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50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Final Designations and Nondesignations of Critical Habitat for 42 Plant Species From the Island of Molokai, Hawaii; Final Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AH08

Endangered and Threatened Wildlife and Plants; Final Designations and Nondesignations of Critical Habitat for 42 Plant Species From the Island of Molokai, HI

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 41 of 51 listed species known historically from the Hawaiian island of Molokai. A total of approximately 9,843 hectares (24,333 acres) of land on Molokai fall within the boundaries of the 88 critical habitat units designated for these 41 species. This critical habitat designation requires the Service to consult 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. This rule also determines that designating critical habitat would not be prudent for one species, *Pritchardia munroi.* 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 April 17, 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 List of Endangered and Threatened Plants (50 CFR 17.12), there are 51 plant species that, at the time of listing, were reported from the island of Molokai (Table 1).

TABLE 1.—SUMMARY OF ISLAND DISTRIBUTION OF 51 SPECIES FROM MOLOKAI

Species (common name)	Island distribution						
	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	N.W. Isles, Kahoolawe, Niihau
Adenophorus periens (pendant kihi fern)	C	H	C	R	R	C	
Alectryon macrococcus (mahoe)	C	C	C	.....	C	.....	
Bidens wiebkei (kookoolau)	.....	.....	C	.....	.....	.....	
Bonamia menziesii (No common name)	C	C	H	C	C	C	
Brighamia rockii (pua ala)	.....	.....	C	H	H	.....	
Canavalia molokaiensis (awikiwiki)	.....	.....	C	.....	.....	.....	
Centaurium sebaeoides (awiwi)	C	C	C	C	C	.....	
Clermontia oblongifolia ssp. *brevipes* (oha wai)	.....	.....	C	.....	.....	.....	
Ctenitis squamigera (pauoa)	H	C	C	C	C	H	
Cyanea dunbarii (haha)	.....	.....	C	.....	.....	.....	
Cyanea grimesiana ssp. *grimesiana* (haha)	.....	C	C	C	C	.....	
Cyanea mannii (haha)	.....	.....	C	.....	.....	.....	
Cyanea procera (haha)	.....	.....	C	.....	.....	.....	
Cyperus trachysanthos (puukaa)	C	C	H	H	.....	.....	Ni (C)
Diellia erecta (asplenium-leaved diellia)	C	C	C	H	C	C	
Diplazium molokaiense (No common name)	H	H	H	H	C	.....	
Eugenia koolauensis (nioi)	.....	C	H	.....	.....	.....	
Flueggea neowawraea (mehamehame)	C	C	H	.....	C	C	
Hedyotis mannii (pilo)	.....	.....	C	C	C	.....	
Hesperomannia arborescens (No common name).	.....	C	C	H	C	.....	
Hibiscus arnottianus ssp. *immaculatus* (kokio keokeo).	.....	.....	C	.....	.....	.....	
Hibiscus brackenridgei (mao hau hele)	H	C	H	C	C	C	Ka (R)
*Ischaemum byrone*Hilo ischaemum)	R	.....	C	.....	C	.....	
Isodendrion pyrifolium (wahine noho kula)	H	H	H	H	H	C	Ni (H)
Labordia triflora (kamakahala)	.....	.....	C	.....	.....	.....	
Lysimachia maxima (No common name)	.....	.....	C	.....	.....	.....	
Mariscus fauriei (No common name)	.....	.....	C	H	.....	C	
Marsilea villosa (ihi ihi)	.....	C	C	.....	.....	.....	Ni (H)
Melicope mucronulata (alani)	.....	.....	C	.....	C	.....	
Melicope munroi (alani)	.....	.....	H	C	.....	.....	
Melicope reflexa (alani)	.....	.....	C	.....	.....	.....	
Neraudia sericea (No common name)	.....	.....	C	H	C	.....	Ka (H)
Peucedanum sandwicense (makou)	C	C	C	.....	C	.....	
Phyllostegia mannii (No common name)	.....	.....	C	.....	H	.....	
Phyllostegia mollis (No common name)	.....	C	H	.....	C	.....	
Plantago princeps (laukahi kuahiwi)	C	C	C	.....	C	H	
Platanthera holochila (No common name)	C	H	C	.....	C	.....	
Pritchardia munroi (loulu)	.....	.....	C	.....	.....	.....	
Pteris lidgatei (No common name)	.....	C	H	.....	C	.....	
Schiedea lydgatei (No common name)	.....	.....	C	.....	.....	.....	

TABLE 1.—SUMMARY OF ISLAND DISTRIBUTION OF 51 SPECIES FROM MOLOKAI—Continued

Species (common name)	Island distribution						
	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	N.W. Isles, Kahoolawe, Niihau
Schiedea nuttallii (No common name)	C	C	C		R		
Schiedea sarmentosa (No common name)			C				
Sesbania, tomentosa (ohai)	C	C	C	H	C	C	Ni (H), Ka (C), NW Isles (C)
Silene alexandri (No common name)			H				
Silene lanceolata (No common name)	H	C	C	H		C	
Solanum incompletum (popolo ku mai)	H		H		H	H	C
Spermolepis hawaiiensis (No common name)	C	C	C	C	C	C	
Stenogyne bifida (No common name)			C				
Tetramolopium rockii (No common name)			C				
Vigna o-wahuensis (No common name)		H	C	C	C	C	Ni (H), Ka (C)
Zanthoxylum hawaiiense (ae)	C		C	H	C	C	

KEY: C (Current)—population last observed within the past 30 years. H (Historical)—population not seen for more than 30 years. R (Reported)—reported from undocumented observations.

Sixteen of these species are endemic to the island of Molokai, while 35 species are reported from Molokai and one or more other Hawaiian islands. Each of these species is described in more detail below in the section ''Discussion of Plant Taxa.'' Although we considered designating critical habitat on Molokai for each of the 51 plant species, for the reasons described below, the final designation includes critical habitat for 41 of 51 plant species. Species that also occur on other Hawaiian islands may have critical habitat designated on those other islands in subsequent rulemakings.

The Island of Molokai

The island of Molokai, the fifth largest in the Hawaiian Islands chain, is approximately 61 kilometers (km) (38 miles (mi)) long, up to 17 km (10 mi) wide, and encompasses an area of about 688 square (sq) km (266 sq mi). Three shield volcanoes make up most of the land mass of Molokai: West Molokai Mountain, East Molokai Mountain, and a volcano that formed Kalaupapa Peninsula.

The taller and larger East Molokai Mountain rises 1,813 meters (m) (4,970 feet (ft)) above sea level and comprises roughly 50 percent of the island's area. Topographically, the windward (north) side of East Molokai differs from the leeward (south) side. Precipitous cliffs line the windward coast and deep valleys dissect the coastal area. The annual rainfall on the windward side is 200 to over 375 centimeters (cm) (75 to over 150 inches (in)), distributed throughout the year. The soils are poorly drained and high in organic matter. The gulches and valleys are usually very steep, but sometimes gently sloping. Much of the native vegetation on windward East Molokai is intact because of its relative inaccessibility to humans and animals, although destructive ungulates have begun to enter the area in recent years.

Discussion of Plant Taxa

Species Endemic to Molokai

Bidens wiebkei (kookoolau)

Bidens wiebkei, a member of the aster family (Asteraceae), is a short-lived perennial herb, which is somewhat woody at the base and grows from 0.5 to 1 m (1.6 to 3.3 ft) tall with opposite, pinnately compound leaves. This plant is distinguished from other *Bidens* species that grow on Molokai by its erect habit and the curved or twisted, winged achenes (Ganders and Nagata 1999, 57 FR 46325).

This species has been observed in flower during May. Little else is known about the life history of *Bidens wiebkei.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown. (Hawaii Natural Heritage Program (HINHP) Database 2000, United States Fish and Wildlife Service (Service) 1996a).

Historically, *Bidens wiebkei* was known from Pelekunu and the easternmost section of Molokai at Halawa. It is found currently in Halawaiki Gulch, Lamaloa Gulch, and below Puu Kolekole on private lands. There are a total of 5 occurrences containing more than 200 individuals (Geographic Decision Systems International (GDSI) 2000, HINHP Database 2000).

The currently known populations of *Bidens wiebkei* are scattered along slopes in *Metrosideros polymorpha* (ohia) dominated mesic shrublands or dry or mesic *Metrosideros polymorpha-Leptechophylla tameiameiae* (pukiawe) lowland shrubland between 8 and 1,205 m (26 and 3,952 ft) in elevation. Other associated plant species include *Antidesma platyphyllum* (hame), *Dodonaea viscosa* (aalii), *Lysimachia* sp. (kolokolo kuahiwi), *Nestegis sandwicensis* (olopua), *Phyllanthus distichus* (pamakani mahu), *Pisonia* sp. (papala kepau), *Psydrax odorata* (alahee), or *Scaevola gaudichaudii* (naupaka kuahiwi) (Gagne and Cuddihy 1999, Ganders and Nagata 1999, HINHP Database 2000).

The major threats to *Bidens wiebkei* include habitat degradation and possible predation by axis deer (*Axis axis*) and feral goats (*Capra hircus*); competition with nonnative plants, such as *Melinus minutiflora* (molasses grass) and *Schinus terebinthifolius* (Christmas berry); fire; and damage by humans of those plants found along trails (HINHP Database 2000, 57 FR 46325).

Canavalia molokaiensis (awikiwiki)

Canavalia molokaiensis, a member of the legume family (Fabaceae), is a short-lived perennial climbing herb with twining branches and leaves made up of three lance-shaped or sometimes oval leaflets. The only species of this genus found on Molokai, this plant can be distinguished from others in the genus by its more narrow leaflets and its larger, rose-purple flowers (Wagner and Herbst 1999, 57 FR 46325).

This species has been observed in flower during May and December. Fruits and flowers were observed in March. Little else is known about the life history of *Canavalia molokaiensis.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and

limiting factors are unknown (HINHP Database 2000, Service 1996a).

Historically, *Canavalia molokaiensis* was known from East Molokai at Kalaupapa, Pelekunu, and farther south in Kahuaawi Gulch, and in the region of Manawai. It now has a more restricted range, from Kalaupapa to Waialeia, Kaunakakai, Pelekunu, and Kamakou. There are a total of 7 occurrences containing more than 50 plants on State lands, including lands managed by the National Park Service at Kalaupapa National Historical Park, and privately owned lands (GDSI 2000, HINHP Database 2000).

Canavalia molokaiensis typically grows in exposed sites, both dry and mesic, on steep slopes in *Metrosideros polymorpha-Dodonaea viscosa* lowland shrubland and mesic shrublands between 271 and 1,140 m (889 and 3,739 ft) in elevation. Associated plant species include *Artemisia* sp. (hinahina), *Chamaesyce* sp. (akoko), *Coprosma* sp. (pilo), *Leptecophylla tameiameiae,* or *Wikstroemia* sp. (akia) (HINHP Database 2000).

The threats to this species include habitat degradation by feral ungulates, such as feral goats and pigs (*Sus scrofa*), possible predation by feral goats, and competition with nonnative plants, such as *Melinis minutiflora* (Service 1996a).

Clermontia oblongifolia ssp. *brevipes* (oha wai)

Clermontia oblongifolia ssp. *brevipes,* a member of the bellflower family (Campanulaceae), is a short-lived perennial shrub or tree that reaches a height of 2 to 7 m (6.6 to 23 ft). This species is distinguished from others in the genus by the structure of its calyx and corolla, as well as by the lengths of the flower, the floral lobes, and the green hypanthium (base of flower). This subspecies differs from others of the species by the shape and length of its leaves, leaf stalks, and flower stalks (Lammers 1988, 1999).

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

Clermontia oblongifolia ssp. *brevipes* is known from five individuals on the privately owned land of the Nature Conservancy of Hawaii's (TNCH) Pelekunu Preserve. The historical range of this subspecies is not known (HINHP Database 2000; Service 1996a; Joel Lau, HINHP, *in litt.* 2000).

Clermontia oblongifolia ssp. *brevipes* occurs in shallow soil on gulch slopes in the wet *Metrosideros polymorpha*-dominated forests between 776 and 1,508 m (2,545 and 4,946 ft) in elevation. Associated plant species include *Broussaisia arguta* (kanawao), *Cheirodendron trigynum* (olapa), *Cibotium* spp. (hapuu), *Hedyotis terminalis* (manono), or *Melicope* sp. (alani) (HINHP Database 2000; Joel Lau, HINHP, *in litt.* 2000).

The threats to this species on Molokai are habitat degradation by feral pigs; possible predation on the fruit or plant parts by rats (*Rattus rattus*), as evidence on related species suggests; and random naturally occurring events that may cause the extinction of the entire species due to the very small number of individuals (Service 1996a, 57 FR 46325).

Cyanea dunbarii (haha)

Cyanea dunbarii, a member of the bellflower family (Campanulaceae), is a short-lived perennial, branched shrub 1.5 to 2 m (4.9 to 6.6 ft) tall with oval to broadly elliptic leaves that have irregularly lobed or cleft margins. This species is distinguished from others in this endemic Hawaiian genus by the lack of prickles on the stems and the irregularly lobed and cleft leaf margins (Lammers 1999).

Cyanea dunbarii has been observed in flower, with immature fruit, in September. Little is known about the life history of *Cyanea dunbarii.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (HINHP Database 2000, Service 1998a).

Cyanea dunbarii was collected in 1918 at Waihanau and Waialae Valleys, and was not observed again until 1992, when Joel Lau of HINHP found it in Mokomoko Gulch on State-owned land within Molokai Forest Reserve. Currently it is known from one occurrence of approximately 30 mature plants at an elevation of 671 m (2,200 ft) (GDSI 2000; HINHP Database 2000; 61 FR 53130; Ken Wood, National Tropical Botanical Garden (NTBG), *in litt.* 2000).

Cyanea dunbarii occurs on a streambank in a mesic to wet *Dicranopteris linearis* (uluhe)-*Metrosideros polymorpha* lowland forest on moderate to steep slopes between 191 and 1,248 m (626 and 4,093 ft) in elevation. Associated species include *Charpentiera obovata* (papala), *Cheirodendron trigynum, Clermontia kakeana* (ohawai), *Diplazium sandwichianum* (hoio), *Freycinetia arborea* (ieie), *Perrottetia sandwicensisr* (olomea), or *Pipturus albidus* (mamaki) (HINHP Database 2000, Service 1998a).

The major threats to *Cyanea dunbarii* on Molokai are competition with the non-native plants *Buddleia asiatica* (butterfly bush), *Commelina diffusa* (honohono), *Erigeron karvinskianus* (daisy fleabane), *Kalanchoe pinnata* (air plant), or *Rubus rosifolius* (thimbleberry); catastrophic extinction by naturally occurring events, such as landslides or flooding; reduced reproductive vigor due to the small number of individuals; predation by rats as rats are known to be in the area and are known to eat stems and fruits of other species of *Cyanea;* and habitat degradation and predation by axis deer and pigs (Cuddihy and Stone 1990, Service 1998a).

Cyanea mannii (haha)

Cyanea mannii, a member of the bellflower family (Campanulaceae), is a branched, short-lived perennial shrub 1.5 to 3 m (5 to 10 ft) tall with narrowly elliptic or lance-shaped leaves. This species is distinguished from the seven other species of the genus on Molokai by a combination of the following characteristics: a branched, woody habit; leaves with small, hardened, marginal teeth; and a purplish corolla (Lammers 1999, 57 FR 46325).

Cyanea mannii has been observed in flower during July. Little is known about the life history of *Cyanea mannii.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (HINHP Database 2000, Service 1996a).

Historically, *Cyanea mannii* was known only from Kalae on East Molokai. In 1984, a single plant was discovered by Joan Aidem on privately owned land west of Puu Kolekole on East Molokai. Since then, seven additional occurrences have been discovered in the east and west forks of Kawela Gulch on privately owned land on East Molokai and within the State's Molokai Forest Reserve. These 8 occurrences contain approximately 200 individuals on State and privately owned lands (GDSI 2000; HINHP Database 2000; Lammers 1999; Service 1996a; Ken Wood, NTBG, *in litt.* 2000).

This species typically grows on the sides of deep gulches in *Metrosideros polymorpha*-dominated montane mesic forests between 191 and 1,248 m (626 and 4,093 ft) in elevation. Associated plant species include *Dicranopteris linearis, Vaccinium* sp. (ohelo), or *Wikstroemia* sp. (HINHP Database 2000, Lammers 1999, Service 1996a).

Threats to *Cyanea mannii* are habitat degradation by feral pigs; predation by rats, which may feed on the fruit or other parts of the plant, as suggested by

evidence from related species; and catastrophic extinction through naturally occurring events due to this species few occurrences and small number of individuals (Service 1996a).

