects, consultation requirements under section 7 of the Act would be triggered as a result of the funding or permitting processes administered by the Federal agency involved. The benefit of critical habitat designation would ensure that any actions funded by or permits given by a Federal agency would not likely destroy or adversely modify any critical habitat. Without critical habitat, some site-specific projects might not trigger consultation requirements under the Act in areas where species are not currently present; in contrast, Federal project areas with listed species present would still be covered under section 7. Given the overall low likelihood of Federal

¹ Conservation-zoned land is designated to conserve, protect and preserve the State's important natural resources through appropriate management in order to promote the long-term sustainability of these natural resources, and to promote public health, safety and welfare. Only limited development and commercial activity are allowed in the Conservation District.

² Agricultural-zoned land is a catch-all category that includes all lands not otherwise categorized, regardless of the agricultural quality of the land. Crops, livestock, and grazing are permitted in the zone, as are accessory structures and farmhouses. Although land in this zoning is not meant to be urbanized, it is, in practice, sometimes used for large-lot subdivisions. Listed species are found in some parts of this zoning, particularly in gulches, on hillsides, and on some of the land that is used for low-intensity grazing. In many cases, the fact that the land is Agricultural District indirectly protects listed species by limiting urban sprawl.

projects being proposed in the area of proposed unit D, the Service believes there is low potential for negative impacts to unoccupied habitat as a consequence of Federal activities, and thus a low regulatory benefit of a critical habitat designation in this area. We believe there is a low likelihood of negative impacts because of reasons stated above (*i.e.*, land use and zoning, land use history).

Another reason that the benefits of including Lanai D in the critical habitat designation is small is that, even if the area is not included in the designation, the conservation agreement (MOA, 2002) will provide conservation benefits to the target species. The management actions as outlined will remove threats (*e.g.* axis deer, mouflon sheep, rats, invasive nonnative plants) from the Lanaihale and East Lanai Regions, engage in fire control measures, engage in nursery propagation of native flora (including the target species) and planting of such flora. These actions will significantly improve the habitat for all currently occurring species (*Abutilon eremitopetalum*, *Bonamia menziesii*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyrtandra munroi*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahlia* var. *remyi*, *Hibiscus brackenridgei*, *Lobordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Spermolepis hawaiiense*, *Tetramolopium remyi*, and *Viola lanaiensis*) and will provide suitable habitat for reintroduction of extirpated species (*Adenophorus periens*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Cyanea lobata*, *Diellia erecta*, *Diplazium molokaiensis*, *Hesperomannia arborescens*, *Isodendron pyriformis*, *Neraudia sericea*, *Solanum incompletum*, and *Vigna o-wahuensis*).

Another possible benefit is that the designation of critical habitat can serve to educate the public regarding the potential conservation value of an area, and this may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation value for certain species. This outcome would be important for these 28 species. Any information about the species and their habitats that reaches a wide audience, including other parties engaged in conservation activities, would be considered valuable. However, only one landowner would be affected directly by including Lanai D in the designation, and that landowner is already working with the Service to address the habitat needs of

the species. Further, this area was included in the proposed designation, which itself has reached a wide audience, and has thus provided information to the broader public about the conservation value of the area. For these reasons, we would expect that including Lanai D in the designation would provide at most moderate educational benefits to the species.

To be inclusive, we have considered some of these unlikely assumptions in this benefits of inclusion section. The economic analysis also identifies indirect impacts to landowners and other affected parties, and some of these impacts could result in benefits to the species. For example, the critical habitat designation could encourage the State to take measures to manage the populations of feral ungulates by fencing off portions of the State hunting areas (Economic Analysis section 4.b.). Such measures could result in preserving significant populations of the plants within the enclosed areas, and further the recovery of the species. The economic analysis concluded, however, that this result would be unlikely, because closing off portions of the State hunting areas would be vigorously protested by hunters. The economic analysis also stated that there is a possibility, of undetermined likelihood, that private landowners could be required by courts to take specific management actions if failing to take the action is a "taking" of the species (Economic Analysis section 4.c.). Management actions could include such activities as control of feral ungulates, non-native plants, rodents, and invertebrate pests; fire management; maintenance of plant genetic material; propagation; or management of the habitat or the plant populations. Each of these actions would provide commensurate benefits to the species, and designation of a particular area as critical habitat could further define and expand the scope of the management actions and resulting benefits. Many of these actions will be species-specific and benefit species as well as the island's watershed. Also, these types of management actions would ensure these areas continue to provide habitat for the seven island endemics as well as for reintroduction of several species including *Solanum incompletum* and *Isodendron pyriformis* which are no longer found on the island. We believe, however, that many of these same benefits would result from the agreement the Service has recently entered into with the landowner (MOA, 2002). Finally, the Economic Analysis discusses the possibility that

designation could make development more difficult and/or costly (Economic Analysis sections 4.d. and 4.f.). The State or Counties could require developers to prepare a State EIS instead of a less burdensome EA in order to obtain development approvals, and may ultimately require additional project modifications; in addition, landowners could perceive that development in rural and agricultural areas is limited. Preparation of an EIS would presumably result in decisionmaking that is more informed and that is better able to provide for the protection of the species. Similarly, to the extent that designation of critical habitat would result in additional or more finely tuned project modifications, it would further the conservation of the species. The final designation together with the excluded Unit D contain less than 6 ha (15 ac) of land designated as Rural lands. Of these, over half 3.4 ha (8.3 ac) are mountainous and the rest are coastal 2.4 ha (6 ac). In the unlikely event that land values are decreased or economic activities are slowed, these plant species would benefit from the resulting decreased level of invasive activities. For example, the Rural lands in Unit D provide habitat for two multi-island species, *Centaurium sebaeoides* and *Brighamia rockii*. For both species, the Lanai populations are the only non-coastal populations of the species that are known to exist. This makes protecting the Lanai populations and their habitat from harmful activities particularly important. The only anticipated development project identified in the Economic Analysis is the planned construction of a new quarry, and this does not fall within Unit D and has been dropped from the analysis.

In sum, the Service believes that a critical habitat designation for listed plants on Lanai would provide a relatively low level of additional regulatory conservation benefits to each of the plant species. Any regulatory conservation benefits would accrue through the benefit associated with section 7 consultation. Based on a review of past consultations and consideration of the likely future activities in the area, there is little Federal activity expected to occur on this privately-owned island that would trigger section 7 consultation. The Service believes that critical habitat proposal and final designation provides some conservation benefits by educating the public on the site-specific areas on Lanai essential to the recovery of the extant and extirpated species.

(2) Benefits of Exclusion

Proactive voluntary conservation efforts are necessary to prevent the extinction and promote the recovery of these species on Lanai and other Hawaiian islands (Shogren *et al.* 1999, Wilcove and Chen 1998, Wilcove *et al.* 1998). Consideration of this concern is especially important in areas where species have been extirpated and their recovery requires access and permission for reintroduction efforts. For example, eleven of the 28 species associated with proposed unit D are extirpated from Lanai, and natural repopulation is likely not possible without human assistance and landowner cooperation.