Cyanea procera (haha)

Cyanea procera, a member of the bellflower family (Campanulaceae), is a palm-like, short-lived perennial tree 3 to 9 m (10 to 30 ft) tall. It has stalkless, lance-shaped leaves 60 to 75 cm (24 to 30 in) long and 10 to 17 cm (3.9 to 6.7 in) wide with tiny hardened teeth along the margins. This species can be distinguished from other species of the genus by its growth habit, its stalkless leaves, and the single-lipped appearance of the corolla (Lammers 1999, 57 FR 46325).

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

Historically, *Cyanea procera* was known only from an unspecified site in the Kamalo region of East Molokai. Currently, this species is found on private land and the State's Puu Alii Natural Area Reserve (NAR) with a total of 5 occurrences containing at least 10 individuals (GDSI 2000, HINHP Database 2000).

Cyanea procera is found on the walls of steep gulches in wet *Metrosideros polymorpha*-dominated lowland mixed forests between 277 and 1,248 m (909 and 4,093 ft) in elevation. Associated plant species include *Asplenium* spp. (no common name (NCN)), *Brousaissia arguta, Coprosma ochracea* (pilo), *Cyanea* spp. (haha), *Cyrtandra macrocalyx* (haiwale), *Dicranopteris linearis, Pipturus albidus, Pisonia* spp., *Scaevola procera* (naupaka kuahiwi), or *Touchardia latifolia* (olona) (HINHP Database 2000, Service 1996a).

Threats to *Cyanea procera* are predation by rats (as suggested by evidence on related species) and feral goats, habitat degradation by feral goats and pigs, habitat destruction through erosion, and catastrophic extinction from naturally occurring events due to the vulnerability of a few occurrences with a small number of individuals (57 FR 46325).

Hibiscus arnottianus ssp. *immaculatus* (kokio keokeo)

Hibiscus arnottianus ssp. *immaculatus,* a member of the hibiscus family (Malvaceae), is a long-lived perennial tree up to 3 m (10 ft) tall with alternate, oval, toothed leaves measuring 5 to 7 cm (2 to 2.8 in) long and 4 to 6.5 cm (1.6 to 2.6 in) wide. This subspecies is distinguished from other native Hawaiian members of the genus by its white petals and white staminal column (Bates 1999, 57 FR 46325).

This species was observed in flower during July. Little else is known about the life history of *Hibiscus arnottianus* ssp. *immaculatus.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (HINHP Database 2000, Service 1996a).

Hibiscus arnottianus ssp. *immaculatus* once ranged from Waihanau Valley east to Papalaua Valley on East Molokai. Currently this species is found west of Papalaua Valley on privately owned land and in the State's Olokui NAR above Waiehu. There are a total of 3 occurrences containing between 20 and 30 individuals (GDSI 2000, HINHP Database 2000).

Hibiscus arnottianus ssp. *immaculatus* individuals are scattered along steep sea cliffs in mesic forests between 8 and 1,014 m (26 and 3,326 ft) in elevation. Associated native plant species include *Athyrium* spp. (akolea), *Cyanea grimesiana* (haha), *Antidesma platyphyllum, Boehmeria grandis* (akolea), *Diospyros sandwicensis* (lama), *Metrosideros polymorpha, Pipturus* spp. (mamaki), *Psydrax odorata,* or *Urera glabra* (opuhe) (Bates 1999, HINHP Database 2000).

The major threats to *Hibiscus arnottianus* spp. *immaculatus* are habitat destruction by feral goats and catastrophic extinction by naturally occurring events due to the vulnerability of the three occurrences and few individuals (Service 1996a).

Labordia triflora (kamakahala)

Labordia triflora, a short-lived perennial member of the logan family (Loganiaceae), is similar to *L. tinifolia* var. *lanaiensis,* except in the following characteristics: The stems of *L. triflora* are climbing; the leaf stalks are only 1 to 3 millimeters (mm) (0.04 to 0.1 in) long; inflorescence stalks are 40 to 50 mm (1.6 to 2 in) long; and each flower stalk is 10 to 25 mm (0.4 to 1 in) long (Motley 1995).

The flowers of this species are functionally unisexual. 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 (Motley 1995, HINHP Database 2000).

Until 1990, *Labordia triflora* was known only from the type collection at Mapulehu and was believed to be extinct. In 1990, Joel Lau rediscovered the species in Kua Gulch on Molokai. Currently, only 10 individuals are known from one occurrence on privately owned land (GDSI 2000, HINHP Database 2000, Motley 1995).

This species occurs on gulch slopes in mixed mesic *Metrosideros polymorpha* forest, between 191 and 1,143 m (626 and 3,749 ft) in elevation. Associated species include *Coprosma* sp., *Myrsine lessertiana* (kolea lau nui), *Nephrolepis exaltata* (sword fern), *Pouteria sandwicensis* (alaa), *Sadleria cyatheoides* (amau), or *Tetraplasandra hawaiensis* (ohe ohe) (Motley 1995; J. Lau, *in litt.* 2001).

The threats to *Labordia triflora* include habitat degradation and destruction by feral pigs and goats; predation by rats that eat seeds; competition with the non-native plant species *Schinus terebinthifolius;* catastrophic extinction through environmental events; and reduced reproductive vigor due to the species' few occurrences and small number of individuals (Motley 1995, 64 FR 48307).

Lysimachia Maxima (NCN)

Lysimachia maxima, a member of the primrose family (Primulaceae), is a sprawling, short-lived perennial shrub with reddish-brown bark. This species is differentiated from others in this genus by the leaves borne in groups of 3, the broadest portion of the leaf located above the middle, and rusty hairs that disappear with maturity (Wagner *et al.* 1999).

Flowers, buds, and immature fruit of *Lysimachia maxima* have been observed in late May through July. Little 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 1998a, 61 FR 53130).

Lysimachia maxima is only known from one occurrence containing between 45 and 50 individuals on the rim of Pelekunu Valley near Ohialele, on the privately owned land of TNCH's Pelekunu Preserve (GDSI 2000, HINHP Database 2000).

This species occurs in *Metrosideros polymorpha-Dicranopteris linearis* montane wet forest between 446 and 1,329 m (1,463 and 4,359 ft) in elevation. Associated species include *Dubautia* sp. (naenae), *Hedyotis* sp. (NCN), *Ilex anomala* (kawau), *Psychotria* sp. (kopiko), or *Vaccinium* sp. (HINHP Database 2000).

The major threats to *Lysimachia maxima* are catastrophic extinction from random environmental events (*e.g.*, landslides); reduced reproductive vigor

due to the small number of individuals in the only known occurrence; and habitat degradation and/or predation by feral pigs and goats that are known from adjacent areas (Service 1998a).

Melicope reflexa (alani)

Melicope reflexa, a long-lived perennial of the rue family (Rutaceae), is a sprawling shrub 1 to 3 m (3.3 to 10 ft) tall with short, yellowish-brown, short-lived hairs on new growth. Opposite leaves with leaf stalks usually over 1 cm (0.4 in) long, larger leaves and fruit, and partially fused sections of the capsule (fruit) separate it from other species of the genus (Stone *et al.* 1999).

Little 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 1996a).

Historically, *Melicope reflexa* occurred from a ridge between Hanalilolilo and Pepeopae to as far east as Halawa on East Molokai. The 3 remaining occurrences of fewer than a total of 1,000 individuals are on State and private lands in Honomuni, the Wailau-Mapulehu summit area, and Kukuinui Ridge in Wailau Valley (GDSI 2000, HINHP Database 2000).

Melicope reflexa typically grows in wet *Metrosideros polymorpha*-dominated forest with native trees, such as *Cheirodendron* sp. (olapa), at elevations between 319 and 1,508 m (1,046 and 4,946 ft). Associated native plant species include *Antidesma platyphyllum*, *Alyxia oliviformis* (maile), *Cheirodendron trigynum*, *Cibotium* spp., *Dicranopteris linearis*, *Freycinetia arborea*, or *Syzygium sandwicensis* (ohia ha) (Stone *et al.* 1999; J. Lau, *in litt.* 2001).

Major threats to *Melicope reflexa* include habitat degradation and predation by ungulates (axis deer and feral pigs); competition with the non-native plant *Clidemia hirta* (Koster's curse); and catastrophic extinction from environmental events due to this species' few occurrences and small number of individuals (Service 1996a, 57 FR 46325).

Pritchardia munroi (loulu)

Pritchardia munroi, a member of the palm family (Arecaceae), is a long-lived perennial tree about 4 to 5 m (13 to 16 ft) tall. The leaves are deeply divided into segments with long, drooping tips. This species is distinguished from others of the genus by its relatively smooth leaves; the grayish-brown hair on the inflorescence stalks, which are shorter than the petioles (leaf stalks); and the small size of the fruits (Read and Hodel 1999).

Little 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 1996a).

Historically and currently, *Pritchardia munroi* is found in leeward East Molokai, above Kamalo, near Kapuaokoolau Gulch. The only known wild individual is found on privately owned land (HINHP Database 2000, Read and Hodel 1999).

The only known wild individual grows near the base of a small ravine in mesic *Metrosideros polymorpha-Dodonaea viscosa-Leptechophylla tameiameiae* shrubland at elevations between 189 and 1,205 m (619 and 3,952 ft). Associated plant species include *Bidens menziesii* (kookoolau), *Coprosma* sp., *Diospyros sandwicensis, Dubautia linearis* (naenae), *Pleomele auwahiensis* (hala pepe), *Pseudognaphalium sandwicensium* (enaena), *Sida fallax* (ilima), or *Wikstroemia* sp. (Read and Hodel 1999; J. Lau, *in litt.* 2001).

Threats to the only known wild individual of *Pritchardia munroi* include habitat degradation by ungulates (axis deer, goats, or pigs) around its fenced exclosure, which prevents the establishment of seedlings; predation of seeds by rats; and catastrophic extinction by random environmental events (*e.g.*, fire) due to its extreme rarity (Service 1996a, 57 FR 46325).

Schiedea lydgatei (NCN)

Schiedea lydgatei, a member of the pink family (Caryophyllaceae), is a low, hairless short-lived perennial with branched stems 10 to 40 cm (4 to 16 in) long that are woody at the base. The opposite, thin, three-veined leaves with petioles and the smooth, open flower clusters with relatively larger, green sepals separate this species from other members of this endemic Hawaiian genus (Wagner *et al.* 1999).

This species has been observed with flowers and fruit in June. Little 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 (HINHP Database 2000, Service 1996a).

Historically, *Schiedea lydgatei* was found in Kalae, Poholua, Makolelau, and Ohia Gulch on East Molokai. This species is now known from 4 occurrences in a more restricted area in Makakupaia, Kawela, and Makolelau. The 4 occurrences total more than 1,000 individuals on State and privately owned lands (GDSI 2000, HINHP Database 2000).

This species is found along ridges in dry to mesic grassland, shrubland, and forest with scattered native trees. It ranges in elevation between 458 and 1,047 m (1,502 and 3,434 ft). Associated plant species include *Dicranopteris linearis*, *Dodonaea viscosa*, *Leptecophylla tameiameiae*, or *Metrosideros polymorpha* (Gagne and Cuddihy 1999, HINHP Database 2000, Wagner *et al.* 1999).

The major threats to *Schiedea lydgatei* are habitat degradation by feral ungulates; competition with the non-native plant species *Melinus minutiflora*; and catastrophic extinction due to random environmental events, primarily fire, because in this species' dry, windswept habitat a single fire could potentially destroy a large part of the occurrence (Service 1996a, 57 FR 46325).

Schiedea sarmentosa (NCN)

Schiedea sarmentosa, a short-lived perennial herb of the pink family (Caryophyllaceae), is a many-branched shrub. The opposite leaves are slender, threadlike, and covered with dense, glandular hairs. The flowers are female on some plants and bisexual on others. This species differs from others in this endemic Hawaiian genus by its densely bushy habit, leaf width, hairiness, and staminode (false stamen) length (Wagner *et al.* 1999).

The population in Makolelau Gulch has a frequency of 31 percent female plants. Based on analyses of pollen-ovule ratios, pollen size, inflorescence structure, and comparison to other *Schiedea* species tested in a wind tunnel, *Schiedea sarmentosa* could be wind-pollinated. Little 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 1998a).

Schiedea sarmentosa has been found in Kawela Gulch, Makolelau, and Onini Gulch. Currently, only five occurrences are known to be extant on private lands. Estimates of the total number of individuals have ranged to over 1,000. An accurate count is difficult because this species grows interspersed with *Schiedea lydgatei* (GDSI 2000, HINHP Database 2000, Service 1998a).

Schiedea sarmentosa is typically found on steep or gentle to moderate slopes in *Metrosideros polymorpha-Dodonaea viscosa* lowland dry or mesic shrubland, or dry to mesic forest dominated by *Metrosideros polymorpha* and/or *Diospyros sandwicensis*, at elevations between 316 and 1,072 m (1,036 and 3,516 ft). Associated species include *Alyxia oliviformis*, *Bidens menziesii*, *Carex meyenii* (NCN),

Chamaesyce sp., *Chenopodium oahuense* (aheahea), *Leptecophylla tameiameiae*, *Lipochaeta rockii* (nehe), *Nestegis sandwicensis*, *Nothocestrum latifolium* (aiea), *Pleomele auwahiensis*, *Sida fallax*, or *Sophora chrysophylla* (mamane) (HINHP Database 2000; J. Lau, *in litt.* 2001).

Major threats to *Schiedea sarmentosa* include habitat degradation by feral goats and pigs, competition by the non-native plants *Melinis minutiflora* and *Ricinus communis* (castor bean), and fire. The species is also threatened by a risk of extinction from naturally occurring events due to the low number of occurrences (Service 1998a, 61 FR 53130).

Silene alexandri (NCN)

Silene alexandri, a member of the pink family (Caryophyllaceae), is an erect, short-lived perennial herb, 30 to 60 cm (1 to 2 ft) tall, and woody at the base. The narrow, elliptic leaves are hairless except for a fringe along the margins. Flowers are arranged in open clusters on stalks. The hairless stems, flowering stalks, and sepals and the larger flowers with white petals separate this species from other members of the genus (Wagner *et al.* 1999).

Little 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 1996a).

Historically, *Silene alexandri* was known from Makolelau and Kamalo on East Molokai. Recently, the single known occurrence, comprised of fewer than 10 individuals, was reported to be extirpated in the wild. However, individuals remain in cultivation (GDSI 2000; HINHP Database 2000; Steve Perlman, NTBG, pers. comm., 2001).

The only known occurrence was found on moderate to steep slopes or cliffs in dry forest at an elevation between 316 and 1,073 m (1,036 and 3,519 ft). Associated plant species include *Bidens menziesii*, *Carex wahuensis* (NCN), *Diospyros sandwicensis*, *Dodonaea viscosa*, *Leptecophylla tameiameiae*, or *Schiedea* spp. (J. Lau, *in litt.* 2001).

Threats to *Silene alexandri* include habitat degradation by feral goats, possible predation by goats and cattle (*Bos taurus*), and catastrophic extinction through random environmental events, of which the most serious is fire (Service 1996a, 57 FR 46325).

Stenogyne bifida (NCN)

Stenogyne bifida, a nonaromatic member of the mint family (Lamiaceae), is a climbing, short-lived perennial herb, with smooth or slightly hairy, four-angled stems. The long, narrow calyx teeth and the deep lobe in the upper lip of the yellow corolla separate this species from others of the genus (Weller and Sakai 1999).

Little 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 1996a).

Historically, *Stenogyne bifida* was known from scattered occurrences from Waianui in central Molokai to Pukoo Ridge on East Molokai. This species is now known from only 5 East Molokai occurrences totaling fewer than 10 individuals on Manawai-Kahananui Ridge on private lands; on Kolo Ridge, at Kamoku Flats; and on the east fork of Kawela Gulch on the privately owned land of TNCH's Pelekunu Preserve (GDSI 2000, HINHP Database 2000).

Stenogyne bifida typically grows on gulch slopes in *Metrosideros polymorpha*-dominated montane mesic to wet forest with native species such as *Broussaisia arguta*, *Cheirodendron trigynum*, *Cibotium* sp., *Cyanea* sp., *Dicranopteris linearis*, *Dodonaea viscosa*, *Hedyotis hillebrandii* (manono), *Hedyotis* sp., *Leptecophylla tameiameiae*, *Pipturus albidus*, *Pouteria sandwicensis*, *Psychotria* sp., *Vaccinium* sp., or *Wikstroemia* sp. at elevations between 336 and 1,300 m (1,102 and 4,264 ft) (HINHP Database 2000; Service 1996a; J. Lau, *in litt.* 2001).

The most pervasive threat to this species is habitat degradation by ungulates (axis deer, goats, and pigs) (Service 1996a, 57 FR 46325).

Tetramolopium rockii (NCN)

Tetramolopium rockii, a member of the aster family (Asteraceae), is a glandular, hairy, prostrate short-lived perennial shrub that forms complexly branching mats. The species has been divided into two varieties in the most recent treatment of this genus in Hawaii. Leaves of *T. rockii* var. *calcisabulorum* have slightly inrolled edges and are whitish due to the long silky hairs on their surfaces, whereas var. *rockii* has smaller, less hairy, flat, yellowish-green leaves. This species differs from others of the genus by its growth habit, its hairy and glandular surfaces, its spatulate leaf shape, and its yellow disk florets (Lowrey 1999).

Little 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 1996a).

Of the two recognized varieties of *Tetramolopium rockii*, var. *rockii* was first discovered at Moomomi about 80 years ago and is still extant in that area. *Tetramolopium rockii* var. *rockii* is found in four areas from Kalawao to Kahinaakalani, Keieho Point to Kapalauoa, and Moomomi to Kahinaakalani. *Tetramolopium rockii* var. *calcisabulorum* is only reported from Keieho Point to Kapalauoa, intergrading with var. *rockii* where their ranges overlap. The total number of individuals of both varieties in the 4 occurrences is estimated to be 174,000; they are located on State lands, including land managed by the National Park Service at Kalaupapa National Historical Park, and privately owned lands (GDSI 2000, HINHP Database 2000).

Tetramolopium rockii is restricted to hardened calcareous sand dunes or ash-covered basalt in the coastal spray zone or coastal dry shrubland and grassland between sea level and 199 m (0 and 653 ft) in elevation. Native plant species associated with this species include *Diospyros sandwicensis*, *Fimbristylis cymosa* (mauu akiaki), *Heliotropium anomalum* (hinahina), *Melanthera integrifolia*, *Metrosideros polymorpha*, *Osteomeles anthyllidifolia* (ulei), *Pouteria sandwicensis*, *Psydrax odorata*, *Scaevola* sp. (naupaka), *Sida fallax*, or *Sporobolus virginicus* (akiaki) (HINHP Database 2000, Lowrey 1999, Service 1996a).

The major threats to *Tetramolopium rockii* are habitat degradation by ungulate (axis deer and cattle) activity and human recreation, competition with the non-native plant *Prosopis pallida* (kiawe), and catastrophic extinction due to fire (57 FR 46325).

Multi-Island Species

Adenophorus periens (pendant kihi fern)

Adenophorus periens, a short-lived perennial member of the grammitis family (Grammitidaceae), is a small, pendant, epiphytic (not rooted on the ground) fern. This species differs from other species in this endemic Hawaiian genus by having hairs along the pinna (leaflet) margins, by the pinnae being at right angles to the midrib axis, by the placement of the sori (a cluster of spore cases) on the pinnae, and the degree of dissection of each pinna (Linney 1989, Service 1999a).

Little is known about the life history of *Adenophorus periens*, which seems to grow only in dense closed-canopy 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) are dispersed by wind, possibly by water, and perhaps on the feet of birds or

insects. Spores lack a thick resistant coat, which may indicate that their longevity is brief, probably measured in days at most. Due to the weak differences between seasons, there seems to be no evidence of seasonality in growth or reproduction. Additional information on reproductive cycles, longevity, specific environmental requirements, and limiting factors is not known (Linney 1989, Service 1999a).

Historically, *Adenophorus periens* was known from Kauai, Oahu, Lanai, East Maui, and Hawaii Island. Currently, it is known from several locations on Kauai, Molokai, and Hawaii. On Molokai, it is found in a single occurrence containing seven individuals on private land (GDSI 2000, HINHP Database 2000).

On Molokai, *Adenophorus periens* is an epiphyte usually growing on *Metrosideros polymorpha* trunks, and is found in *Metrosideros polymorpha-Myrsine lessertiana* forest at elevations between 811 and 1,508 m (2,660 and 4,946 ft). It is found in habitats of well-developed, closed canopy providing deep shade and high humidity. Associated native species include *Anoectochilus sandvicensis* (jewel orchid), *Broussaisia arguta*, *Cheirodendron trigynum*, *Cibotium glaucum* (hapuu), *Coprosma ochracea*, *Cyanea* sp., *Cyrtandra* sp. (haiwale), *Dicranopteris linearis*, *Freycinetia arborea*, *Hedyotis terminalis*, *Ilex anomala*, *Labordia hirtella* (NCN), *Leptecophylla tameiameiae*, *Machaerina angustifolia* (uki), *Melicope* sp., *Psychotria* spp., *Stenogyne kamehamehae* (NCN), *Syzygium sandwicensis*, *Vaccinium calycinum* (ohelo), or *Viola chamissoniana* ssp. *robusta* (pamakani) (HINHP Database 2000, Linney 1989, Service 1999a).

The threats to this species on Molokai are habitat degradation by feral pigs and goats, and competition with the non-native plant *Psidium cattleianum* (strawberry guava) (HINHP Database 2000, Service 1999a, 59 FR 56333).

Alectryon macrococcus (mahoe)

Alectryon macrococcus, a long-lived perennial member of the soapberry family (Sapindaceae), consists of two varieties, *macrococcus* and *auwahiensis*, both of which are trees with reddish-brown branches and leaves with one to five pairs of sometimes asymmetrical egg-shaped leaflets. The underside of the leaf has dense brown hairs only when young in *A. macrococcus* var. *macrococcus* and whether young or mature (persistent) in *A. macrococcus* var. *auwahiensis* (only found on East Maui). The only member of its genus found in Hawaii, this species is distinguished from other Hawaiian members of its family by being a tree with a hard fruit 2.3 cm (0.9 in) or more in diameter (Wagner *et al.* 1999).

Alectryon macrococcus is a relatively slow-growing, long-lived tree that grows in xeric (dry) to mesic sites and is adapted to periodic drought. Little else is known about the life history of this species. Flowering cycles, pollination vectors, seed dispersal agents, and specific environmental requirements are unknown (Service 1997).

Historically and currently, *Alectryon macrococcus* var. *macrococcus* is known from Kauai, Oahu, Maui, and Molokai. On Molokai, it is found on private land, along the Puu Kolekole jeep road, Kaunakakai Gulch, and Kamiloloa Gulch in a total of six occurrences containing nine individuals on State and privately owned lands (GDSI 2000, HINHP Database 2000).

On Molokai, *Alectryon macrococcus* var. *macrococcus* typically grows on talus slopes or in gulches within dry or mesic lowland forest between elevations of 534 and 1,120 m (1,751 and 3,674 ft). Associated native plants include *Dodonaea viscosa*, *Lipochaeta* sp. (nehe), *Myrsine* sp. (kolea), *Nestegis sandwicensis, Nothocestrum* sp. (aiea), *Pleomele* sp. (halapepe), *Psychotria* sp., or *Streblus pendulina* (aiai) (HINHP Database 2000, Service 1997, Wagner *et al.* 1999).

The threats to *Alectryon macrococcus* var. *macrococcus* on Molokai include habitat degradation by feral goats and pigs; competition from non-native plant species, such as *Melinus minutiflora*, *Pennisetum clandestinum* (kikuyu grass), *Psidium cattleianum*, or *Schinus terebinthifolius*; damage from the black twig borer (*Xylosandrus compactus*); seed predation by rats, mice (*Mus domesticus*), and insects (probably the endemic microlepidopteran (small caterpillar) *Prays* cf. *fulvocanella*); loss of pollinators; and catastrophic extinction through a single natural or human-caused environmental disturbance (*e.g.*, fire) due to the very small remaining number of individuals and their limited distribution on Molokai (HINHP Database 2000, Service 1997, 57 FR 20772).

Bonamia menziesii (NCN)

Bonamia menziesii, a member of the morning glory family (Convolvulaceae) and a short-lived perennial, 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, longer stems and petioles, 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 1999a).

Historically, *Bonamia menziesii* was known from Kauai, the Waianae Mountains of Oahu, Molokai, Maui, and Hawaii Island. Currently, this species is extant on Kauai, Oahu, Lanai, Maui, and Hawaii. This species was last collected on Molokai in 1918 from Maunaloa by J. F. Rock (HINHP Database 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Bonamia menziesii* on Molokai.

Nothing is known of the threats to *Bonamia menziesii* on Molokai.

Brighamia rockii (pua ala)

Brighamia rockii, a long-lived perennial member of the bellflower family (Campanulaceae), is an unbranched plant with a succulent stem that is bulbous at the bottom and tapers toward the top, ending in a compact rosette of fleshy leaves. 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 (sepal) lobes, and its shorter flower stalks (Lammers 1999).

Observations of *Brighamia rockii* by Gemmill (1996) 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 have been known to flower at nine months of age. This species has been observed in flower during August. Little 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 (HINHP Database 2000, Service 1996a).

Historically, *Brighamia rockii* ranged along the northern coast of East Molokai from Kalaupapa to Halawa and may possibly have grown on Lanai and Maui. Currently, it is only extant on Molokai in a total of 5 occurrences with between 121 and 131 individual plants occurring on State and privately owned lands. It occurs on steep, inaccessible sea cliffs along East Molokai's northern coastline from Anapuhi Beach to Wailau Valley on private lands, and on the relatively inaccessible State-owned sea stack of Huelo, east of Anapuhi Beach (GDSI

2000; HINHP Database 2000; Lammers 1999; K. Wood, *in litt.* 2000).

On Molokai, *Brighamia rockii* is found in rock crevices on steep basalt sea cliffs, often within the spray zone, in coastal dry or mesic forest, *Eragrostis variabilis* (kawelu) mixed coastal cliff communities or shrubland, or *Pritchardia* sp. (loulu) coastal mesic forest between sea level and 671 m (0 and 2,201 ft) in elevation. Associated native species include *Artemisia* sp., *Bidens* sp. (kookoolau), *Carex wahuensis* ssp. *wahuensis* (NCN), *Chamaesyce celastroides* var. *amplectans* (akoko), *Cocculus orbiculatus* (huehue), *Cyperus phleoides* ssp. *phleoides* (NCN), *Cyrtomium falcatum* (ahina kuahiwi), *Dianella sandwicensis* (ukiuki), *Diospyros sandwicensis, Hedyotis littoralis* (NCN), *Lepidium bidentatum* var. *o-waihiense* (anaunau), *Metrosideros polymorpha, Osteomeles anthyllidifolia, Pandanus tectorius* (hala), *Peucedanum sandwicensis* (makou), *Phymatosorus grossus* (lauae), *Pittosporum halophilum* (hoawa), *Pritchardia hillebrandii* (loulu), *Psydrax odorata, Reynoldsia sandwicensis* (ohe), *Scaevola sericea* (naupaka kahakai), *Schiedea globosa* (NCN), *Senna gaudichaudii* (kolomona), *Tetramolopium* spp., or *Wikstroemia uva-ursi* (akia) (HINHP Database 2000; Lammers 1999; K. Wood, *in litt.* 2000).

The threats to this species on Molokai are habitat degradation (and possibly predation) by axis deer and goats; competition with the non-native plants *Cyperus gracilis* (McCoy grass), *Digitaria ciliaris* (Henry's crabgrass), *Digitaria insularis* (sourgrass), *Ficus microcarpa* (Chinese banyan), *Kalanchoe pinnata, Lantana camara* (lantana), *Oxalis corniculata* (yellow wood sorrel), *Pluchea carolinensis* (sourbush), *Portulaca oleracea* (pigweed), and *Solanum seaforthianum* (NCN); seed predation by rats; and lack of pollinators (HINHP Database 2000, Service 1996a, 57 FR 46325).

Centaurium sebaeoides (awiwi)

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* (bitter herb), 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. This species appears to be an annual; triggered by declining photo-period, the plant produces seeds and dies. Medeiros *et al.* (1999) noted that in the wild, seedlings first appeared in March and April; flowers first appeared in April and May; mature capsules were observed beginning in May and continuing through June; and by the first week of July, most plants were dead. Little is known about the life history of this species. Its pollination vectors, seed dispersal agents, specific environmental requirements, and limiting factors are unknown (Service 1995a).

Historically and currently, *Centaurium sebaeoides* is known from scattered localities on Kauai, Oahu, Molokai, Lanai, and Maui. Currently on Molokai, there are a total of two occurences containing thousands of individuals, near Mokio Point on privately owned land and in Kalaupapa National Historical Park on State-owned land managed by the National Park Service (GDSI 2000; HINHP Database 2000; Wagner *et al.* 1999; Chuck Chimera, U.S. Geological Survey, pers. comm., 2000).

On Molokai, *Centaurium sebaeoides* grows in volcanic or clay soils or on cliffs in arid coastal areas at elevations between sea level and 409 m (0 and 1,341 ft). Associated species include *Artemisia* sp., *Bidens* sp., *Chamaesyce celastroides* (akoko), *Cyperus phleoides* (NCN), *Dodonaea viscosa, Fimbristylis cymosa, Heteropogon contortus* (pili grass), *Jacquemontia ovalifolia* (pauohiiaka), *Lipochaeta heterophylla* (nehe), *Lipochaeta succulenta* (nehe), *Lycium sandwicense* (ohelo kai), *Lysimachia mauritiana* (kolokolo kuahiwi), *Melanthera integrifolia, Panicum fauriei* (NCN), *Panicum torridum* (kakonakona), *Scaevola sericea, Schiedea globosa, Sida fallax,* or *Wikstroemia uva-ursi* (Medeiros *et al.* 1999, Wagner *et al.* 1999, 56 FR 55770).

The major threats to this species on Molokai are displacement by non-native, woody species, such as *Casuarina equisetifolia* (paina), *Casuarina glauca* (saltmarsh), *Leucaena leucocephala* (koa haole), *Prosopis pallida, Schinus terebinthifolius, Syzygium cumini* (Java plum), and *Tournefortia argentea* (tree heliotrope); trampling and habitat degradation by feral goats and cattle; and damage caused by off-road vehicles (Medeiros *et al.* 1999).

Ctenitis squamigera (pauoa)

Ctenitis squamigera is a short-lived perennial in the spleenwort family (Aspleniaceae). It has a rhizome (horizontal stem) 5 to 10 mm (0.2 to 0.4 in) thick, creeping above the ground and densely covered with scales similar to those on the lower part of the leaf stalk. *Ctenitis squamigera* can be readily distinguished from other Hawaiian species of *Ctenitis* by the dense covering of tan-colored scales on its fronds (Degener and Degener 1957, Wagner and Wagner 1992).

Little is known about the life history of this species. Reproductive cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998b).

Historically, *Ctenitis squamigera* was recorded from the islands of Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii Island. It is currently found on Oahu, Lanai, Molokai, and Maui. There is currently a single occurrence with 20 individuals on the island of Molokai in Wawaia Gulch on privately owned land (GDSI 2000; HINHP Database 2000; J. Lau, *in litt.* 2000).

On Molokai, *Ctenitis squamigera* is found in mesic forest and gulch slopes between elevations of 757 and 1,133 m (2,483 and 3,716 ft). Associated native plant taxa include *Carex meyenii, Diospyros sandwicensis, Dryopteris unidentata* (NCN), *Metrosideros polymorpha, Nephrolepis exaltata, Nestegis sandwicensis, Pleomele auwahiensis, Pouteria sandwicensis,* or *Xylosma hawaiiense* (maua) (Service 1998b; 59 FR 49025; J. Lau, *in litt.* 2000).

The primary threats to *Ctenitis squamigera* are habitat degradation by goats and competition with the non-native plants *Melinis minutiflora* and *Schinus terebinthifolius* (Service 1998b; 59 FR 49025; J. Lau, *in litt.* 2000).

Cyanea grimesiana ssp. grimesiana (haha)

Cyanea grimesiana ssp. *grimesiana,* a short-lived perennial 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).

Little is known about the life history of this plant. On Molokai, flowering plants have been observed in July and August. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999a).

Historically and currently, *Cyanea grimesiana* ssp. *grimesiana* is known from Oahu, Molokai, Lanai, and Maui. On Molokai, it is found in a total of two occurrences containing seven individuals in Wailau, Puu Kahea and Olokui NAR on State-owned lands

(GDSI 2000, HINHP Database 2000, Service 1999a).

On Molokai, *Cyanea grimesiana* ssp. *grimesiana* is typically found in mesic forest often dominated by *Metrosideros polymorpha* or *M. polymorpha* and *Acacia koa* (koa), or on cliffs, at elevations between 93 and 1,354 m (305 and 4,441 ft). Associated plants include *Antidesma* sp. (hame), *Bobea* sp. (ahakea), *Cibotium* sp., *Cyrtandra* sp., *Dicranopteris linearis, Doodia* sp. (okupukupu lauii), *Freycinetia arborea, Nephrolepis* sp. (kupukupu), *Psychotria* sp., *Syzygium sandwicensis,* or *Xylosma* sp. (maua) (HINHP Database 2000).

The threats to this species on Molokai are habitat degradation and/or destruction caused by axis deer, feral goats, and pigs; competition with various non-native plants, such as *Clidemia hirta;* catastrophic extinction by randomly naturally occurring events (*e.g.*, fire, landslides) due to the small number of existing individuals; trampling by hikers; seed predation by rats; and predation by various species of slugs (*Milax* spp.) (HINHP Database 2000, Service 1999a, 61 FR 53108).