Castle and Cooke Resorts, LLC, is involved in several important voluntary conservation agreements and is currently carrying out some of these activities for conservation and watershed protection purposes. For example, the Partners for Fish and Wildlife Awehi Gulch agreement was entered into in fiscal year 1998 with the stated purpose of restoring and protecting a mesic to dry forest community including a population of the endangered *Gardenia brighamii*. The strategy to be employed for this project was to construct a three-acre deer-proof fenced enclosure, ensure that all deer were removed from the fenced area, plant and water *G. brighamii* within the fenced area, and control invasive alien plants in areas around the out-planted individuals. The agreement is between Castle and Cooke Resorts, LLC, the State Division of Forestry and Wildlife (DOFAW), and the USFWS. The USFWS provided funding for fence materials (\$24,000), DOFAW provided the labor to construct the fence, and Castle and Cooke provided the labor and materials needed to plant, water, and weed the area. The fence was completed and no deer were left within the enclosure. Shortly thereafter, Castle and Cooke planted 150 *G. brighamii*, planted other native species (50 individuals) appropriate to the area within the Awehi enclosure, conducted alien plant removal above the level agreed upon, and set up a watering system (tank and delivery lines) that will be used for establishing more than just the original gardenia plants in the enclosure.

Another important voluntary project undertaken in partnership with the landowner is the Lanaihale Summit Forest Restoration Project. This is a very large and ambitious project (approximately 5,800 acres) within the area of proposed unit D, for which the USFWS has obligated a total of \$177,500 to date. The landowner is matching that amount with at least \$143,266 of in-kind

cost-share in the form of fence-line clearing and native-plant restoration (growing, planting, and weed control). It is understood that these amounts will not be sufficient to complete the summit fence but will allow the project to get started with the assumption that the partnership will be able to secure additional funding from various sources to help complete the project. Castle and Cooke has entered into other agreements with agencies besides the Service, such as the Hawaii Division of Forestry and Wildlife and Hawaii Department of Health for additional funds to assist with completion of this project. The agreement documenting this project lists 10 of the proposed critical habitat plant species (among others) that will benefit from its completion. The project is currently ongoing. Castle and Cooke's Conservation Department has almost completed clearing the fence line for the first (Unit 1) of three enclosure units that will make up the summit fence project. They have also obtained bids from private contractors for construction of this first phase of fencing.

A third voluntary partnership project undertaken in cooperation with this landowner is the Lanai Cloud Forest Enclosure project. For this much smaller enclosure project, the Service provided \$27,500 to be matched by in-kind services valued at \$9,213 to be provided by the company. The purpose of this project is to provide an area protected by a fence that excluded not only deer and sheep, but predators (rats and feral cats) as well. The exact size and location for this project have not yet been finalized, but will be selected to provide the greatest protection and restoration potential for listed plants and two species of imperilled tree snails. This project is yet to get underway due to the higher priority of the summit fence. The Service and the landowner are planning to complete this project by the end of fiscal year 2003.

Another noteworthy voluntary agreement is the Lanai Forest and Watershed Partnership. While this multi-party agreement does not commit the company (or any party) to complete any conservation actions, it does demonstrate the willingness of the company to work cooperatively with all involved parties toward landscape-scale conservation efforts.

In addition to the projects described above, to address the conservation needs of all of the listed species associated with proposed unit D and to cover a larger landscape area, Castle and Cooke Resorts, LLC, has recently entered into an agreement with the Service to voluntarily manage proposed unit D and some adjacent lands for the

conservation benefit of all of the listed species from Lanai. This agreement includes the following important voluntary commitments by Castle and Cooke Resorts, LLC:

1. Construction of enclosure fencing around large portions of Lanaihale and East Lanai (proposed unit D and adjacent lands); this fencing would expand upon the Lanaihale summit fence described above and protect a much larger area.

2. Active management of feral ungulates that are negatively affecting listed plants within the fenced areas; through a combination of public hunting and staff hunting, feral ungulates will be eliminated or controlled to allow for the restoration of listed plant species within fenced areas.

3. Active management of nonnative grasses and other fire hazards, and development of fire control measures;

4. Nursery propagation and planting of native flora, including these listed species, within the fenced areas;

5. In the unlikely event that future Federal projects occur on Lanai in the most important portions of proposed unit D (e.g., Lanaihale and some adjacent areas), the landowner has agreed to have these projects reviewed by the Service to a standard similar to that required by section 7 consultation for designated critical habitat. These areas were identified by the company's contract botanist as having the highest conservation value for these listed species. They include the Lanaihale area (2,339 ha (5,781 ac)), an adjacent area to the north (702 ha (1,734 ac)), and an area east of the Lanaihale area (1,082 ha (2,674 ac)).

The Service believes that each of the listed species originally included within proposed unit D will benefit substantially from this agreement due to a reduction in ungulate browsing and habitat conversion, a reduction in competition with nonnative weeds, a reduction in risk of fire, and the reintroduction of species currently extirpated from various areas and for which the technical ability to propagate these species currently exists or will be developed in the near future.

On Lanai, simply preventing "harmful activities" will not slow the extinction of listed plant species. Where consistent with the discretion provided by the Act, the Service believes it is necessary to implement policies that provide positive incentives to private landowners to voluntarily conserve natural resources and that remove or reduce disincentives to conservation. While the impact of providing these incentives may be modest in economic terms, they can be significant in terms

of conservation benefits that can stem from the cooperation of the landowner. The continued participation of Castle and Cooke Resorts, LLC, in the existing Lanai Forest and Watershed Partnership and other voluntary conservation agreements will greatly enhance the Service's ability to further the recovery of these endangered plants. Approximately 27 percent of the proposed critical habitat on Lanai, including portions of proposed unit D, are zoned Agriculture. Although the Service's economic analysis did not find it likely, the landowner and other commenters nevertheless believe that there is a risk that the critical habitat designation will result in the rezoning of lands, that State and county permits will contain additional requirements and expense for protection of lands designated as critical habitat, and that there is an increased risk of third-party litigation. We believe that the landowner's concerns over these potential negative impacts would affect its voluntary conservation efforts, which we believe are necessary to conserve these species.

As described earlier, Castle and Cooke Resorts, LLC, has a history of entering into conservation agreements with various Federal and State agencies and nongovernmental organizations on important portions of their lands. These arrangements have taken a variety of forms. They include partnership commitments such as the Awehi Gulch Partners for Fish and Wildlife project, Puhielelu Exclosure (funded through section 6 of the Act), Lanai Summit Fence project in concert with NRCS and the Service, Lanai Snail Fence, Lanai Forest Stewardship Project, Lanai Forest and Watershed Partnership, and the Kanepuu Preserve (perpetual easement to TNCH).

Thus, we believe it is essential for the recovery of these 28 species to build on the previous voluntary conservation efforts. Because the Federal government owns no land on Lanai, and because large tracts of land suitable for conservation of threatened and endangered species are owned by one private landowner, successful recovery of listed species on Lanai is especially dependent upon working partnerships and the voluntary cooperation of this landowner. Without additional voluntary conservation efforts for these 28 species, recovery will not occur.

(3) *The 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, we have determined that the benefits of

excluding proposed unit Lanai D as critical habitat outweigh the benefits of including it as critical habitat for *Abutilon eremitopetalum*, *Adenophorus periens*, *Bonamia menziesii*, *Brighamia rockii*, *Centaurium sebaeoides*, *Cenchrus agrimonioides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiensis*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahliana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyriformium*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Neraudia sericea*, *Solanum incompletum*, *Spermolepis hawaiiense*, *Tetramolopium remyi*, *Vigna o-wahuensis*, and *Viola lanaiensis*.

This conclusion is based on the following factors:

1. Large portions of proposed unit D (Lanaihale area) are currently being managed under the Lanai Forest and Watershed Partnership by the landowner on a voluntary basis in cooperation with us and the State of Hawaii to achieve important conservation goals. Building on this partnership approach, Castle and Cooke Resorts, LLC, has entered into a long-term agreement with the Service to manage the area within proposed unit D and adjacent areas for conservation. In the past, Castle and Cooke Resorts, LLC, has cooperated with us, the State, and other organizations to implement voluntary conservation activities on their lands that have resulted in tangible conservation benefits.