Cyperus trachysanthos (puukaa)

Cyperus trachysanthos, a member of the sedge family (Cyperaceae), is a short-lived perennial grass-like plant with a short rhizome (underground stem). The culms (aerial 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 culms (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 1999a).

Historically, *Cyperus trachysanthos* was known from Niihau, Kauai, and scattered locations on Oahu, Molokai, and Lanai. This species is now extant on Niihau, Kauai, and Oahu. This species was last collected on Molokai in 1912 from Maunaloa by J. F. Rock (HINHP Database 2000).

Nothing is known of the preferred habitat or native species associated with *Cyperus trachysanthos* on Molokai.

Nothing is known of the threats to *Cyperus trachysanthos* on Molokai.

Diellia erecta (asplenium-leaved diellia)

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 larger brown or dark gray scales, fused or separate sori along both margins of the pinna, 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 this species. Its reproductive cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999a).

Historically, *Diellia erecta* was known from Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii Island. Currently, it is known from Kauai, Oahu, Molokai, Maui, and Hawaii. On Molokai, it is known from a total of 4 occurrences containing at least 10 individuals in Halawa Valley, Kahuaawi Gulch, Makolelau, and Onini Gulch on privately owned lands (HINHP Database 2000; Service 1999a; K. Wood, *in litt.* 1999).

On Molokai, *Diellia erecta* is found in mixed mesic forest and mesic *Diospyros sandwicensis* forest between elevations of 716 and 1,133 m (2,348 and 3,716 ft). Associated native plant species include *Alyxia oliviformis, Bobea* sp., *Coprosma foliosa* (pilo), *Dodonaea viscosa, Dryopteris unidentata, Dubautia linearis* ssp. *opposita* (naenae), *Leptecophylla tameiameiae, Metrosideros polymorpha, Myrsine* sp., *Ochrosia compta* (holei), *Pleomele auwahiensis, Psychotria* sp., *Sophora chrysophylla, Syzygium sandwicensis,* or *Wikstroemia* sp. (HINHP Database 2000; K. Wood, *in litt.* 1999).

The major threats to *Diellia erecta* on Molokai are habitat degradation by pigs, goats, and axis deer; competition with the non-native plant species *Blechnum occidentale* (NCN), *Fraxinus uhdei* (tropical ash), *Melinus minutiflora, Psidium cattleianum,* and *Ricinus communis;* catastrophic extinction due to random naturally occurring events; and reduced reproductive vigor due to the small number of existing individuals (HINHP Database 2000; K. Wood, *in litt.* 1999; Service 1999a; 59 FR 56333).

Diplazium molokaiense (NCN)

Diplazium molokaiense, a short-lived fern in 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* on the Hawaiian Islands by a combination of characters, 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.* Reproductive cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors for *Diplazium molokaiense* are unknown (Service 1998a).

Historically, *Diplazium molokaiense* was found on Kauai, Oahu, Molokai, Lanai, and Maui. Currently, this species is known only from Maui. This species was last collected on Molokai in 1912 from Kaluaaha Valley by C. N. Forbes (HINHP Database 2000).

On Molokai, *Diplazium molokaiense* was found on steep, rocky, wooded gulch walls in wet forests between elevations of 97 and 1,349 m (318 and 4,425 ft) (HINHP Database 2000).

There is no information on threats that may affect *Diplazium molokaiense* on Molokai (Service 1998a).

Eugenia koolauensis (nioi)

Eugenia koolauensis, a member of the myrtle family (Myrtaceae), is a long-lived perennial tree or shrub between 2 and 7 m (7 and 23 ft) tall with branch tips covered with dense brown hairs. *Eugenia koolauensis* differs from the other species in the genus in having leaves that are densely hairy on the lower surface and leaf margins that curve under the leaves (Wagner *et al.* 1999).

This species has been observed in flower from February to December in various years. No other information exists on its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, or limiting factors (Service 1998b).

Historically, *Eugenia koolauensis* was known from Maunaloa on western Molokai and from Oahu. Currently, this species is extant on Oahu. It was last collected on Molokai in 1912 from the west end of the island by J. F. Rock (HINHP Database 2000).

On Molokai, *Eugenia koolauensis* was found in rocky gulches or on gentle slopes with deep soil between 475 and 992 m (1,558 and 3,254 ft) in elevation. Associated native plant species include *Diospyros sandwicensis, Erythrina sandwicensis* (wiliwili), *Nesoluma polynesicum, Nestegis sandwicensis, Nototrichium sandwicensis, Reynoldsia sandwicensis,* or *Xylosma hawaiiense* (J. Lau, *in litt.* 2001).

Information on threats that may affect *Eugenia koolauensis* on Molokai is unknown.

Flueggea neowawraea (mehamehame)

Flueggea neowawraea, a member of the spurge family (Euphorbiaceae), is a large tree up to 30 m (100 ft) tall and 2 m (7 ft) in diameter with white oblong pores covering its scaly, pale brown bark. This species is usually dioecious (having separate male and female plants) and is the only member of the genus found in Hawaii. It can be distinguished from other Hawaiian species in the family by its hairless whitish lower leaf surfaces and round fruits (Hayden 1999, Service 1999).

Individual trees of *Flueggea neowawraea* bear only male or female flowers and must be cross-pollinated from a different tree to produce viable seed. 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 (Hayden 1999, Service 1999a).

Historically, *Flueggea neowawraea* was known from Molokai, Oahu, Kauai, Maui, and Hawaii Island. Currently, this species is found on Kauai, Oahu, Maui, and Hawaii. This species was last collected on Molokai in 1931 from Waihii by G. W. Russ (HINHP Database 2000).

On Molokai, *Flueggea neowawraea* occurred in gulches in mesic forest between 450 and 840 m (1,476 and 2,755 ft) in elevation (J. Lau, *in litt.* 2001).

Information on threats that may affect *Flueggea neowawraea* on Molokai is unknown.

Hedyotis mannii (pilo)

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

Little 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 1996a).

Historically and currently, *Hedyotis mannii* is found on Lanai, West Maui, and Molokai. After an absence of 50 years, this species was rediscovered on Molokai in 1987 by Steve Perlman on private land in Kawela Gulch in TNCH's Kamakou Preserve. Only one occurrence of five plants is known to exist in this area (GDSI 2000, HINHP Database 2000).

On Molokai, *Hedyotis mannii* grows on dark, narrow, rocky gulch walls in mesic and perhaps wet forests at 593 to 1,212 m (1,945 to 3,975 ft) in elevation. Associated plant species include *Cibotium* sp., *Cyanea* sp., *Pipturus* sp., *Psychotria* sp., or *Scaevola* sp. (HINHP Database 2000, Service 1996a, Wagner *et al.* 1999).

The threats to *Hedyotis mannii* on Molokai are habitat degradation by feral pigs; competition with the non-native plant *Melinis minutiflora;* and catastrophic extinction through random environmental events to which the limited number of individuals are extremely vulnerable (HINHP Database 2000, Service 1996a, 57 FR 46325).

Hesperomannia arborescens (NCN)

Hesperomannia arborescens, a long-lived perennial member 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 characters: 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. No other information is available on flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998c).

Hesperomannia arborescens was formerly known from Lanai, Molokai, and Oahu. This species is now known from Oahu, Molokai, and Maui. On Molokai, one occurrence of three individuals is known from private land (GDSI 2000, HINHP Database 2000).

On Molokai, *Hesperomannia arborescens* is found on slopes or ridges in wet *Metrosideros polymorpha-Dicranopteris linearis* lowland forest or mesic *Diospyros sandwicensis-M. polymorpha* lowland forest transition zones between 175 and 959 m (574 and 3,146 ft) in elevation. Associated native species include *Antidesma* sp., *Boehmeria grandis, Broussaisia arguta, Cheirodendron* sp., *Cibotium glaucum, Clermontia pallida* (oha wai), *Coprosma* sp., *Cyrtandra* sp., *Diplopterygium pinnatum* (uluhe lau nui), *Elaphoglossum* sp. (ekaha), *Freycinetia arborea, Hedyotis* sp., *Ilex anomala, Myrsine* sp., *Nephrolepis exaltata, Nestegis sandwicensis, Pipturus* sp., *Psychotria mauiensis* (kopiko), *Smilax melastomifolia* (hoi kuahiwi), *Thelypteris* sp. (palapalaia), *Urera glabra,* or *Wikstroemia* sp. (HINHP Database 2000).

The major threats to *Hesperomannia arborescens* on Molokai are habitat degradation by feral pigs, goats, and humans; competition with non-native plants, such as *Clidemia hirta, Kalanchoe pinnata,* and *Rubus rosifolius;* and catastrophic extinction due to random environmental events or reduced reproductive vigor resulting from this species' limited numbers (HINHP Database 2000, 59 FR 14482).

Hibiscus brackenridgei (mao hau hele)

Hibiscus brackenridgei, a short-lived perennial 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. Three subspecies of *Hibiscus brackenridgei* are now recognized: ssp. *brackenridgei, molokaiana,* and *mokuleianus.* Subspecies *molokaiana* was found on the island of Molokai. At the time when we listed this species in 1994, only two subspecies, *brackenridgei* and *mokuleianus,* were recognized. Subsequent to the final rule listing this species in 1994, we became aware of Wilson's (1993) taxonomic treatment of this group, in which *Hibiscus brackenridgei* var. *molokaiana* was changed to subspecies status and recognized as distinct from *Hibiscus brackenridgei* ssp. *brackenridgei.* Wilson's (1993) treatment is cited in the supplement in the revised edition of the ''Manual of the Flowering Plants of Hawaii'' as the basis for recognizing *Hibiscus brackenridgei* ssp. *molokaiana.* We will address this name change in a future **Federal Register** document (Bates 1999, HINHP Database 2000, Wagner *et al.* 1999, Wilson 1993).

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 tied to day length. Little else is known about the life history of this plant. Pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999a).

Historically, *Hibiscus brackenridgei* ssp. *molokaiana* was known from Molokai and is currently found on Oahu. This subspecies was last collected on Molokai in 1920 from Laau

Point by J. F. Rock (HINHP Database 2000).

On Molokai, *Hibiscus brackenridgei* ssp. *molokaiana* occurred on slopes in lowland dry forest and shrubland from 11 to 467 m (36 to 1,531 ft) in elevation (HINHP Database 2000; J. Lau, *in litt.* 2001).

Information on threats that may affect *Hibiscus brackenridgei* ssp. *molokaiana* on Molokai is unknown (Service 1999a).

Ischaemum byrone (Hilo ischaemum)

Ischaemum byrone, a member of the grass family (Poaceae), is a short-lived perennial species with creeping underground and erect stems. *Ischaemum byrone* can be distinguished from other Hawaiian grasses by its tough outer flower bracts, dissimilar basic flower units, which are awned and two-flowered, and a two-or three-tiered inflorescence (O'Connor 1999).

Little 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 1996b).

Ischaemum byrone was historically distributed on Kauai, Oahu, Molokai, Maui, and Hawaii Island. Currently, this species is found on Kauai, Molokai, Maui, and Hawaii Island. On Molokai, there are a total of 2 occurrences containing between 100 and 1,000 individuals located in Wailau Valley and the eastern edge of Kikipua on privately owned lands (GDSI 2000, HINHP Database 2000, 59 FR 10305).

On Molokai, *Ischaemum byrone* is found in coastal dry shrubland or *Artemisia* sp. cliff communities, near the ocean, among rocks or on basalt cliffs or talus slopes, at elevations between sea level and 238 m (0 and 781 ft). Associated taxa include *Bidens molokaiensis* (NCN), *Fimbristylis cymosa, Hedyotis littoralis, Lysimachia mauritiana,* or *Pandanus tectorius* (hala) (Gagne and Cuddihy 1999, HINHP Database 2000, O'Connor 1999).

The threats to *Ischaemum byrone* on Molokai are competition by non-native grasses, particularly *Digitaria ciliaris;* predation by goats and axis deer; and elimination and degradation of habitat through fire and residential development (Service 1996b).

Isodendrion pyrifolium (wahine noho kula)

Isodendrion pyrifolium, a short-lived perennial member of the violet family (Violaceae), is a small, branched shrub. It is distinguished from other taxa 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 drops all but the newest leaves. After sufficient rain, the plants produce flowers with seeds ripening one to two months later. No further information is available on flowering cycles, pollination vectors, seed dispersal agents, specific environmental requirements, or limiting factors (Service 1996c).

Isodendrion pyrifolium was known historically from Kauai, Oahu, Maui, Hawaii, Niihau, Molokai, and Lanai. Currently, this species is only extant on the island of Hawaii. It was last collected on Molokai in the 1800s (HINHP Database 2000).

On Molokai, *Isodendrion pyrifolium* was found in dry shrublands at low elevations between 69 and 422 m (226 and 1,384 ft). Associated native plant species included *Bidens menziesii, Dodonaea viscosa, Heteropogon contortus,* or *Leptecophylla tameiameiae* (HINHP Database 2000; Wagner *et al.* 1999; J. Lau, *in litt.* 2001).

Information on threats that may have affected *Isodendrion pyrifolium* on Molokai is unknown (Service 1996a).

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 narrower, flattened, and more spreading spikelets (flower clusters) (Koyama 1999, 59 FR 56333).

Little 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 1996b).

Historically, *Mariscus fauriei* was found on east Molokai, Lanai, and Hawaii Island. This species is no longer extant on Lanai. Currently on Molokai, there is one occurrence with 20 to 30 plants above Kamiloloa on State-owned land (GDSI 2000; HINHP Database 2000).

On Molokai, *Mariscus fauriei* typically grows in *Diospyros sandwicensis*-dominated lowland dry forests, often on a lava substrate, at elevations between 436 and 1,120 m (1,430 and 3,673 ft). Associated species include *Peperomia* sp. (ala ala wai nui), *Psydrax odorata,* or *Rauvolfia sandwicensis* (hao) (HINHP Database 2000, Koyama 1999).

The threats to *Mariscus fauriei* on Molokai include predation and habitat degradation by feral goats and axis deer. Because there is only one known occurrence on Molokai, the species is also threatened by the risk of extinction through random environmental events and through reduced reproductive vigor (Service 1996b, 59 FR 56333).

Marsilea villosa (ihiihi)

Marsilea villosa, a member of the marsilea family (Marsileaceae), is a short-lived perennial aquatic to semi-aquatic fern, similar in appearance to a four-leaved clover. The leaves are borne in pairs along a thin rhizome. A hard sporocarp (hard-walled case containing male and female spores) is borne at the base of a leaf pair. The plant occurs either in scattered clumps or as a dense interwoven mat, depending on the competition with other species for limited habitat resources. The species is the only member of the genus native to Hawaii and is closely related to *Marsilea vestita* (NCN) of the western coast of the United States (Service 1996c).

Marsilea villosa requires periodic flooding for spore release and fertilization, then a decrease in water level for the young plants to establish, and finally dry soil for sporocarps to mature. Shading reduces the vigor of *Marsilea villosa.* No other life history information is known for this species (Service 1996c).

Marsilea villosa was known historically from Oahu, Molokai, and Niihau. Currently, it is found only on Oahu and Molokai. On Molokai, there are four occurrences with an unspecified number of individuals located at Kamaka ipo, Ilio Point, Kaiehu Point, and from Kaeo to Mokio on State- and privately owned lands (GDSI 2000, HINHP Database 2000).

On Molokai, *Marsilea villosa* typically occurs in shallow depressions in clay soil or lithified sand dunes overlain with alluvial clay. All reported populations occur at elevations between 125 and 172 m (410 and 564 ft). While *Marsilea villosa* can withstand minimal shading, it appears most vigorous growing in open areas. The associated native vegetation with *Marsilea villosa* on Molokai includes *Centaurium sebaeoides, Heteropogon contortus, Schiedea globosa, Sida fallax, Tetramolopium sylvae* (pamakani), or *Waltheria indica* (uhaloa) (Service 1996c).

The threats to *Marsilea villosa* on Molokai are the destruction of natural hydrology; encroachment and competition from naturalized, non-native plants such as *Cenchrus ciliaris* (buffelgrass), *Chamaecrista nictitans*

(partridge pea), *Digitaria insularis, Lantana camara,* and *Prosopis pallida;* damage by off-road vehicles or by grazing cattle and axis deer; habitat destruction, degradation, and fragmentation through development, fire, and trampling by humans and introduced mammals; and catastrophic extinction from random environmental events and from reduced reproductive vigor due to few occurrences and small occurrence sizes (Service 1996c, 57 FR 27863).

Melicope mucronulata (alani)

Melicope mucronulata, a long-lived perennial of the rue family (Rutaceae), is a small tree up to 13 ft (4 m) tall with oval to elliptic-oval leaves. This species is distinguished from others in the genus by the growth habit, the number of flowers in each flower cluster, the size and shape of the fruit, and the degree of hairiness of the leaves and fruit walls (Stone *et al.* 1999).

Little 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 1997).

First discovered in 1920 in Kanaio, East Maui, *Melicope mucronulata* was not relocated until 1983. On Molokai, two occurrences of three individuals were found two years later in Kupaia on the privately owned Kamakou Preserve (GDSI 2000, HINHP Database 2000, Stone *et al.* 1999).

On Molokai, *Melicope mucronulata* occurs on steep, west- or north-facing slopes in mesic *Diospyros sandwicensis-Metrosideros polymorpha* forest, *M. polymorpha-Dodonaea viscosa* shrubland, or *M. polymorpha-Leptechophylla tameiameiae* shrubland between elevations of 199 and 1,143 m (653 and 3,749 ft). Associated native species include *Alyxia oliviformis, Alphitonia ponderosa* (kauila), *Coprosma foliosa, Hedyotis terminalis, Melicope hawaiensis* (alani), *Myrsine lanaiensis* (kolea), *Nestegis sandwicensis, Ochrosia compta, Osteomeles anthyllidifolia, Phyllanthus* sp. (NCN), *Pleomele auwahiensis, Pittosporum* sp., or *Psychotria mariniana* (kopiko) (HINHP Database 2000; J. Lau, *in litt.* 2001).

On Molokai, the major threat to the continued existence of this species is catastrophic extinction from random environmental events due to the few extant occurrences and small number of individuals. Habitat degradation by goats and pigs, predation by goats, and competition with non-native plants, particularly *Melinis minutiflora*, also pose immediate threats to this species (Service 1997, 57 FR 20772).

Melicope munroi (alani)

Melicope munroi, a long lived perennial of the rue 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 only known from Lanai. This species was last collected on Molokai in 1910 by J. F. Rock (HINHP Database 2000).

Nothing is known of the preferred habitat of or native plants associated with *Melicope munroi* on Molokai.

Nothing is known of the threats to *Melicope munroi* on Molokai.

Neraudia sericea (NCN)

Neraudia sericea, a short-lived perennial and a 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 this species. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999a).

Neraudia sericea was known historically from Molokai, Lanai, Maui, and Kahoolawe. Currently, this species is found only on Maui and Molokai. On Molokai, one occurrence of 50 to 100 individuals is known from Makolelau on privately owned land (GDSI 2000, HINHP Database 2000).

On Molokai, *Neraudia sericea* generally occurs on gulch slopes and gulch bottoms in lowland dry to mesic *Metrosideros polymorpha-Dodonaea viscosa-Leptechophylla tameiameiae* shrubland or forest between 691 and 1,043 m (2,266 and 3,421 ft) in elevation. Other associated plant species include *Alyxia oliviformis, Coprosma* sp., *Hedyotis* sp., or *Pleomele auwahiensis* (HINHP Database 2000; Wagner *et al.* 1999; J. Lau, *in litt.* 2001).

The primary threats to *Neraudia sericea* on Molokai are habitat degradation by feral pigs and goats; competition with the non-native plant *Melinus minutiflora*; and catastrophic extinction through random environmental events due to the vulnerability of a single population (Service 1999a, 59 FR 56333).

Peucedanum sandwicense (makou)

Peucedanum sandwicense, a short-lived perennial member of the parsley family (Apiaceae), is a parsley-scented, sprawling herb. Hollow stems arise from a short, vertical stem with several fleshy roots. This species is the only member of the genus in the Hawaiian Islands (Constance and Affolter 1999).

Little 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 1995b).

Historically and currently, *Peucedanum sandwicense* is known from Molokai, Maui, and Kauai. In 1990, it was discovered on Oahu. On Molokai, five occurrences are known from private and State-owned lands in Pelekunu Valley, on Huelo Islet and Mokapu Islet, and State-owned lands managed by the National Park Service at Kalaupapa National Historical Park. The 5 occurrences total approximately 50 individuals (GDSI 2000; HINHP Database 2000; Service 1995b; K. Wood, *in litt.* 2000).

On Molokai, *Peucedanum sandwicense* grows in cliff habitats in brown soil and talus in *Chamaesyce celastroides* var. *amplectans-Chenopodium oahuense* coastal dry shrubland or *Diospyros sandwicensis* forest from sea level to above 840 m (0 to 2,755 ft) in elevation. *Peucedanum sandwicense* is associated with native species such as *Artemisia australis* (ahinahina), *Dianella sandwicensis, Eragrostis* sp. (kawelu), *Lepidium bidentatum* var. *o-waihiense, Melathera integrifolia, Metrosideros polymorpha, Osteomeles anthyllidifolia, Peperomia remyi* (NCN), *Pittosporum halophilum, Plectranthus parviflorus* (ala ala wai nui), *Plumbago zeylanica* (iliee), *Portulaca lutea* (ihi), *Pritchardia hillebrandii, Reynoldsia sandwicensis, Santalum ellipticum* (iliahialoe), *Scaevola sericea, Schiedea globosa, Senna gaudichaudii*, or *Sida fallax* (Constance and Affolter 1999; HINHP

Database 2000; Service 1995b; K. Wood, *in litt.* 2000).

Major threats to *Peucedanum sandwicense* on Molokai are seed predation by rats and competition with the non-native plant species *Ageratum conyzoides* (maile hohono), *Coronopus didymus* (swinecress), *Kalanchoe pinnata, Lantana camara, Malvastrum coromandelianum* ssp. *coromandelianum* (false mallow), *Morinda citrifolia* (noni), *Plantago lanceolata* (English plantain), *Pluchea carolinensis* (sourbush), *Portulaca oleracea, Pseudoelephantopus spicatus* (NCN), *Schinus terebinthifolius*, and *Sonchus oleraceus* (pualele) (Service 1995b; 59 FR 9304; K. Wood, *in litt.* 2000).

Phyllostegia mannii (NCN)

Phyllostegia mannii, a short-lived perennial and nonaromatic member of the mint family (Lamiaceae), is a climbing vine with many-branched, four-sided, hairy stems. This species is distinguished from others in the genus by its hairiness; its thin, narrow leaves, which are not pinnately divided; and the usually six flowers per false whorl in a terminal inflorescence (Wagner *et al.* 1999).

This species has been observed in fruit in July. Little 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 1996a).

Historically, *Phyllostegia mannii* was found from Hanalilolilo to Ohialele on East Molokai and at Ukulele on East Maui. It has not been seen on Maui for over 70 years and is apparently extirpated on that island. On Molokai, this species is now known from only one occurrence on Puu Alii on privately owned land (GDSI 2000, HINHP Database 2000, Service 1996a).

On Molokai, *Phyllostegia mannii* grows in shaded sites in sometimes foggy and windswept, wet, open *Metrosideros polymorpha*-dominated montane forest with a native shrub and *Cibotium* sp. understory between 590 and 1,508 m (1,935 and 4,946 ft) in elevation. Associated plant species include *Asplenium* sp., *Broussaisia arguta, Cheirodendron trigynum, Coprosma ochracea, Cyanea* sp., *Dicranopteris linearis, Hedyotis hillebrandii, Pipturus albidus, Pouteria sandwicensis, Psychotria* sp., *Touchardia latifolia, Vaccinium* sp., or *Wikstroemia* sp. (HINHP Database 2000, Service 1996a).

The only known occurrence of *Phyllostegia mannii* is threatened by habitat destruction and degradation by feral pigs. A single natural or human-caused environmental event could extirpate the species (Service 1996a, 57 FR 46325).

Phyllostegia mollis (NCN)

Phyllostegia mollis, a short-lived member of the mint family (Lamiaceae), grows as a nearly erect, densely hairy, non-aromatic, perennial herb. A suite of technical characteristics concerning the kind and amount of hair, the number of flowers in a cluster, and details of the various plant parts separate this species from other members of the genus (Wagner *et al.* 1999).

Individual *Phyllostegia mollis* plants live for approximately five years. The species is known to flower in late winter and spring. Little 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 1998b).

Historically, *Phyllostegia mollis* was known from Oahu, Molokai, and East Maui. Currently, this species is found only on Oahu and Maui. It was last collected on Molokai in 1912 from Kamakou Preserve by J. F. Rock (HINHP Database 2000).

On Molokai, *Phyllostegia mollis* typically grew in mesic *Metrosideros polymorpha* forests between 551 and 1,216 m (1,807 and 3,988 ft) in elevation (J. Lau, *in litt.* 2001).

Nothing is known of the threats that may have affected *Phyllostegia mollis* on Molokai.

Plantago princeps (laukahi kuahiwi)

Plantago princeps, a short-lived member of the plantain family (Plantaginaceae), is a small shrub or robust perennial herb. This species differs from other native members of the genus in Hawaii by its large branched stems, flowers at nearly right angles to the axis of the flower cluster, and fruits that break open at a point two-thirds from the base. The four varieties, vars. *anomala, laxiflora, longibracteata*, and *princeps*, are distinguished by the branching and pubescence of the stems; the size, pubescence, and venation of the leaves; the density of the inflorescence; and the orientation of the flowers (Wagner *et al.* 1999).

Little is known about the life history of this plant. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown. However, individuals have been observed in fruit from April through September (Service 1999a).

Plantago princeps was historically known from Kauai, Oahu, Molokai, Maui, and Hawaii Island. It no longer occurs on Hawaii Island. *Plantago princeps* var. *anomala* is currently known from Kauai and Oahu; var. *longibracteata* is known from Kauai and Oahu; var. *princeps* is known from Oahu; and var. *laxiflora* is known from Molokai and Maui. On Molokai, there is currently one remaining occurrence of *Plantago princeps* var. *laxiflora* with five individuals in Kawela Gulch on privately owned land (GDSI 2000, HINHP Database 2000, Service 1999a).

On Molokai, *Plantago princeps* var. *laxiflora* is typically found on streambanks in *Metrosideros polymorpha* lowland mesic forest between 592 and 1,213 m (1,942 and 3,979 ft) in elevation. Associated plant species include *Coprosma* sp., *Cyanea* sp., *Dodonaea viscosa, Dryopteris unidentata, Pipturus albidus*, or *Wikstroemia oahuensis* (akia), (Wagner *et al.* 1999; J. Lau, *in litt.* 2001).

The primary threats to *Plantago princeps* var. *laxiflora* on Molokai are predation and habitat degradation by feral pigs and goats, and competition with various non-native plant species (Service 1999a, 59 FR 56333).

Platanthera holochila (NCN)

Platanthera holochila, a short-lived perennial member of the orchid family (Orchidaceae), is an erect, deciduous herb. The stems arise from underground tubers, the pale green leaves are lance- to egg-shaped, and the greenish-yellow flowers occur in open spikes. It is distinguished by other Hawaiian orchids by its underground tubers that lack roots at the nodes or pseudobulbs, and the shape and length of its dorsal sepal. This is the only species of this genus that occurs in the Hawaiian Islands (Wagner *et al.* 1999).

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

Historically, *Platanthera holochila* was known from Maui, Oahu, Molokai, and Kauai. Currently, *P. holochila* is extant on Kauai, Molokai, and Maui. On Molokai, one occurrence with less than 10 individuals is reported from Hanalilolilo on the privately owned land of Kamakou Preserve (GDSI 2000, HINHP Database 2000).

On Molokai, *Platanthera holochila* is found on slightly sloping ridgetops in *Metrosideros polymorpha-*

Cheirodendron trigynum wet forest or *M. polymorpha* mixed montane bog between 551 and 1,382 m (1,807 and 4,532 ft) in elevation. Associated native plants include *Cibotium* sp., *Leptecophylla tameiameiae*, or *Oreobolus furcatus* (NCN) (J. Lau, *in litt.* 2001).

The primary threats to *Platanthera holochila* on Molokai are habitat degradation and destruction by feral pigs, competition with non-native plants, and a risk of extinction from naturally occurring events and/or reduced reproductive vigor, due to the small number of remaining occurrences and individuals. Predation by non-native slugs may also be a potential threat to this species (Service 1999a, 61 FR 53108).

Pteris lidgatei (NCN)

Pteris lidgatei, a short-lived member of the maidenhair fern family (Adiantaceae), is a coarse perennial herb, 0.5 to 1 m (1.6 to 3.3 ft) tall. *Pteris lidgatei* can be distinguished from other species of *Pteris* in the Hawaiian Islands by the texture of its fronds and the tendency of the sori along the leaf margins to be broken into short segments instead of being fused into continuous marginal sori (Wagner and Wagner 1992).

Little 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 1998a).

Historically, *Pteris lidgatei* was found on Oahu, Molokai, and West Maui. Currently, this species is known from Oahu and Maui. It was last collected on Molokai in 1912 from the slopes of Olokui by C. N. Forbes (HINHP Database 2000).

On Molokai, *Pteris lidgatei* grew on steep streambanks between 78 and 1,266 m (256 and 4,152 ft) in elevation in wet forest (HINHP Database 2000).

Nothing is known of the threats that may have affected *Pteris lidgatei* on Molokai (Service 1998a).

Schiedea nuttallii (NCN)

Schiedea nuttallii, a long-lived perennial member of the pink family (Caryophyllaceae), is a generally hairless, erect subshrub. This species is distinguished from others in this endemic Hawaiian genus by its habit, length of the stem internodes, length of the inflorescence, number of flowers per inflorescence, and smaller leaves, flowers, and seeds (Wagner *et al.* 1999).

Based on field and greenhouse observations, *Schiedea nuttallii* is hermaphroditic (flowers contain both male and female parts). Plants on Oahu have been under observation for 10 years, and they appear to be long-lived. *Schiedea nuttallii* appears to be an outcrossing (requires cross-pollination) species. Under greenhouse conditions, plants fail to set seed unless hand-pollinated, suggesting that this species requires insects for pollination. Fruits and flowers are abundant in the wet season but can be found throughout the year. Little else is known about the life history of this plant. Its flowering cycles, pollination vectors, seed dipersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999a; Weller *et al.* 1990; Kapua Kawelo, U.S. Deptartment of Defense, Army Environmental, *in litt.* 1999).

Historically, *Schiedea nuttallii* was known from scattered locations on Kauai, Oahu, Molokai, and Maui. Currently, populations occur on Kauai, Oahu, and Molokai. On Molokai, one occurrence with 22 individuals of *Schiedea nuttallii* is reported on private lands (GDSI 2000, HINHP Database 2000, Service 1999a).

On Molokai, *Schiedea nuttallii* typically grows in streamside grottos in wet *Metrosideros polymorpha-Cheirodendron trigynum* forest at elevations between 677 and 1,423 m (2,220 and 4,667 ft). Associated plants include *Asplenium lobulatum* (piipii lau manamana), Asplenium macraei (iwaiwa lau lii), *Asplenium unilaterale* (pamoho) *Cyrtandra hawaiiensis* (haiwale), *Thelypteris sandwicensis* (NCN), or *Vandenboschia davallioides* (palai hihi) (J. Lau, *in litt.* 2001).

Schiedea nuttallii on Molokai is seriously threatened by competition with several non-native plants; predation by the black twig borer, slugs, and snails; and a risk of extinction from naturally occurring events (*e.g.*, landslides) and/or from reduced reproductive vigor due to the small number of individuals (Service 1999a, 61 FR 53108).

Sesbania tomentosa (ohai)

Sesbania tomentosa, a short-lived perennial member of the pea family (Fabaceae), is typically a sprawling 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 salmon colored 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* (Egyptian rattlepod) 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 1999a).

Currently, *Sesbania tomentosa* occurs on six of the eight main Hawaiian Islands (Kauai, Oahu, Molokai, Kahoolawe, Maui, and Hawaii Island) and in the Northwestern Hawaiian Islands (Nihoa and Necker islands). It is no longer found on Niihau and Lanai. On Molokai, *Sesbania tomentosa* is known from 9 occurrences with over 2,000 individuals, occurring from Moomomi to Nenehanaupo and from Kamiloloa to Makolekau on State- and privately owned lands (GDSI 2000, HINHP Database 2000, Service 1999a, 59 FR 56333).

On Molokai, *Sesbania tomentosa* is found in *Scaevola sericea* coastal dry shrubland on windswept slopes, sea cliffs and weathered basaltic slopes between sea level and 516 m (0 and 1,692 ft) in elevation. Associated plant species include *Dodonaea viscosa, Jacquemontia ovalifolia* ssp. *sandwicensis, Melanthera integrifolia*, or *Sida fallax* (HINHP Database 2000, Service 1999a).

The primary threats to *Sesbania tomentosa* on Molokai are competition with various non-native plant species, such as *Lantana camara* and grass species; habitat degradation by feral cattle; lack of adequate pollination; seed predation by rats, mice, and potentially non-native insects; and destruction by random environmental events (*e.g.*, fire) and human activities (*e.g.*, off-road vehicles) (Service 1999a, 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 50 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*, the only other member of the genus found on Molokai, 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 this species. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1996a).