2. Simple regulation of "harmful activities" is not sufficient to conserve these species. Landowner cooperation and support will be required to prevent the extinction and promote the recovery of all of the listed species on this island due to the need to implement proactive conservation actions such as ungulate management, weed control, fire suppression, and plant propagation. This need for landowner cooperation is especially acute because the proposed unit Lanai D is unoccupied by eleven of the 28 species. Future conservation efforts, such as translocation of these eleven plant species back into unoccupied habitat on the island, will require the cooperation of Castle and Cooke Resorts, LLC.

3. Excluding proposed unit Lanai D will foster participation in ongoing and future voluntary conservation efforts on the island. We believe the memorandum of agreement with Castle and Cooke Resorts, LLC, documents this

commitment to voluntary conservation efforts on their lands on Lanai. This cooperation is essential to the conservation of the species.

4. Given the current watershed partnership and recent conservation agreements between the Service and the landowner, the Service believes the overall regulatory and educational benefits of including this unit as critical habitat are relatively small in comparison. The designation of critical habitat can serve to educate the general public as well as conservation organizations regarding the potential conservation value of an area, but this goal will be effectively accomplished through the identification of this area in the management agreements described above. Likewise, there will be little Federal regulatory benefit to the species because, as described in the economic analysis and in this rule, there is a low likelihood that this proposed critical habitat unit will be negatively affected to any significant degree by Federal activities requiring section 7 consultation. The Service is unable to identify any other potential benefits associated with critical habitat for this proposed unit.

In conclusion, we find that the net benefits of excluding proposed unit Lanai D from critical habitat for these species outweigh the benefits of including it. As described above, the overall benefits to these species of a critical habitat designation for this unit are relatively small. We conclude there is a higher likelihood of beneficial conservation activities occurring on this portion of Lanai without designated critical habitat than there would be with designated critical habitat in this location. We reached this conclusion because active management is integral to the recovery of these species, which are found almost entirely on private land. The landowner is more likely to continue and increase their ongoing voluntary conservation efforts on the island if this area is not designated as critical habitat.

(4) *Exclusion of This Unit Will Not Cause Extinction of the Species*

In considering whether or not exclusion of proposed unit D might result in the extinction of any of these 28 species, the Service first considered the impacts to the seven species endemic to Lanai (*Abutilon eremitopetalum*, *Cyanea macrostegia* ssp. *gibsonii*, *Gahnia lanaiensis*, *Hedyotis schlechtendahliana* var. *remyi*, *Labordia tinifolia* var. *lanaiensis*, *Phyllostegia glabra* var. *lanaiensis*, and *Viola lanaiensis*), and second to the 21

species known from Lanai and one or more other Hawaiian islands.

For both the seven endemic and the 21 “multi-island” species, it is the Service’s conclusion that the conservation agreement developed by Castle and Cooke Resorts, LLC, and agreed to by the Service will provide more net conservation benefits than would be provided by designating proposed unit D as critical habitat. This agreement, which is described above, will provide tangible proactive conservation benefits that will reduce the likelihood of extinction for all Lanai’s listed plants and increase their likelihood of recovery. We believe that extinction of any these species as a consequence of this exclusion is unlikely because there are no known threats in proposed unit D due to any current or reasonably anticipated Federal actions that might be regulated under section 7 of the Act.

Implementation of the conservation agreement between the landowner and the Service, and the exclusion of proposed unit D, has the highest likelihood of preventing extinction of these species, especially the species endemic to the island of Lanai.

In addition, critical habitat is being designated on another area of Lanai for one species (Unit 1—*Tetramolopium remyi*), and critical habitat has been proposed and is likely to be designated on other islands for the remaining 20 multi-island species consistent with the guidance in recovery plans. These other designations identify conservation areas for the maintenance and expansion of the existing populations.

In sum, the above analysis indicates there is a much greater likelihood of the landowner undertaking conservation actions on Lanai to prevent extinction without the proposed unit Lanai D being designated as critical habitat. Therefore, the exclusion of the proposed unit Lanai D will not cause extinction and should in fact improve the chances of recovery for *Abutilon eremitopetalum*, *Adenophorus periens*, *Bonamia menziesii*, *Brighamia rockii*, *Centaureum sebaeoides*, *Cenchrus agrimonoides*, *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, *Cyanea macrostegia* ssp. *gibsonii*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiensis*, *Gahnia lanaiensis*, *Hedyotis mannii*, *Hedyotis schlechtendahlana* var. *remyi*, *Hesperomannia arborescens*, *Hibiscus brackenridgei*, *Isodendron pyriformis*, *Labordia tinifolia* var. *lanaiensis*, *Melicope munroi*, *Neraudia sericea*, *Solanum incompletum*, *Spermolepis hawaiiense*, *Tetramolopium remyi*,

Vigna o-wahuensis, and *Viola lanaiensis*.

Taxonomic Changes

At the time we listed *Cyanea grimesiana* ssp. *grimesiana* and *Cyanea lobata*, we followed the taxonomic treatments in Wagner *et al.* (1990), the widely used and accepted *Manual of the Flowering Plants of Hawaii*. Subsequent to the final listing, we became aware of new taxonomic treatments of these species. Also, the soon-to-be-published book *Hawaii’s Ferns and Fern Allies* (Palmer, in press) has changed the family name for *Ctenitis squamigera* from Aspleniaceae to Dryopteridaceae. Due to the court-ordered deadlines, we are required to publish this final rule to designate critical habitat on Lanai before we can prepare and publish a notice of taxonomic changes for these three species. We plan to publish a taxonomic change notice for these three species after we have published the final critical habitat designations on Lanai.

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, the Office of Management and Budget (OMB) has determined that this is a significant regulatory action because it may raise novel legal or policy issues. As required by the executive order, we have provided a copy of the rule, which describes the need, for this action and how designation meets that need and the economic analysis, which assesses the costs and benefits of this critical habitat designation, to OMB for review. OMB did not recommend or make any changes in this regulatory action.

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

Under the Regulatory Flexibility Act (RFA)(5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to 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 (*i.e.*, small businesses, small organizations, and small governmental jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.

SBREFA amended the RFA to require Federal agencies to provide a certification statement with the factual basis for certifying that the rule will not

have a significant economic effect on a substantial number of small entities.

As discussed in our Draft Economic Analysis, we are certifying that the critical habitat designation for the three Lanai species will not have a significant effect on a substantial number of small entities because the lands designated as critical habitat are owned solely by one landowner, Castle and Cooke Resorts, LCC, which is not a small entity as defined by RFA, as amended by the SBREFA. The following discussion explains our rationale.

The regulatory flexibility analysis determines whether this critical habitat designation potentially affects a “substantial number” of small entities in counties supporting critical habitat areas. It also quantifies the probable number of small businesses likely to experience a “significant effect.” While SBREFA does not explicitly define either “substantial number” or “significant effect,” the Environmental Protection Agency and other Federal agencies have interpreted these terms to represent an impact on 20 percent or more of the small entities in any industry and an effect equal or greater than three percent or more of a business’ annual revenues. In both tests, this analysis conservatively examines the total estimated section 7 costs calculated in the Draft Economic Analysis, including those impacts that may be “attributable co-extensively” with the listing of the species.

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, Maui County is not a small governmental jurisdiction because its population was 128,100 in 2000. Although certain State agencies, such as DLNR, may be affected by the proposed critical habitat designation, State governments are considered independent sovereigns, not small governments, for the purposes of the RFA.

No primary projects or activities that might be affected by the proposed critical habitat are expected to affect small businesses. Castle and Cooke Resorts, LLC, the sole owner of the lands on which critical habitat is designated, may be adversely affected by a decrease in property values. However, this is a company that received over \$13.5 million in net income in 1999 (Lynch, February 7, 2000). It is therefore not considered to be a small business. Thus, the proposed critical habitat designation is not likely to affect small businesses on Lanai.

Our Draft Economic Analysis does mention that some small businesses may be adversely affected if, in the unlikely event that the Department of Land and Natural Resources builds fences around the critical habitat, some businesses that cater to the hunting community may be adversely affected. However, courts have indicated that an RFA/SBREFEA analysis is properly limited to the impacts on entities directly regulated by the regulation. *American Trucking Ass'ns v. U.S. Env'tl. Protection Agency*, 178 F.3d 1027, 1045 (D.C. Cir. 1999); *Mid-Tex Elec. Corp. v. Federal Energy Regulatory Comm'n*, 88 F.3d 1105, 1170 (D.C. Cir. 1996). In this instance, that would mean that the RFA/SBREFEA analysis should consider impacts on entities subject to section 7 consultation requirements, not entities regulated indirectly because of affiliation or relationship to a directly regulated entity. Thus entities that are not directly regulated by the critical habitat designation, such as businesses that supply hunters on Lanai, are not considered in this analysis.

Since these three plant species were listed (between 1991 and 1994), there have been no formal section 7 consultations and only seven informal section 7 consultations on Lanai, in addition to consultations on Federal grants to State wildlife programs. None of these consultations affected small entities. Two informal consultations were conducted on behalf of a private consulting firm, representing Maui Electric Company, who requested species lists for a proposed generating station at Miki Basin. None of the three species were reported from this area. Two informal consultations were conducted on behalf of the FAA for airport navigational or improvement projects. None of the three species were reported from the project areas. One informal consultation was conducted on behalf of the U.S. Department of the Navy regarding nighttime, low-altitude terrain flights and confined area landings over and on limited areas of northwestern Lanai by the Marine Corps. None of the three species were reported from the project area. One informal consultation was conducted on behalf of the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) for the construction of a wildlife exclusion fence and removal of nonnative ungulates from the enclosure, control of invasive nonnative plants within the enclosure, and outplanting of native plants in the Lanaihale watershed area. Two species, *Bidens micrantha* ssp. *kalealaha* and *Tetramolopium remyi*,

were reported from the project area. Funding for the project will be provided by NRCS, through their Wildlife Habitat Incentive Program, to Castle and Cooke Resorts, LLC. One informal consultation was conducted on behalf of the Service, for the effects of fencing and replanting of listed and endangered species within Awehi Gulch. None of the three species were reported from the Awehi Gulch project area. In addition, we are in the process of determining a project area in the Lanaihale watershed for fencing and restoration of native vegetation. Funding for the project will be provided by the Service to Castle and Cooke Resorts, LLC, in partnership with the State DLNR. Only one of the three species (*Tetramolopium remyi*) is reported from the project area.

We have determined that Maui Electric Company is not a small entity because it is not an independent non-profit organization, small governmental jurisdiction, or a small business. The FAA, U.S. Department of the Navy, and NRCS are not small entities. The informal consultations on the Lanaihale watershed area project and the Awehi Gulch project indirectly affected or concerned the major landowner on Lanai, Castle and Cooke Resorts, LLC. As stated above, we have determined that Castle and Cooke Resorts, LLC, is not a small entity because it is not a small retail and service business with less than \$5 million in annual sales nor is it a small agricultural business with annual sales less than \$750,000. We concurred with the NRCS's determination that the Lanaihale watershed area project, as proposed, was not likely to adversely affect listed species. At this time, the Lanaihale watershed area projects are ongoing. Therefore, the requirement to reinstate consultation for ongoing projects will not affect a substantial number of small entities on Lanai.

In areas where the species is clearly not present, designation of critical habitat could trigger additional review of Federal activities under section 7, that would otherwise not be required. However, there will be little additional impact on State and local governments and their activities because two of the proposed critical habitat areas are occupied by at least one species. Other than the federally funded habitat restoration projects in the Lanaihale watershed area, we are aware of relatively few activities in the designated critical habitat areas for these three plants that have Federal involvement and thus would require consultation for ongoing projects. As mentioned above, we have conducted only seven informal consultations under

section 7 on Lanai to date, and only one consultation involved any of the three species. As a result, we cannot easily identify future consultations that may be due to the listing of the species or the increment of additional consultations that may be required by this critical habitat designation. Therefore, for the purposes of this review and certification under the Regulatory Flexibility Act, we are assuming that any future consultations in the area proposed as critical habitat will be due to the critical habitat designations.

On Lanai, all of the designations are on private land under one landowner. Nearly all of the land within the critical habitat units is unsuitable for development, land uses, and activities. This is due to the units remote locations, lack of access, and rugged terrain. The majority of this land is within the State Conservation District, where State land-use controls severely limit development and most activities. Approximately 46 percent of this land is within the State Agricultural District, and less than one percent is within the State Rural District. On non-Federal lands, activities that lack Federal involvement would not be affected by the critical habitat designations. However, activities of an economic nature that are likely to occur on non-Federal lands in the area encompassed by these designations consist of improvements in communications and tracking facilities; ranching; road improvements; recreational use, such as hiking, camping, picnicking, game hunting, and fishing; botanical gardens; and crop farming. With the exception of communications and tracking facilities improvements by the FAA or the Federal Communications Commission, these activities are unlikely to have Federal involvement. On lands that are in agricultural production, the types of activities that might trigger a consultation include irrigation ditch system projects that may require section 404 authorizations from the Corps and watershed management and restoration projects sponsored by NRCS. However the NRCS restoration projects typically are voluntary, and the irrigation ditch system projects within lands that are in agricultural production are rare, and would likely affect only the major landowner on the island (who is not a small entity), within these critical habitat designations.

Lands that are within the State Rural District are primarily located within undeveloped coastal areas. The types of activities that might trigger a consultation include shoreline restoration or modification projects that may require section 404 authorizations

from the Corps or FEMA, housing or resort development that may require permits from the Department of Housing and Urban Development, small farms that may receive funding or require authorizations from the Department of Agriculture, watershed management and restoration projects sponsored by NRCS, and activities funded or authorized by the EPA. However, we are not aware of a significant number of future activities that would require Federal funds, permits, or authorizations in these coastal areas.

Even where the requirements of section 7 might apply due to critical habitat, based on our experience with section 7 consultations for all listed species, virtually all projects—including those that, in their initial proposed form, would result in jeopardy or adverse modification determinations under section 7—can be implemented successfully with, at most, the adoption of reasonable and prudent alternatives. These measures, by definition, must be economically feasible and within the scope of authority of the Federal agency involved in the consultation. As we have a very limited consultation history for these three species from Lanai, we can describe only the general kinds of actions that may be identified in future reasonable and prudent alternatives. These are based on our understanding of the needs of these species and the threats they face, especially as described in the final listing rules and in this critical habitat designation, as well as our experience with similar listed plants in Hawaii. In addition, all of these species are protected under the State of Hawaii's Endangered Species Act (Hawaii Revised Statutes, Chap. 195D–4). Therefore, we have also considered the kinds of actions required under the State licensing process for these species. The kinds of actions that may be included in future reasonable and prudent alternatives include conservation set-asides; management of competing non-native species; restoration of degraded habitat; propagation; outplanting and augmentation of existing populations; construction of protective fencing; and periodic monitoring. These measures are not likely to result in a significant economic impact to a substantial number of small entities because any measure included as a reasonable and prudent alternative would have to be economically feasible to the individual landowner and because, as discussed above, we do not believe there will be a substantial number of small entities affected by the Act's consultation requirements.