The historical range of *Silene lanceolata* includes five Hawaiian Islands: Kauai, Oahu, Molokai, Lanai, and Hawaii. *Silene lanceolata* is presently found on the islands of Molokai, Oahu, and Hawaii. On Molokai, one occurrence of approximately 100 individuals was found in 1987 on private land near Puu Kolekole (GDSI 2000; Service 1996a; K. Wood, *in litt.* 1999).

On Molokai, *Silene lanceolata* grows on gulch slopes, ridge tops, and cliffs in dry to mesic shrubland between 581 and 1,043 m (1,906 and 3,421 ft) in elevation. Associated native plant species include *Bidens menziesii, Carex wahuensis, Diospyros sandwicensis, Dodonaea viscosa, Dubautia linearis, Leptecophylla tameiameiae, Metrosideros polymorpha*, or *Schiedea* spp. (NCN) (Service 1996a; J. Lau, *in litt.* 2001; K. Wood, *in litt.* 1999).

Habitat destruction by feral ungulates (goats and pigs), wildfires, and competition by invading non-native plants are immediate threats to *Silene lanceolata* on Molokai (Service 1996a, 57 FR 46325).

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 (59 FR 56333).

Historically, *Solanum incompletum* was known from 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, the species is only known from the island of Hawaii. It is unclear when the last individual was collected on Molokai (HINHP Database 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Solanum incompletum* on the island of Molokai.

Nothing is known of the threats to *Solanum incompletum* on Molokai.

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.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999a).

Historically, *Spermolepis hawaiiensis* was known from Kauai, Oahu, Lanai, and the island of Hawaii. Currently, it is found on Kauai, Oahu, Molokai, Lanai, Maui, and the island of Hawaii. On Molokai, there is one known occurrence with approximately 600 individuals on privately owned land in Kamalo (GDSI 2000, HINHP Database 2000, Service 1999a, 59 FR 56333).

On Molokai, *Spermolepis hawaiiensis* is known from ridge crests and gulch slopes in dry to mesic shrublands at elevations between 432 and 972 m (1,416 and 3,188 ft). Associated plant species include *Dodonaea viscosa, Leptecophylla tameiameiae, or Metrosideros polymorpha* (J. Lau, *in litt.* 2001).

The primary threats to *Spermolepis hawaiiensis* on Molokai are habitat degradation by feral goats; competition with various non-native plants, such as *Lantana camara, Melinis minutiflora*, and grasses; and habitat destruction and extinction due to natural environmental events, such as erosion, landslides, and rockslides due to natural weathering (Service 1999a, 59 FR 56333).

Vigna o-wahuensis (NCN)

Vigna o-wahuensis, a member of the pea 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 this species. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999a).

Historically, *Vigna o-wahuensis* was known from Niihau, Oahu, Molokai, Lanai, Kahoolawe, Maui, and the island of Hawaii. Currently, it is known from the islands of Molokai, Lanai, Kahoolawe, Maui, and the island of Hawaii. On Molokai, 2 occurrences with approximately 16 individuals occur on privately owned lands at Onini Gulch and Makolelau (GDSI 2000, HINHP Database 2000, Service 1999a).

On Molokai, *Vigna o-wahuensis* occurs in dry to mesic grassland and shrubland between 516 and 1,041 m (1,692 and 3,414 ft) in elevation. Associated plant species include *Chenopodium oahuense, Cyperus laevigatus* (makaloa), *Dodonaea viscosa, Eragrostis variabilis, Heteropogon contortus, Ipomoea* sp. (morning glory), *Leptecophylla tameiameiae, Scaevola sericea, Sida fallax*, or *Vitex rotundifolia* (pohinahina) (Geesink *et al.* 1999, HINHP Database 2000, Service 1999a).

The primary threats to *Vigna o-wahuensis* on Molokai are competition with various non-native plant species and a risk of extinction due to random environmental events (primarily fire) and/or reduced reproductive vigor because of the small number of existing occurrences and individuals (Service 1999a, 59 FR 56333).

Zanthoxylum hawaiiense (ae)

Zanthoxylum hawaiiense, a long-lived perennial in the rue family (Rutaceae), is a medium-sized tree with pale to dark gray bark and lemon-scented leaves. It 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-shape fruits with a rounded tip (Stone *et al.* 1999).

Little 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 1996b).

Historically, *Zanthoxylum hawaiiense* was known from the islands of Kauai, Molokai, Lanai, Maui, and the island of Hawaii. Currently, *Zanthoxylum hawaiiense* is found on Kauai, Molokai, Maui, and the island of Hawaii. On Molokai, the four occurrences with a

total of five individuals are located at Makolelau and Puu Hoi Ridge on private lands (GDSI 2000, HINHP Database 2000).

On Molokai, *Zanthoxylum hawaiiense* is found on gulch slopes in mesic *Metrosideros polymorpha* or *Diospyros sandwicensis* forest between 754 and 1,084 m (2,473 and 3,555 ft) in elevation. Associated species include *Alyxia oliviformis, Dodonaea viscosa, Leptecophylla tameiameiae, Myrsine lanaiensis, Nestegis sandwicensis, Osteomeles anthyllidifolia, Pleomele auwahiensis,* or *Psychotria* spp. (HINHP Database 2000; Stone *et al.* 1999; 59 FR 10305; J. Lau, *in litt.* 2001).

The threats to *Zanthoxylum hawaiiense* on Molokai include browsing, grazing, and trampling by feral goats; competition with non-native plant species; habitat degradation and destruction by humans; and extinction from naturally occurring events (primarily fire) and/or from reduced reproductive vigor due to the small number of individuals and occurrences (Service 1996b, 59 FR 10305).

A summary of occurrences and landownership for the 51 plant species reported from the island of Molokai is given in Table 2.

TABLE 2.—SUMMARY OF EXISTING OCCURRENCES ON MOLOKAI AND OF LANDOWNERSHIP FOR 51 SPECIES REPORTED FROM MOLOKAI

Species	Number of current occurrences	Landownership		
		Federal	State	Private
Adenophorus periens	1	.....	.....	X
Alectryon macrococcus	6	.....	X	X
Bidens wiebkei	5	.....	.....	X
Bonamia menzeisii	0	.....	.....	.....
Brighamia rockii	5	.....	X	X
Canavalia molokaiensis	7	.....	X*	X
Centaurium sebaeoides	2	.....	X*	X
Clermontia oblongifolia ssp. *brevipes*	5	.....	.....	X
Ctenitis squamigera	1	.....	.....	X
Cyanea dunbarii	1	.....	X	.....
Cyanea grimesiana ssp. *grimesiana*	2	.....	X	.....
Cyanea mannii	8	.....	X	X
Cyanea procera	5	.....	X	X
Cyperus trachysanthos	0	.....	.....	.....
Diellia erecta	4	.....	.....	X
Diplazium molokaiense	0	.....	.....	.....
Eugenia koolauensis	0	.....	.....	.....
Flueggea neowawraea	0	.....	.....	.....
Hedyotis mannii	1	.....	.....	X
Hesperomannia arborescens	1	.....	.....	X
Hibiscus arnottianus ssp. *immaculatus*	3	.....	X	X
Hibiscus brackenridgei	0	.....	.....	.....
Ischaemum byrone	2	.....	.....	X
Isodendrion pyrifolium	0	.....	.....	.....
Labordia triflora	1	.....	.....	X
Lysimachia maxima	1	.....	.....	X
Mariscus fauriei	1	.....	X	.....
Marsilea villosa	4	.....	X	X
Melicope mucronulata	2	.....	.....	X
Melicope munroi	0	.....	.....	.....
Melicope reflexa	3	.....	X	X
Neraudia sericea	1	.....	.....	X
Peucedanum sandwicense	5	.....	X*	X
Phyllostegia mannii	1	.....	.....	X
Phyllostegia mollis	0	.....	.....	.....
Plantago princeps	1	.....	.....	X
Platanthera holochila	1	.....	.....	X
Pritchardia munroi	1	.....	.....	X
Pteris lidgatei	0	.....	.....	.....
Schiedea lydgatei	4	.....	X	X
Schiedea nuttallii	1	.....	.....	X
Schiedea sarmentosa	5	.....	.....	X
Sesbania tomentosa	9	.....	X	X
Silene alexandri	0	.....	.....	.....
Silene lanceolata	1	.....	.....	X
Solanum incompletum	0	.....	.....	.....
Spermolepis hawaiiensis	1	.....	.....	X
Stenogyne bifida	5	.....	.....	X
Tetramolopium rockii	4	.....	X*	X
Vigna o-wahuensis	2	.....	.....	X
Zanthoxylum hawaiiense	2	.....	.....	X

*Some occurrences are on State land that is managed by the National Park Service at Kalaupapa National Historical Park and/or the U.S. Coast Guard Reservation at Kalaupapa.

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, *Adenophorus periens, Alectryon macrococcus* (as *A. macrococcum* var. *macrococcum* and *A. mahoe*), *Bidens wiebkei, Bonamia menziesii, Brighamia rockii, Canavalia molokaiensis, Flueggea neowawraea* (as *Drypetes phyllanthoides*), *Hedyotis mannii* (as *H. thyrsoidea* var. *thyrsoidea*), *Hesperomannia arborescens* (as *H. arborescens* var. *bushiana* and var. *swezeyi*), *Hibiscus arnottianus* ssp. *immaculatus* (as *H. immaculatus*), *Hibiscus brackenridgei* (as *H. brackenridgei* var. *brackenridgei,* var. *mokuleianus,* and var. ''from Hawaii''), *Ischaemum byrone, Marsilea villosa, Melicope reflexa* (as *P. reflexa*), *Neraudia sericea* (as *N. kahoolawensis*), *Peucedanum sandwicense* (as *P. kauaiense*), *Plantago princeps* (as *P. princeps* var. *elata,* var. *laxifolia,* var. *princeps*), *Sesbania tomentosa* (as *S. hobdyi* and *S. tomentosa* var. *tomentosa*), *Silene alexandri, Silene lanceolata, Solanum incompletum* (as *S. haleakalense* and *S. incompletum* var. *glabratum,* var. *incompletum,* and var. *mauiensis*), *Vigna o-wahuensis* (as *V. sandwicensis* var. *heterophylla* and var. *sandwicensis*), and *Zanthoxylum hawaiiense* (as *Z. hawaiiense* var. *citiodora*) were considered endangered; *Diellia erecta* and *Zanthoxylum hawaiiense* (as *Z. hawaiiense* var. *hawaiiense* and var. *velutinosum*) were considered threatened; and *Ctenitis squamigera, Diplazium molokaiense, Isodendrion pyrifolium, Labordia triflora, Melicope mucronulata* (as *Pelea mucronulata*), *Melicope munroi* (as *Pelea munroi*), *Plantago princeps* (as *P. princeps* var. *acaulis,* var. *denticulata,* and var. *queleniana*), and *Tetramolopium rockii* 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 we 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 *Labordia triflora* 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 51 species as endangered or threatened between 1991 and 1999. A summary of the listing actions can be found in Tables 3(a) and 3(b).

TABLE 3(A).—SUMMARY OF LISTING ACTIONS FOR 51 PLANT SPECIES FROM MOLOKAI

Species	Federal Status	Proposed listing rule		Final listing rule	
		Date	**Federal Register**	Date	**Federal Register**
Adenophorus periens	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Alectryon macrococcus	E	05/24/91	56 FR 23842	05/15/92	57 FR 20772
Bidens wiebkei	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Bonamia menzeisii	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Brighamia rockii	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Canavalia molokaiensis	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Centaurium sebaeoides	E	09/28/90	55 FR 39664	10/29/91	56 FR 55770
Clermontia oblongifolia ssp. *brevipes*	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Ctenitis squamigera	E	06/24/93	58 FR 34231	09/09/94	59 FR 49025
Cyanea dunbarii	E	10/02/95	60 FR 51436	10/10/96	61 FR 53130
Cyanea grimesiana ssp. *grimesiana*	E	10/02/95	60 FR 51417	10/10/96	61 FR 53108
Cyanea mannii	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Cyanea procera	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Cyperus trachysanthos	E	10/02/95	60 FR 51417	10/10/96	61 FR 53108
Diellia erecta	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Diplazium molokaiense	E	12/14/92	57 FR 39066	06/27/94	59 FR 32932
Eugenia koolauensis	E	10/02/95	60 FR 51398	10/10/96	61 FR 53089
Flueggea neowawraea	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Hedyotis mannii	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Hesperomannia arborescens	E	10/14/92	57 FR 47028	03/28/94	59 FR 14482
Hibiscus arnottianus ssp. *immaculatus*	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Hibiscus brackenridgei	E	09/28/90	55 FR 39664	10/29/91	56 FR 55770
Isodendrion pyrifolium	T	10/02/95	60 FR 51417	10/10/96	61 FR 53108
Ischaemum byrone	E	12/17/92	57 FR 59951	03/04/94	59 FR 10305
Labordia triflora	E	05/15/97	62 FR 26757	09/03/99	64 FR 48307
Lysmachia maxima	E	10/02/95	60 FR 51436	10/10/96	61 FR 53130
Mariscus fauriei	E	12/17/92	57 FR 59951	03/04/94	59 FR 10305
Marsilea villosa	E	02/15/91	56 FR 6349	06/22/92	57 FR 27863

TABLE 3(A).—SUMMARY OF LISTING ACTIONS FOR 51 PLANT SPECIES FROM MOLOKAI—Continued

Species	Federal Status	Proposed listing rule		Final listing rule	
		Date	**Federal Register**	Date	**Federal Register**
Melicope mucronulata	E	05/24/91	56 FR 23842	05/15/92	57 FR 20772
Melicope munroi	E	05/15/97	62 FR 26757	09/03/99	64 FR 48307
Melicope reflexa	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Neraudia sericea	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Peucedanum sandwicense	T	10/30/91	56 FR 55862	02/25/94	59 FR 9304
Phyllostegia mannii	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Phyllostegia mollis	E	10/02/95	60 FR 51398	10/10/96	61 FR 53089
Plantago princeps	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Platanthera holochila	E	10/02/95	60 FR 51417	10/10/96	61 FR 53108
Pritchardia munroi	E	10/08/92	57 FR 46325	09/20/91	56 FR 47718
Pteris lidgatei	E	10/02/95	60 FR 51398	10/10/96	61 FR 53089
Schiedea lydgatei	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Schiedea nuttallii	E	10/02/95	60 FR 51417	10/10/96	61 FR 53108
Schiedea sarmentosa	E	10/02/95	60 FR 51436	10/10/96	61 FR 53130
Sesbania tomentosa	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Silene alexandri	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Silene lanceolata	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Solanum incompletum	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Spermolepis hawaiiensis	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Stenogyne bifida	E	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Tetramolopium rockii	T	09/20/91	56 FR 47718	10/08/92	57 FR 46325
Vigna o—wahuensis	E	09/14/93	58 FR 48012	11/10/94	59 FR 56333
Zanthoxylum hawaiiense	E	12/17/92	57 FR 59951	03/04/94	59 FR 10305

Key: E=Endangered T=Threatened.