In summary, we have determined that, because all of the critical habitat designations are on lands under one landownership and because that landowner is not a small entity, this rule would not affect a substantial number of small entities and would not result in a significant economic effect on a substantial number of small entities. Most of this private land within the areas being designated as critical habitat is currently being used for recreational or conservation purposes, and therefore is not likely to require any Federal authorization. In the remaining areas, Federal involvement—and thus section 7 consultations, the only trigger for economic impact under this rule—would be limited to a subset of the area being designated. The most likely future section 7 consultations resulting from this rule would be for informal consultations on federally funded land and water conservation projects, species-specific surveys and research projects, and watershed management and restoration projects sponsored by NRCS and the Service. These consultations would likely occur on only a subset of the total number of parcels, all under one ownership, and, therefore, would not affect a substantial number of small entities. This rule would result in project modifications only when proposed Federal activities would destroy or adversely modify critical habitat. While this may occur, it is not expected frequently enough to affect the single landowner. Even when it does occur, we do not expect it to result in a significant economic impact, as the measures included in reasonable and prudent alternatives must be economically feasible and consistent with the proposed action. Therefore, we are certifying that the designation of critical habitat for *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi* will not have a significant economic impact on a substantial number of small entities. Therefore, a regulatory flexibility analysis is not required.

Small Business Regulatory Enforcement Fairness Act (5 U.S.C. 804(2))

In the economic analysis, we determined whether designation of critical habitat would cause: (a) Any effect on the economy of \$100 million or more, (b) any increases in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions, or (c) any significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S.-based enterprises to compete with foreign-based enterprises.

Refer to the final addendum to the economic analysis for a discussion of the effects of this determination.

Executive Order 13211

On May 18, 2001, the President issued Executive Order 13211, on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. Although this rule is a significant regulatory action under Executive Order 12866, it is not expected to significantly affect energy production supply and distribution facilities. No energy production, supply, and distribution facilities are included within designated critical habitat. Further, for the reasons described in the economic analysis, we do not believe the designation of critical habitat for *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi* on Lanai will affect future energy production. Therefore, this action is not a significant energy action and no Statement of Energy Effects is required.

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

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.):

(a) This rule will not “significantly or uniquely” affect small governments. A Small Government Agency Plan is not required. Small governments will not be affected unless they propose an action requiring Federal funds, permits, or other authorizations. Any such activities will require that the Federal agency ensure that the action will not adversely modify or destroy designated critical habitat.

(b) This rule will not produce a Federal mandate on State or local governments or the private sector of \$100 million or greater in any year; that is, it is not a “significant regulatory action” under the Unfunded Mandates Reform Act. The designation of critical habitat imposes no obligations on State or local governments.

Takings

In accordance with Executive Order 12630 (“Government Actions and Interference with Constitutionally Protected Private Property Rights”), we have analyzed the potential takings implications of designating critical habitat for the three species from Lanai in a takings implication assessment. The takings implications assessment concludes that this final rule does not pose significant takings implications.

Federalism

In accordance with Executive Order 13132, this final rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of Interior policy, we requested information from appropriate State agencies in Hawaii. The designation of critical habitat in the two areas currently occupied by one or more of the three plant species imposes no additional restrictions beyond those currently in place; and, therefore, has little incremental impact on State and local governments and their activities. The designation of critical habitat in the remaining four unoccupied areas may require section 7 consultation on non-Federal lands (where a Federal nexus occurs) that might otherwise not have occurred. In these cases, the most likely scenario would be section 7 consultation on Federal funding for State game management programs. However, of the four unoccupied areas, only the Lanai 1—*Tetramolopium remyi* unit falls within a State Game Management Area (GMA), and the area in which the recently extirpated *Tetramolopium remyi* population occurred within the unit has already been fenced by the State for protection against damage by ungulates. Therefore, there will be little additional impact on State and local governments and their activities as a result of the designation of critical habitat in currently unoccupied areas on Lanai.

The designations may have some benefit to these governments, in that the areas essential to the conservation of these species are more clearly defined and the primary constituent elements of the habitat necessary to the survival of the species are specifically identified. While this definition and identification does not alter where and what federally sponsored activities may occur, it may assist these local governments in long-range planning, rather than waiting for case-by-case section 7 consultations to occur.

Civil Justice Reform

In accordance with Executive Order 12988, the Department of the Interior's Office of the Solicitor has determined that this rule does not unduly burden the judicial system and does meet the requirements of sections 3(a) and 3(b)(2) of the Order. We have designated critical habitat in accordance with the provisions of the Endangered Species Act. The rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs of the three plant species from Lanai.

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

This rule does not contain any information collection requirements that require OMB approval under the Paperwork Reduction Act. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number.

National Environmental Policy Act

We have determined that we do not need to prepare an Environmental Assessment and/or an Environmental Impact Statement as defined by the National Environmental Policy Act of 1969 in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act. We published a notice outlining our reason for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This determination does not constitute a major Federal action significantly affecting the quality of the human environment.

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) Executive Order 13175 and the Department of the Interior's manual at 512 DM 2, we

readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. We have determined that there are no Tribal lands essential for the conservation of these three plant species. Therefore, designation of critical habitat for these three species does not involve any Tribal lands.

References Cited

A complete list of all references cited in this final rule is available upon request from the Pacific Islands Fish and Wildlife Office (see **ADDRESSES** section).

Authors

The primary authors of this final rule are the staff of the Pacific Islands Fish and Wildlife Office (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

Accordingly, we hereby 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 § 17.12(h) by revising the entries for *Bidens micrantha* ssp. *kalealaha*, *Portulaca sclerocarpa*, and *Tetramolopium remyi* under "FLOWERING PLANTS" to read as follows:

§ 17.12 Endangered and threatened plants.
 * * * * *
 (h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
FLOWERING PLANTS							
* <i>Bidens micrantha</i> ssp. <i>kalealaha</i> .	* Kookoolau	* U.S.A. (HI)	* Asteraceae	* E	* 467	* 17.96(b)	* NA
* <i>Portulaca sclerocarpa</i> .	* Poe	* U.S.A. (HI)	* Portulacaceae	* E	* 532	* 17.96(b)	* NA

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
* <i>Tetramolopium remyi</i>	* None	* U.S.A. (HI)	* Asteraceae	* E	* 435	* 17.96(b)	* NA
*	*	*	*	*	*	*	*

3. Amend § 17.96 by adding a new paragraph (b) to read as follows:

§ 17.96 Critical habitat—plants.

* * * * *

(b) Critical habitat; plants on the island of Lanai, Hawaii.

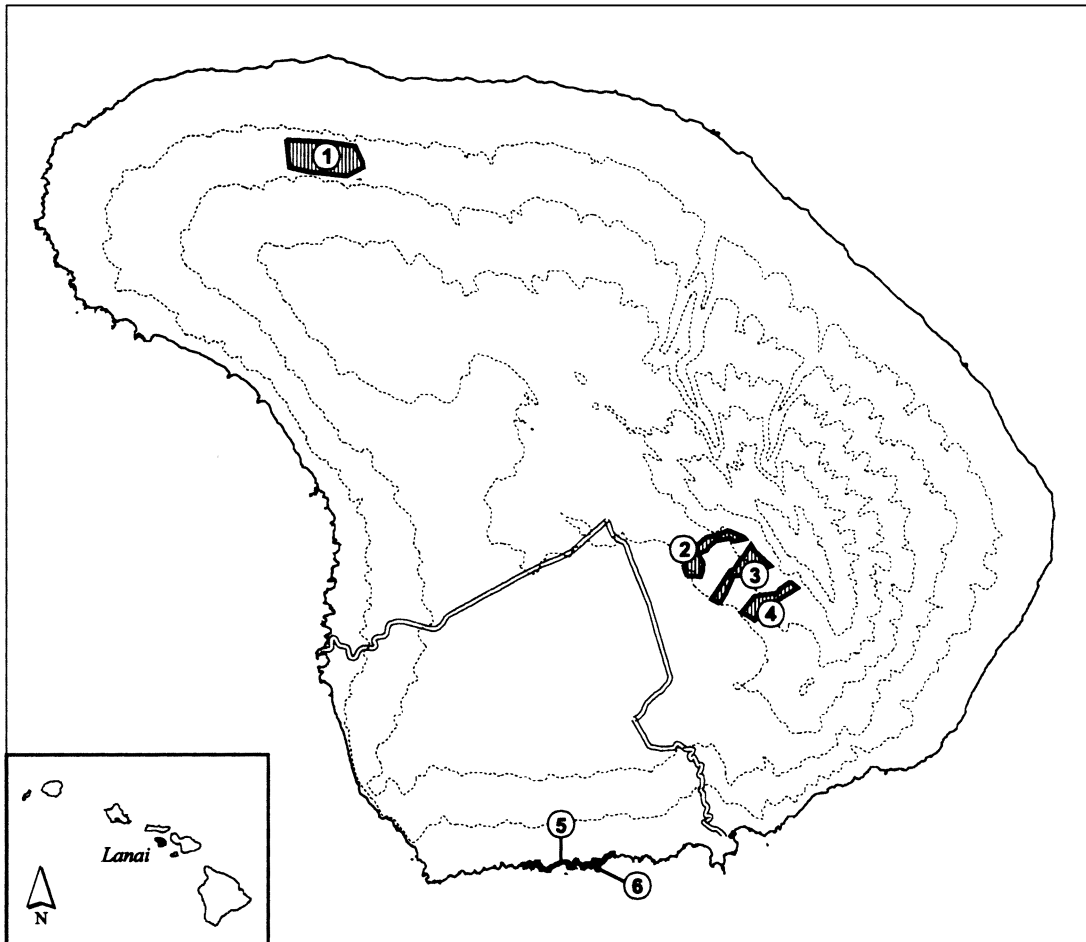
(1) *Maps and critical habitat unit descriptions.* The following paragraphs contain the legal descriptions of the critical habitat units designated for the island of Lanai, Hawaii. Existing manmade features and structures within

proposed areas, such as buildings, roads, aqueducts, reservoirs, diversions, flumes, telecommunications equipment, telemetry antennas, radars, missile launch sites, arboreta and gardens, heiau (indigenous places of worship or shrines), airports, other paved areas, lawns, other rural residential landscaped areas, electrical transmission and distribution, and communication facilities and regularly maintained associated rights-of way and access ways do not contain one or more

of the primary constituent elements described for each species in paragraph (b)(2) of this section and therefore, are not included in the critical habitat designations. Critical habitat units are described below. Coordinates in UTM Zone 4 with units in meters using North American Datum of 1983 (NAD83). The following map shows the general locations of the six critical habitat units designated on the island of Lanai.

(i) **Note:** Map 1—Index map follows:

BILLING CODE 4310-55-P




Map 1
Lanai Final Critical Habitat - Island Index Map

 Final Lanai Critical Habitat Unit

 Major Roads

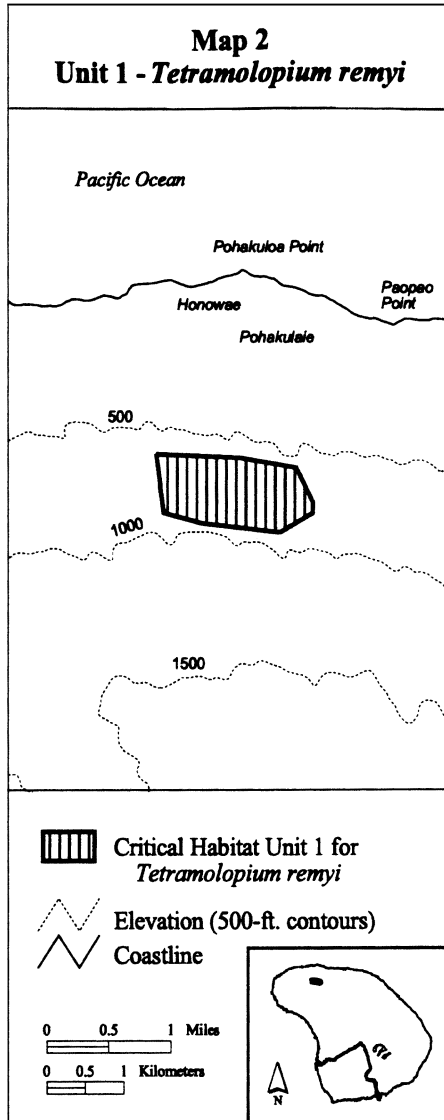
 Coastline

 Elevation (500-ft. contours)

(ii) Lanai 1—*Tetramolopium remyi* (151 ha; 373 ac).

(A) Unit consists of the following nine boundary points: 708156, 2313405; 709229, 2313365; 709970, 2313244; 710178, 2312821; 710182, 2312686; 709754, 2312448; 708741, 2312566; 708241, 2312691; 708156, 2313405.

(B) Note: Map 2 follows:

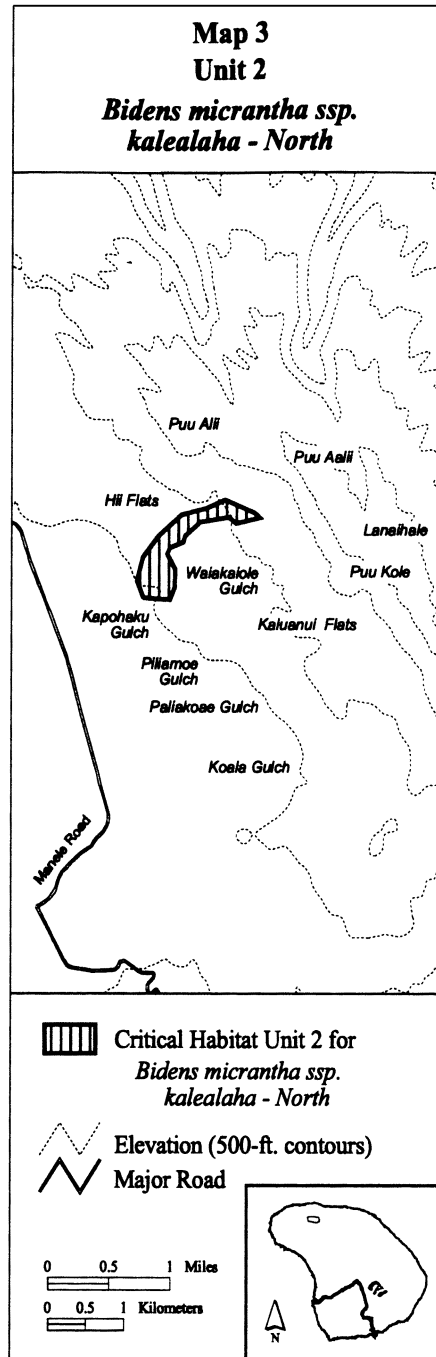


(iii) Lanai 2—*Bidens micrantha* ssp. *kalealaha*—North (53 ha; 131 ac)

(A) Unit consists of the following 20 boundary points: 718727, 2301883; 718642, 2302092; 718720, 2302377; 718928, 2302637; 719228, 2302896; 719550, 2302974; 719799, 2303078; 720193, 2302917; 720260, 2302858; 719948, 2302788; 719846, 2302865; 719474, 2302802; 719277, 2302635; 719253, 2302561; 719078, 2302494; 719042, 2302419; 719144, 2302231;

719136, 2302009; 719078, 2301859; 718727, 2301883.