TABLE 3(B).—SUMMARY OF LISTING ACTIONS (PROPOSED AND FINAL CRITICAL HABITAT DETERMINATIONS) FOR 51 PLANT SPECIES FROM MOLOKAI

Species	Proposed designation or nondesignation of critical habitat		Designation or nondesignation of critical habitat	
	Date(s)	**Federal Register**	Date(s)	**Federal Register**
Adenophorus periens	11/07/2000, 12/27/2000, 12/29/2000, 03/04/2002, 04/05/2002, 05/28/2002, 05/28/2002	65 FR 66808, 65 FR 82086, 65 FR 83158, 67 FR 9806, 67 FR 16492, 67 FR 36968, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Alectryon macrococcus	11/07/2000, 12/18/2000, 12/29/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 37108	02/27/2003	68 FR 9116
Bidens wiebkei	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Bonamia menzeisii	11/07/2000, 12/18/2000, 12/27/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 65 FR 82086, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 36968, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Brighamia rockii	12/29/2000, 03/04/2002, 04/03/2002, 04/05/2002	65 FR 83158, 67 FR 9806, 67 FR 15856, 67 FR 16492	01/09/2003,	68 FR 1220
Canavalia molokaiensis	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Centaurium sebaeoides	11/07/2000, 12/18/2000, 12/27/2000,	65 FR 66808, 65 FR 79192, 65 FR 82086,	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116

TABLE 3(B).—SUMMARY OF LISTING ACTIONS (PROPOSED AND FINAL CRITICAL HABITAT DETERMINATIONS) FOR 51 PLANT SPECIES FROM MOLOKAI—Continued

Species	Proposed designation or nondesignation of critical habitat		Designation or nondesignation of critical habitat	
	Date(s)	**Federal Register**	Date(s)	**Federal Register**
	12/29/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 83158, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 37108		
Clermontia oblongifolia ssp. *brevipes*	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Ctenitis squamigera	12/18/2000, 12/27/2000, 12/29/2000, 01/28/2002, 03/04/2002, 04/05/2002, 05/28/2002	65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 3940, 67 FR 9806, 67 FR 16492, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Cyanea dunbarii	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Cyanea grimesiana ssp. *grimesiana*	12/18/2000, 12/27/2000, 12/29/2000, 03/04/2002, 04/03/2002, 04/05/2002	65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 9806, 67 FR 15856, 67 FR 16492	01/09/2003,	68 FR 1220,
Cyanea mannii	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Cyanea procera	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Cyperus trachysanthos	11/07/2000, 01/28/2002, 03/04/2002, 04/05/2002, 05/28/2002	65 FR 66808, 67 FR 3940, 67 FR 9806, 67 FR 16492, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Diellia erecta	12/18/2000, 12/29/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002, 05/28/2002	65 FR 79192, 65 FR 83158, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 36968, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Diplazium molokaiense	12/18/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 79192, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Eugenia koolauensis	04/05/2002, 05/28/2002, 04/05/2002, 05/28/2002	67 FR 16492, 67 FR 37108, 67 FR 16492, 67 FR 37108	NA	NA
Flueggea neowawraea	11/07/2000, 12/18/2000, 01/28/2002, 04/03/2002, 04/05/2002, 05/28/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 67 FR 3940, 67 FR 15856, 67 FR 16492, 67 FR 36968, 67 FR 37108	02/27/2003	68 FR 9116
Hedyotis mannii	12/18/2000, 12/27/2000, 12/29/2000, 03/04/2002, 04/03/2002, 04/05/2002	65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 9806, 67 FR 15856, 67 FR 16492	01/09/2003	68 FR 1220
Hesperomannia arborescens	12/18/2000, 12/29/2000, 03/04/2002, 04/03/2002, 04/05/2002,	65 FR 79192, 65 FR 83158, 67 FR 9806, 67 FR 15856, 67 FR 16492,	01/09/2003	68 FR 1220

TABLE 3(B).—SUMMARY OF LISTING ACTIONS (PROPOSED AND FINAL CRITICAL HABITAT DETERMINATIONS) FOR 51 PLANT SPECIES FROM MOLOKAI—Continued

Species	Proposed designation or nondesignation of critical habitat		Designation or nondesignation of critical habitat	
	Date(s)	**Federal Register**	Date(s)	**Federal Register**
	05/28/2002	67 FR 37108		
Hibiscus arnottianus ssp. *immaculatus*	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Hibiscus brackenridgei	12/18/2000, 12/27/2000, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002, 05/28/2002	65 FR 79192, 65 FR 82086, 67 FR 9806, 67 FR 15856, 67 FR 16492 67 FR 36968, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Isodendrion pyrifolium	01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002, 05/28/2002	67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 36968, 67 FR 37108	01/09/2003	68 FR 1220
Ischaemum byrone	12/18/2000, 12/29/2000, 01/28/2002, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 79192, 65 FR 83158, 67 FR 3940, 67 FR 15856, 67 FR 16492, 67 FR 36968	02/27/2003	68 FR 9116
Labordia triflora	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Lysmachia maxima	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Mariscus fauriei	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Marsilea villosa	12/29/2000, 04/05/2002, 05/28/2002	65 FR 83158, 67 FR 16492, 67 FR 37108	NA	NA
Melicope mucronulata	12/18/2000, 12/29/2000, 04/03/2002, 04/05/2002	65 FR 79192, 65 FR 83158, 67 FR 15856, 67 FR 16492	NA	NA
Melicope munroi	12/27/2000, 03/04/2002, 04/05/2002	65 FR 82086, 67 FR 9806, 67 FR 16492	01/09/2003	68 FR 1220
Melicope reflexa	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Neraudia sericea	12/18/2000, 12/29/2000, 03/04/2002, 04/03/2002, 04/05/2002	65 FR 79192, 65 FR 83158, 67 FR 9806, 67 FR 15856, 67 FR 16492	01/09/2003	68 FR 1220
Peucedanum sandwicense	11/07/2000, 12/18/2000, 12/29/2000, 01/28/2002, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940, 67 FR 15856, 67 FR 16492, 67 FR 37108	02/27/2003	68 FR 9116
Phyllostegia mannii	04/03/2002, 04/05/2002	67 FR 15856, 67 FR 16492	NA	NA
Phyllostegia mollis	12/18/2000, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 79192, 67 FR 15856, 67 FR 16492, 67 FR 37108	NA	NA
Plantago princeps	11/07/2000, 12/18/2000, 12/29/2000, 01/28/2002, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940, 67 FR 15856, 67 FR 16492, 67 FR 37108	02/27/2003	68 FR 9116
Platanthera holochila	11/07/2000, 12/18/2000, 12/29/2000,	65 FR 66808, 65 FR 79192, 65 FR 83158,	02/27/2003	68 FR 9116

TABLE 3(B).—SUMMARY OF LISTING ACTIONS (PROPOSED AND FINAL CRITICAL HABITAT DETERMINATIONS) FOR 51 PLANT SPECIES FROM MOLOKAI—Continued

Species	Proposed designation or nondesignation of critical habitat		Designation or nondesignation of critical habitat	
	Date(s)	**Federal Register**	Date(s)	**Federal Register**
	01/28/2002, 04/03/2002, 04/05/2002, 05/28/2002	67 FR 3940, 67 FR 15856, 67 FR 16492, 67 FR 37108		
Pritchardia munroi	NA	NA	NA	NA
Pteris lidgatei	12/18/2000, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 79192, 67 FR 15856, 67 FR 16492, 67 FR 37108	NA	NA
Schiedea lydgatei	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Schiedea nuttallii	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Schiedea sarmentosa	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Sesbania tomentosa	11/07/2000, 12/18/2000, 12/29/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/14/2002, 05/28/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 34522, 67 FR 36968, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Silene alexandri	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Silene lanceolata	12/29/2000, 01/28/2002, 04/05/2002, 05/28/2002	65 FR 83158, 67 FR 3940, 67 FR 16492, 67 FR 37108	NA	NA
Solanum incompletum	01/28/2002, 04/05/2002	67 FR 3940, 67 FR 16492	01/09/2003	68 FR 1220
Spermolepis hawaiiensis	11/07/2000, 12/18/2000, 12/27/2000, 12/29/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 36968, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Stenogyne bifida	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Tetramolopium rockii	12/29/2000, 04/05/2002	65 FR 83158, 67 FR 16492	NA	NA
Vigna o-wahuensis	12/18/2000, 12/27/2000, 12/29/2000, 01/28/2002, 03/04/2002, 04/03/2002, 04/05/2002, 05/28/2002, 05/28/2002	65 FR 79192, 65 FR 82086, 65 FR 83158, 67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 36968, 67 FR 37108	01/09/2003, 02/27/2003	68 FR 1220, 68 FR 9116
Zanthoxylum hawaiiense	11/07/2000, 12/18/2000, 12/29/2000, 01/28/2002, 04/03/2002, 04/05/2002, 05/28/2002	65 FR 66808, 65 FR 79192, 65 FR 83158, 67 FR 3940, 67 FR 15856, 67 FR 16492, 67 FR 36968	02/27/2003	68 FR 9116

At the time each plant was listed, we found that designation of critical habitat was prudent for two of these plants (*Labordia triflora* and *Melicope munroi*) and not prudent for the other 49 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,* 2 F. 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 49 of the 51 species reported from Molokai. 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).

On August 10, 1998, the court ordered us to publish proposed critical habitat designations or nondesignations for at least 100 species by November 30, 2000, and to publish proposed designations or nondesignations 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 *Labordia triflora* 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 two taxa, along with eight 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 that it was reasonable for us to integrate these 10 Maui Nui (Maui, Lanai, Molokai, and Kahoolawe) plant taxa into the schedule established for designating critical habitat for the other 245 Hawaiian plants, but the court ordered us to publish proposed critical habitat designations for the 10 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.

On February 18, 1999, we contacted landowners on the island of Molokai, notifying them of our requirement to designate critical habitat for 51 plant species. We included a copy of the November 30, 1998, **Federal Register** notice, a map showing the general locations of the species that may be on his/her property, and a handout containing general information on critical habitat. We held an open house on the island of Molokai, at the Mitchell Pauole Community Center, on March 15, 2000, to meet one-on-one with local landowners and other interested members of the public. In addition, we met with Maui County DOFAW staff and discussed their management activities on Molokai.

On December 29, 2000, we published the fourth of the court-ordered proposed critical habitat designations or nondesignations for 32 Molokai plants (65 FR 83158). The prudency findings 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 Lanai plants on December 27, 2000 (65 FR 82086). All of these proposed rules had been sent to the **Federal Register** by or on November 30, 2000, as required by the court orders.

In those rules, we proposed that critical habitat was prudent for 47 species (*Adenophorus periens, Alectryon macrococcus, Bidens wiebkei, Brighamia rockii, Canavalia molokaiensis, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Ctenitis squamigera, Cyanea dunbarii, Cyanea grimesiana* ssp. *grimesiana, Cyanea mannii, Cyanea procera, Diellia erecta, Diplazium molokaiense, Flueggea neowawraea, Hedyotis mannii, Hesperomannia arborescens, Hibiscus arnottianus* ssp. *immaculatus, Hibiscus brackenridgei, Ischaemum byrone, Labordia triflora, Lysimachia maxima, Mariscus fauriei, Marsilea villosa, Melicope mucronulata, Melicope reflexa, Neraudia sericea, Peucedanum sandwicense, Phyllostegia mannii, Phyllostegia mollis, Plantago princeps, Platanthera holochila, Schiedea lydgatei, Schiedea nuttallii, Schiedea sarmentosa, Sesbania tomentosa, Silene alexandri, Silene lanceolata, Spermolepis hawaiiensis, Stenogyne bifida, Tetramolopium rockii, Vigna o-wahuensis,* and *Zanthoxylum hawaiiense*) that are reported from Molokai as well as on Kauai, Niihau, Maui, Kahoolawe, and Lanai. We proposed that critical habitat was not prudent for one species, *Pritchardia munroi,* because it would increase the threat of vandalism or collection of this species on Molokai. Critical habitat was not proposed in that rule for two species, *Lysimachia maxima* and *Phyllostegia mannii,* because they are currently found only in areas on Molokai that do not require special management consideration or protection because they are already protected and managed to the benefit of these species.

On December 29, 2000, we proposed designation of critical habitat on approximately 6,163 hectares (ha) (15,228 acres (ac)) of land on the island of Molokai. The publication of the proposed rule opened a 60-day public comment period, which closed on February 27, 2001. On February 22, 2001, we published a notice (66 FR 11132) announcing the reopening of the comment period until April 2, 2001, on the proposal to designate critical habitat for plants from Molokai and a notice of a public hearing. On March 21, 2001, we held a public hearing at the Mitchell Pauole Center Hall, Molokai.

On October 3, 2001, we submitted a joint stipulation to the U.S. District Court 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 April 5, 2002, we published a revised proposed rule for 51 plant species from Molokai (67 FR 16492). Critical habitat for 46 (*Adenophorus periens, Alectryon macrococcus, Bidens wiebkei, Brighamia rockii, Canavalia molokaiensis, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Ctenitis squamigera, Cyanea dunbarii, Cyanea grimesiana* ssp. *grimesiana, Cyanea mannii, Cyanea procera, Diellia erecta, Diplazium molokaiense, Eugenia koolauensis, Flueggea neowawraea, Hedyotis mannii, Hesperomannia arborescens, Hibiscus arnottianus* ssp. *immaculatus, Hibiscus brackenridgei, Ischaemum byrone, Isodendrion pyrifolium, Labordia triflora, Lysimachia maxima, Mariscus fauriei, Marsilea villosa, Melicope mucronulata, Melicope reflexa, Neraudia sericea, Peucedanum sandwicense, Phyllostegia mannii, Phyllostegia mollis, Plantago princeps, Platanthera holochila, Pteris lidgatei, Schiedea lydgatei, Schiedea nuttallii, Schiedea sarmentosa, Sesbania tomentosa, Silene alexandri, Silene lanceolata, Spermolepis hawaiiensis, Stenogyne bifida, Tetramolopium rockii, Vigna o-wahuensis*, and *Zanthoxylum hawaiiense*) of the 51 plant species from Molokai was proposed on approximately 17,614 ha (43,532 ac) of land (67 FR 16492). We proposed that critical habitat was prudent for one species (*Eugenia koolauensis*) for which a prudency finding had not been made previously. Critical habitat was not proposed for *Bonamia menziesii, Cyperus trachysanthos, Melicope munroi*, and *Solanum incompletum* on the island of Molokai because these plants no longer occur on Molokai, and we are unable to identify habitat that 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 June 4, 2002. On July 11, 2002, we submitted joint stipulations to the U.S. District Court 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 August 12, 2002, we published a notice announcing the availability of the draft economic analysis on the proposed critical habitat (67 FR 52419). On August 23, 2002, we published a notice announcing a public hearing (67 FR 54607). On August 26, 2002, we held a public information meeting at the Mitchell Pauole Center Hall, Kaunakakai, Molokai. On August 26, 2002, we published a notice reopening the public comment period until September 30, 2002 (67 FR 54766). On September 9, 2002, we held a public hearing at the Mitchell Pauole Center Hall, Kaunakakai, Molokai.

Summary of Comments and Recommendations

We received a total of two oral and 702 written comments during the three comment periods on the revised proposal and draft economic analysis, including the public hearing held on September 9, 2002. These included responses from three State agencies, two county agencies, and 19 private organizations or individuals, including four designated peer reviewers. Approximately 680 of these were identical letters submitted as part of a mailing campaign, in support of the proposed critical habitat designations. Of the 24 parties who did not respond as part of the mailing campaign, eight supported the proposed designations, 13 were opposed, and three provided information or declined to oppose or support the proposed designations.

We reviewed all comments received for substantive issues and new information regarding critical habitat for *Adenophorus periens, Alectryon macrococcus, Bidens wiebkei, Brighamia rockii, Canavalia molokaiensis, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Ctenitis squamigera, Cyanea dunbarii, Cyanea grimesiana* ssp. *grimesiana, Cyanea mannii, Cyanea procera, Diellia erecta, Diplazium molokaiense, Eugenia koolauensis, Flueggea neowawraea, Hedyotis mannii, Hesperomannia arborescens, Hibiscus arnottianus* ssp. *immaculatus, Hibiscus brackenridgei, Ischaemum byrone, Isodendrion pyrifolium, Labordia triflora, Lysimachia maxima, Mariscus fauriei, Marsilea villosa, Melicope mucronulata, Melicope reflexa, Neraudia sericea, Peucedanum sandwicense, Phyllostegia mannii, Phyllostegia mollis, Plantago princeps, Platanthera holochila, Schiedea lydgatei, Schiedea nuttallii, Schiedea sarmentosa, Sesbania tomentosa, Silene alexandri, Silene lanceolata, Spermolepis hawaiiensis, Stenogyne bifida, Tetramolopium rockii, Vigna o-wahuensis*, and *Zanthoxylum hawaiiense.* Similar comments were grouped into general issues and are addressed in the summary below.

Peer Review

In accordance with our policy published on July 1, 1994 (59 FR 34270), we solicited independent opinions from 15 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 four. All four generally supported our methodology and conclusion, but none supported or opposed the proposed critical habitat designations. Comments received from the peer reviewers are summarized in the following section and were considered in developing the final rule.

Issue 1: Biological Justification and Methodology

(1) *Comment:* One peer reviewer wrote that the amount and location of lands in the proposed rule appears to be adequate for the long-term conservation of these species if lands, that were not included in the proposal because they were not in need of special management or protection are managed properly. Further, the peer reviewer stated that deletion of significant portions of any of the proposed critical habitat units is likely to prevent the recovery of, or lead to the extinction of, listed species. Another peer reviewer commented that the proposed rule identifies enough land to provide for the long-term conservation of multiple populations. Another commenter wrote in support of tripling the acreage of critical habitat on Molokai in order to help ensure the survival of plant species. Conversely, other commenters felt that the proposed critical habitat units are larger than necessary and that the Service should work to ensure that: (1) The benefits of exclusion are carefully weighed against the benefits of designating critical habitat, (2) ''critical habitat does not include the entire geographical area which can be occupied by the threatened or endangered species'' (16 U.S.C. 1532(5)(C)), and (3) the final rule will exclude large areas that do not

contain the primary constituent elements for habitat designation.

Our Response: 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. This new information showed that the primary constituent elements were not present in certain portions of some of the proposed units and that recent changes in land use had occurred that would preclude those areas from supporting the primary constituent elements in the future, or that the areas should not be considered essential to the conservation of the species in question. In many cases, critical habitat boundaries were reduced for multi-island species because we have proposed or otherwise identified adequate and more appropriate habitat on other islands. In addition, some areas excluded from this designation, such as TNCH lands, will still contribute significantly to the recovery of these species. These areas are counted towards the recovery goal of 8 to 10 populations of 100, 300, or 500 individuals.