(B) Note: Map 3 follows:

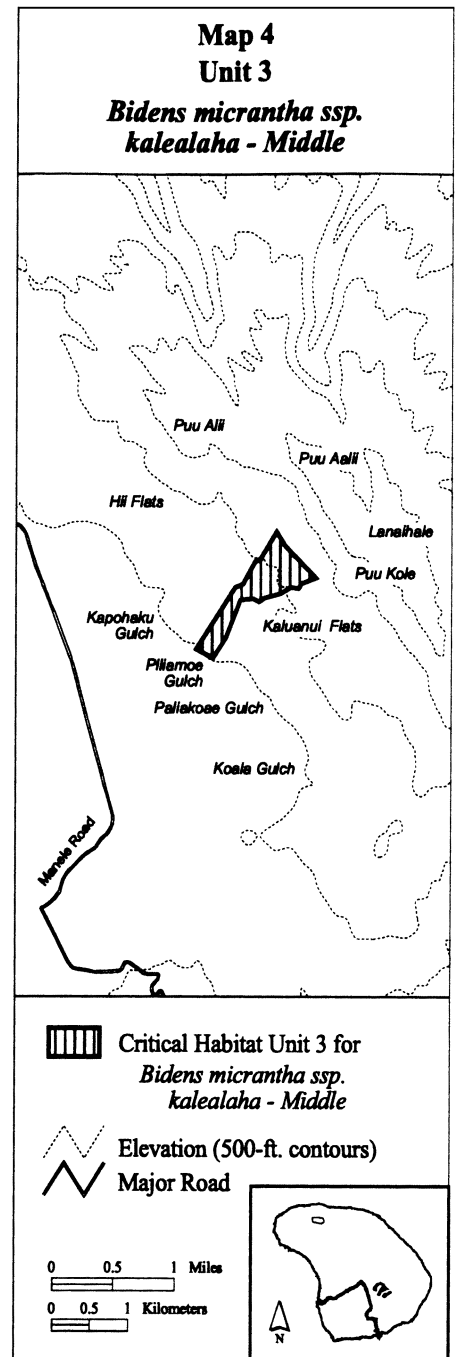


(iv) Lanai 3—*Bidens micrantha* ssp. *kalealaha*—Middle (60 ha; 148 ac)

(A) Unit consists of the following 19 boundary points: 719582, 2301162; 719361, 2301274; 719868, 2302031; 719968, 2302070; 720134, 2302344; 720198, 2302369; 720411, 2302710; 720524, 2302530; 720931, 2302147; 720741, 2302073; 720699, 2302012; 720600, 2302026; 720464, 2301954; 720259, 2301901; 720187, 2301857;

720106, 2301890; 719937, 2301876; 719749, 2301413; 719582, 2301162.

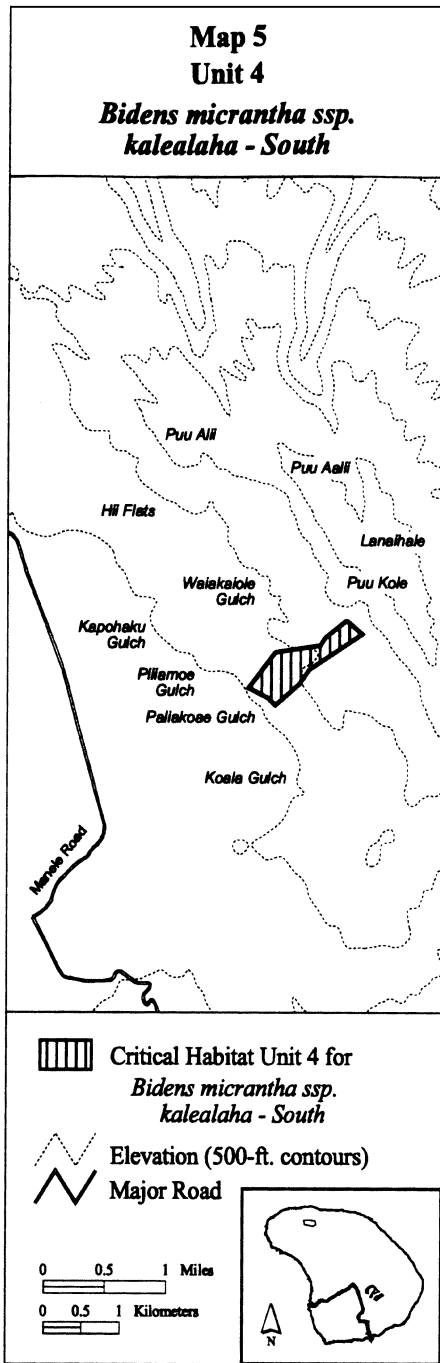
(B) Note: Map 4 follows:



(v) Lanai 4—*Bidens micrantha* ssp. *kalealaha*—South (48 ha; 118 ac)

(A) Unit consists of the following 11 boundary points: 721438, 2301740; 721647, 2301574; 720952, 2301142; 720824, 2300969; 720507, 2300707; 720411, 2300796; 720164, 2300917; 720513, 2301353; 721094, 2301439; 721161, 2301532; 721438, 2301740.

(B) Note: Map 5 follows:

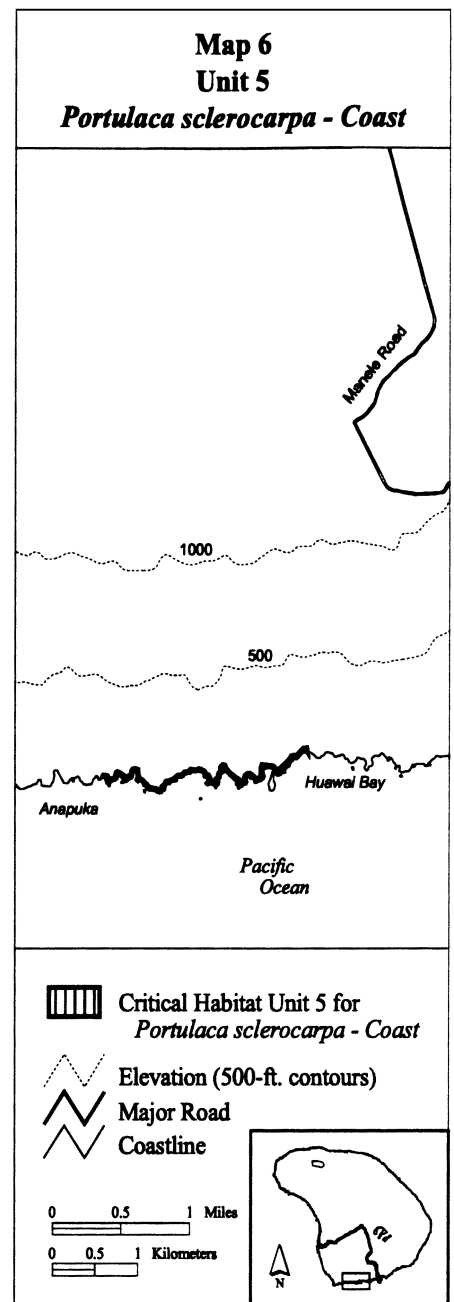


(vi) Lanai 5—*Portulaca sclerocarpa*—Coast (7 ha; 17 ac).

(A) Area consists of the following 109 boundary points and the intermediate

coastline: 716811, 2294534; 714416, 2294262; 714411, 2294277; 714422, 2294291; 714456, 2294290; 714473, 2294280; 714478, 2294247; 714484, 2294226; 714558, 2294267; 714568, 2294317; 714590, 2294331; 714662, 2294292; 714689, 2294248; 714719, 2294280; 714735, 2294279; 714745, 2294295; 714745, 2294323; 714766, 2294357; 714795, 2294361; 714829, 2294349; 714833, 2294329; 714834, 2294305; 714838, 2294281; 714832, 2294257; 714855, 2294254; 714880, 2294241; 714901, 2294221; 714907, 2294204; 714937, 2294195; 714949, 2294166; 714960, 2294158; 714995, 2294154; 715038, 2294145; 715070, 2294126; 715089, 2294125; 715107, 2294172; 715130, 2294182; 715151, 2294225; 715167, 2294229; 715188, 2294229; 715221, 2294240; 715245, 2294248; 715267, 2294269; 715290, 2294289; 715314, 2294291; 715335, 2294295; 715357, 2294305; 715377, 2294327; 715415, 2294331; 715439, 2294357; 715477, 2294353; 715496, 2294344; 715533, 2294357; 715564, 2294356; 715580, 2294347; 715605, 2294340; 715615, 2294316; 715619, 2294292; 715644, 2294298; 715659, 2294286; 715669, 2294259; 715670, 2294239; 715660, 2294219; 715671, 2294213; 715692, 2294216; 715715, 2294212; 715735, 2294242; 715758, 2294268; 715763, 2294284; 715770, 2294312; 715799, 2294336; 715787, 2294371; 715800, 2294392; 715821, 2294402; 715849, 2294396; 715860, 2294364; 715893, 2294324; 715983, 2294259; 716003, 2294252; 716014, 2294216; 716064, 2294227; 716070, 2294286; 716106, 2294307; 716142, 2294307; 716174, 2294283; 716210, 2294248; 716239, 2294258; 716264, 2294284; 716262, 2294373; 716275, 2294406; 716412, 2294390; 716458, 2294326; 716484, 2294363; 716529, 2294395; 716585, 2294452; 716619, 2294499; 716658, 2294508; 716683, 2294499; 716719, 2294550; 716756, 2294581; 716802, 2294587; 716811, 2294534.

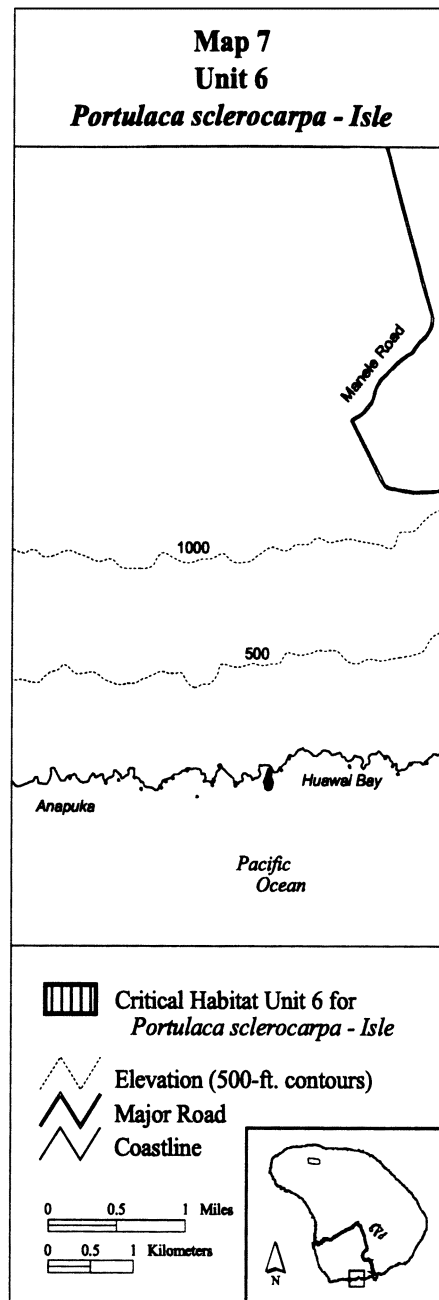
(B) Note: Map 6 follows:



(vii) Lanai 6—*Portulaca sclerocarpa*—Isle (1 ha; 2 ac)

(A) Area consists of the entire offshore island located at approximately: 716391, 2294222.

(B) Note: Map 7 follows:



(VIII) PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR LANAI

Unit name	Species occupied	Species unoccupied
Lanai 1— <i>Tetramolopium remyi</i> .....	.....	<i>Tetramolopium remyi</i> .
Lanai 2— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —North .....	.....	<i>Bidens micrantha</i> ssp. <i>kalealaha</i> .
Lanai 3— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —Middle	<i>Bidens micrantha</i> ssp. <i>kalealaha</i>.	.....
Lanai 4— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —South .....	.....	<i>Bidens micrantha</i> ssp. <i>kalealaha</i> .
Lanai 5— <i>Portulaca sclerocarpa</i> —Coast .....	.....	<i>Portulaca sclerocarpa</i> .
Lanai 6— <i>Portulaca sclerocarpa</i> —Isle	<i>Portulaca sclerocarpa</i>.	.....

(2) Hawaiian plants—Constituent elements; Flowering plants.

Family Asteraceae: *Bidens micrantha* ssp. *kalealaha* (kookoolau)

Lanai 2—*Bidens micrantha* ssp. *kalealaha*—North, Lanai 3—*Bidens micrantha* ssp. *kalealaha*—Middle, and Lanai 4—*Bidens micrantha* ssp.

kalealaha—South, identified in the legal descriptions in (b)(1)(iii), (b)(1)(iv), and (b)(1)(v) of this section, constitute critical habitat for *Bidens micrantha* ssp. *kalealaha* on Lanai. Within these units, the currently known primary

constituent elements of critical habitat include, but are not limited to, the habitat components provided by:

- (i) Gulch slopes in dry *Dodonaea viscosa* shrubland; and
- (ii) Elevations between 409 and 691 m (1,342 and 2,267 ft).

Family Asteraceae: *Tetramolopium remyi* (NCN)

Lanai 1—*Tetramolopium remyi*, identified in the legal descriptions in (b)(1)(ii) of this section, constitutes critical habitat for *Tetramolopium remyi* on Lanai. Within this unit, the currently known primary constituent elements of critical habitat include, but are not

limited to, the habitat components provided by:

- (i) Red, sandy, loam soil in dry *Dodonaea viscosa*-*Heteropogon contortus* communities with one or more of the following associated native species: *Bidens mauiensis*, *Waltheria indica*, *Wikstroemia oahuensis*, or *Melanthera lavarum*; and
- (ii) Elevations between 90 and 481 m (295 and 1,578 ft).

Family Portulacaceae: *Portulaca sclerocarpa* (poe)

Lanai 5—*Portulaca sclerocarpa*—Coast and Lanai 6—*Portulaca sclerocarpa*—Isle, identified in the legal descriptions in (b)(1)(vi) and (b)(1)(vii)

of this section, constitute critical habitat for *Portulaca sclerocarpa* on Lanai.

Within these units, the currently known primary constituent elements of critical habitat include, but are not limited to, the habitat components provided by:

- (i) Exposed ledges in thin soil in coastal communities; and
- (ii) Elevations between 0 and 30 m (0 and 98 ft).

Dated: December 27, 2002.

David P. Smith,

Acting Assistant Secretary of Fish and Wildlife and Parks.

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