(2) *Comment:* One commenter was concerned that there is an absence of good scientific data on the plants in this rulemaking and stated that guesswork is an unacceptable way to designate critical habitat.

Our Response: When developing this rule to designate critical habitat for 46 plants from Molokai, we used the best scientific data currently available, 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 Molokai on September 9, 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 from landowners, land managers, and interested parties on the island of Molokai; discussions with botanical experts; and recommendations from the Hawaii Pacific Plant Recovery Coordinating Committee (HPPRCC) (GDSI 2000; HINHP Database 2000; HPPRCC 1998; Service 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001; 65 FR 83158; 67 FR 16492; CPC *in litt.* 1999).

In accordance with our policy on peer review published on July 1, 1994 (59 FR 34270), we solicited the expert opinions of knowledgeable and independent specialists regarding the proposed rule. The purpose of this peer review was to ensure that our designation methodology of critical habitat of Molokai plants was based on scientifically sound data, assumptions, and analysis. The comments of the peer reviewers were taken into consideration in the development of this final designation and nondesignation. We are required under a court-approved stipulation to finalize this designation by February 28, 2003. If provided with new information, we may revise the critical habitat designation in the future.

(3) *Comment:* One commenter felt that the Service's definition of a population is not adequate.

Our Response: We acknowledge the difficulty in identifying a discrete, quantitative distance between populations but believe, as do the peer reviewers who commented on this issue, that the use of 1,000 m (3,280 ft) is a scientifically reasonable convention. We have defined a population, for the purpose of this rule, 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).

(4) *Comment:* One peer reviewer suggested that sites significantly altered by human activities, such as roads and buildings, should not be included in ''conservation plans,'' but that areas that have been altered by agriculture and other activities that do not significantly disturb the soil should be included as they provide potential sites for restoration of plant species.

Our Response: Agricultural lands are generally not considered to be the highest ranking places to designate critical habitat because they usually have had the most disturbance. However, for some species some of this land is essential for their conservation because suitable habitat does not exist elsewhere. Approximately 11 percent of designated land on Molokai is within the State Agricultural District.

(5) *Comment:* One commenter stated that the presence of an endangered species in a particular habitat is not necessarily an indication that such habitat is best for the species' survival and reproduction. For example, conservationists believed that the Hawaiian goose (nene) (*Branta sandvicensis*) preferred uplands because it remained extant in upland habitats, but later information suggests that the nene prefer lower elevations.

Our Response: The best available information, both historic and current, was used from a variety of sources (see ''Methods'' section) to determine the primary constituent elements. Historic information is scant for many species. However, the Service remains obligated to use the best available information, which includes the characteristics of the habitat supporting a taxon's remaining individuals. We expect more will become known in the future about the specific life history needs of these species, but we believe at this time that we have used the best available scientific information, including peer review and expert scientific input.

(6) *Comment:* One peer reviewer and other commenters stated that the proposed rule is improved by the inclusion of appropriate unoccupied habitat because such habitat will help to recover species that have been reduced to an unsustainable number of populations. Several commenters opposed designating critical habitat in unoccupied areas. Two commenters wrote that the lands in urban, agricultural, and rural districts are designated, used, and intended for a wide variety of land use activities. As such, there is a much greater likelihood that critical habitat designation will have an adverse economic impact on the landowner. These commenters recommend the following rebuttable presumption: Non-conservation lands that are unoccupied by any listed species should not be designated as critical habitat.

Our Response: Our recovery plans for these species identify the need to expand existing populations and reestablish wild populations within 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. Additional, nonadjacent, areas of unoccupied habitat are essential to the conservation of the species because they provide habitat for the establishment of new populations.

(7) *Comment:* One commenter felt that critical habitat should be designated for *Pritchardia munroi.* This commenter opposed the Service's decision that it is not prudent to designate critical habitat on the grounds that: (1) Designation of critical habitat would not increase the threat of vandalism to this species; (2) the Service failed to list overcollecting as one of the threats to this species in the revised proposal (67 FR 16497); (3) the species' existence on non-Federal land is irrelevant; (4) the Service cannot refuse to designate critical habitat because it cannot think of a future Federal activity likely to trigger consultation under section 7 of the Act; and (5) critical habitat offers benefits that go far beyond the protection that *Pritchardia munroi* receives under section 7, namely, critical habitat will help a species *recover,* whereas section 7 merely protects a species from *extinction.*

Our Response: In this final rule to designate or not designate critical habitat for 42 plants from Molokai we have incorporated new information and addressed comments and new information received during the comment periods. However, no additional information was provided during the comment periods that demonstrates that the threats to *Pritchardia munroi* from vandalism or collection would not increase if critical habitat was designated for this species on Molokai.

We believe that designation of critical habitat would likely increase the threat from vandalism or collection to this species of *Pritchardia* on Molokai. First, it is easy to identify, and second, it may be attractive to collectors of rare palms either for their personal use or to trade or sell for personal gain (Johnson 1996). We believe that the evidence shows that this species of palm may be attractive to such collectors. Several nurseries advertise and sell *Pritchardia* palms, including *Pritchardia munroi* and six other federally listed *Pritchardia* species. See the section entitled ''Prudency'' in this rule for more information regarding instances of vandalism, collection, and commercial trade of Hawaiian species of *Pritchardia.* Although the final listing rule and proposed critical habitat do not list vandalism or overcollection as threats, in light of documented vandalism and overcollection events on species in the same genus on Kauai, we believe that *Pritchardia munroi* is vulnerable to the same types of threats because of the similarity in appearance of the species.

In addition, we believe that designation would not provide significant benefits that would outweigh these increased risks. First, *Pritchardia munroi* does not occur on Federal land. The private land where it is found is zoned for agriculture, though the single tree has been fenced (HINHP Database 2000). In addition, this species is found in a small ravine in an area that is remote and inaccessible to standard vehicles. It is, therefore, unlikely that the land on which it is found will be developed. Since there does not appear to be any actions in the future that would involve a Federal agency, designation of critical habitat would not provide any additional protection to the species that it does not already have through listing alone. If, however, any future Federal involvement did occur, such as through the permitting process or funding by the U.S. Department of Agriculture, the U.S. Department of Interior, the Corps through section 404 of the Clean Water Act, the U.S. Federal Department of Housing and Urban Development, or the Federal Highway Administration, the actions would be subject to consultation under section 7 of the Act.

We acknowledge that critical habitat designation, in some situations, may provide some value to the species, for example, by identifying areas important for conservation and calling attention to those areas in need of special protection. However, for this species, we believe that the benefits of designating critical habitat do not outweigh the potential increased threats from vandalism or collection. Given all of the above considerations, we have determined that designation of critical habitat for *Pritchardia munroi* is not prudent.

(8) *Comment:* One commenter asked why other federally listed plants on Molokai and historically listed plants were not included in the critical habitat proposal. One peer reviewer questioned the decision to not designate critical habitat for *Gardenia brighamii* and *Kokia cookei* based on: (1) Recent records of *Gardenia brighamii* on Molokai; (2) the recovery plan's stated need for three populations of *Gardenia brighamii* on Molokai; and (3) *Kokia cookei* being known only from Molokai.

Our Response: The proposed rule to designate critical habitat for 46 species found on Molokai was prepared in response to a lawsuit (*see ''Previous Federal Action''*). Species listed prior to 1991, such as *Gardenia brighamii* and *Kokia cookei,* were not included in this lawsuit and were thus not addressed in the proposed rule. In addition, critical habitat was not proposed for four species (*Bonamia menziesii, Cyperus trachysanthos, Melicope munroi,* and *Solanum incompletum*) that no longer occur on Molokai and for which we were unable to identify any habitat that is essential to their conservation on the island. Finally, critical habitat is not designated for four species (*Hedyotis mannii, Phyllostegia mollis, Platanthera holochila,* and *Vigna o-wahuensis*) because they are currently found only in areas on Molokai that do not require special management consideration or protection because they are already protected and managed within TNCH preserves.

Issue 2: Effects of Critical Habitat Designation

(9) *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. 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.

(10) *Comment:* Several commenters believed that critical habitat will not help to recover listed plants and is unnecessarily restrictive, even if it is scientifically based. These commenters

generally advocated on-the-ground management in place of critical habitat designation. Suggested alternatives included voluntary outplanting and propagation, Service support for conservation programs, and incentives for landowners to recover species. The commenters recommended that research be conducted to determine if critical habitat areas can be effectively managed in light of the many threats that face them. They concluded that private landowners may welcome the introduction of listed species on their property if the Service could help support such projects and cooperation and, in doing so, showed trust in landowners.

Our Response: While we agree that critical habitat will not take the place of on-the-ground management, 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 preclude conservation of listed species. There also are educational or informational benefits to the designation of critical habitat. Educational benefits include notifying landowners, land managers, and the general public about the importance of protecting the habitat of these species and disseminating information about their essential habitat requirements. On-the-ground management for restoration of these species is addressed in the species' recovery plans. The Service routinely coordinates with and assists private landowners and others interested in conservation through a variety of programs.

Issue 3: Site-Specific Biological Comments

(11) *Comment:* One peer reviewer stated that critical habitat should be designated for TNCH's Pelekunu Preserve unless assurances exist that: (1) Ungulates will be unequivocally controlled if they reach specified damage thresholds; (2) damage thresholds will be reevaluated if experience shows that current thresholds are inadequate to protect listed species; and (3) control of ungulates to threshold levels will occur even if the Molokai Hunters Working Group objects to the control. Another commenter pointed out that the fact that TNCH recognized the need to manage these fragile areas for conservation should confirm that the habitat not only ''*may*'' but actually *does* ''require special management considerations or protection,'' and thus more than satisfies the definition of critical habitat. According to the commenter, failure to designate TNCH lands as critical habitat would be violating the requirement that the Service designate critical habitat ''to the maximum extent prudent and determinable'' (16 U.S.C. 1533(a)(3)). The commenter also stated that critical habitat designation will protect TNCH's Moomomi, Pelekunu, and Kamakou Preserves from Federal actions occurring outside the preserves that may modify or destroy essential habitat found within preserve boundaries. Another commenter noted that TNCH's land should be designated because it is the among the highest quality native habitat areas on Molokai.

Our Response: In the revised proposed determinations of prudency and proposed designations of critical habitat for plant species from the island of Molokai, Hawaii (April 5, 2002; 67 FR 16492), we indicated that we believed that lands managed by TNCH provided adequate special management or protection for 19 of the Molokai plant species. This was based the definition of critical habitat (section 3(5)), which specifies critical habitat as areas within the geographical area occupied by the species on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection. In order to give meaning to this last clause, we considered that if an area was already adequately managed then there would be no requirement for special management considerations or protection.

However, in a recent opinion (*Center for Biological Diversity* v. *Norton,* Civ. No. 01–409 TUC DCB D. Ariz. Jan. 13, 2003), a Federal district court determined that our definition of critical habitat, as it applies to special management, is not correct. The court stated that ''whether habitat does or does not require special management by defendant or FWS is not determinative on whether or not the habitat is 'critical' to a threatened or endangered species (pages 13–14 of the court's decision).'' We continue to believe that our interpretation was reasonable. However, we nevertheless have not declined to include areas from this final designation because they are adequately managed.

As discussed in detail in the ''*Analysis of Impacts Under Section 4(b)(2)*,'' we have determined that the benefits of excluding TNCH's Molokai preserves as critical habitat outweigh the benefits of including them as critical habitat for *Bidens wiebkei, Canavalia molokaiensis, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Cyanea mannii, Cyanea procera, Hedyotis mannii, Labordia triflora, Lysimachia maxima, Mariscus fauriei, Melicope mucronulata, Phyllostegia mannii, Phyllostegia mollis, Platanthera holochila, Schiedea sarmentosa, Silene alexandrii, Stenogyne bifida, Tetramolopium rockii,* and *Vigna o-wahuense.*

(12) *Comment:* One peer reviewer questioned the designation of critical habitat in the western portion of Kalaupapa Peninsula because it is heavily degraded and does not appear to be good habitat for *Centaurium sebaeoides, Sesbania tomentosa,* and *Tetramolopium rockii.*

Our Response: We agree and have removed this portion of the Kalaupapa Peninsula from critical habitat.

(13) *Comment:* The Service provides no rationale for the decision to eliminate from critical habitat an area that *Marsilea villosa* currently occupies in Kamakaipo Gulch on the west shore of Molokai.

Our Response: In the April 5, 2002, revised proposal, we stated there was critical habitat for *Marsilea villosa* within Molokai unit A1. Upon further inspection, we discovered that certain areas contain the suitable habitat for this species were inadvertently left out of the designation. We are unable at this time to publish another revised proposal to include this suitable habitat for *Marsilea villosa.* We have proposed critical habitat for this species on the island of Molokai. We will publish a separate rule incorporating this suitable habitat for the species after completing the final rules for the other Hawaiian islands.

Issue 4: Legal Issues

(14) *Comment:* A peer reviewer and other commenters noted that critical habitat should be identified for all areas that may need to be managed for the benefit of the listed species. The Act defines critical habitat (Section 3(5)(A)(I)) as ''the specific areas* * *(I) essential to the conservation of the species and (II) which may require special management considerations or protection* * *.'' It does not use the phrase ''which may require additional special management considerations or protection.'' Therefore, all areas that meet the definition of critical habitat

should be designated, even if they are currently being managed for conservation. Designation of these areas would be in accordance with the mandatory duty to designate critical habitat ''to the maximum extent prudent and determinable'' (16 U.S.C. 1533(a)(3)). Also, designation will provide an additional measure of protection by preventing Federal agencies from carrying out, funding, or approving any activity likely to result in adverse modification or destruction of critical habitat—whether directly or indirectly, regardless of the location of the activity. Furthermore, areas that may have adequate management in place may not be safe from even direct threats from Federal activities, which can arise with little warning.

Our Response: Section 3(5)(A)(i) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*) defines critical habitat as areas on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection. In order to give meaning to the last clause of the definition, we have previously considered that, if an area was already adequately managed, then there would be no requirement for special management considerations or protection. We believed that adequate special management or protection would be provided by a legally operative plan that addresses the maintenance and improvement of essential habitat elements and that provides for the long-term conservation of the species. We considered 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 in place, and/or 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). Therefore, if an area provides physical and biological features essential to the conservation of the species, and also is covered by a plan that meets these criteria, then such an area would not have constituted critical habitat as defined by the Act because the physical and biological features found there do not require special management.

However, in a recent opinion (*Center for Biological Diversity* v. *Norton,* Civ. No. 01–409 TUC DCB D. Ariz. Jan. 13, 2003), a Federal district court determined that our definition of critical habitat, as it applies to special management, is not correct. The court stated that ''whether habitat does or does not require special management by defendant or FWS is not determinative on whether or not the habitat is 'critical' to a threatened or endangered species (pages 13–14 of the court's decision).'' We continue to believe that our interpretation was reasonable. However, we nevertheless have not declined to include areas from this final designation because they are adequately managed.

(15) *Comment:* Critical habitat designation, and the underlying decision to list as endangered the species that are the subject of the designation, exceed the constitutional limits of the Service's delegated authority. Congress enacted the Endangered Species Act as an exercise of its commerce clause power and delegated exercise of that Commerce Clause power to the Service to apply the Act by regulation. The listed species are not interstate. They exist only in Hawaii and do not cross state lines. Nor are they in commerce as the subject of any economic endeavor. They lack any commercial value. Therefore, the Service's regulations listing these species and designating critical habitat for them within Hawaii exceed the Federal power to regulate interstate commerce under the governing precedents interpreting the Commerce Clause.

Our Response: The Federal government has the authority under the Commerce Clause of the U.S. Constitution to protect these species, for the reasons given in Judge Wald's opinion and Judge Henderson's concurring opinion in *Nat'l Ass'n of Home Builders* v. *Babbitt,* 130 F.3d 1041 (D.C. Cir. 1997), *cert. denied,* 1185 S. Ct. 2340 (1998). *See also Gibbs* v. *Babbitt,* No.99–1218 (4th Cir. 2000). The *Home Builders* case involved a challenge to application of ESA prohibitions to protect the listed Delhi Sands flower-loving fly. As with the species at issue here, the Delhi Sands flower-loving fly is endemic to only one State. Judge Wald held that application of the ESA to this fly was a proper exercise of Commerce Clause power because it prevented loss of biodiversity and destructive interstate competition.

(16) *Comment:* With regard to the Draft Economic Analysis (DEA), a commenter stated that since State law prohibits taking of endangered plants, a court could follow Federal precedents and say that an action that degrades critical habitat injures the plant and so is an ''illegal'' taking of the plant. The economic impact of a landowner not being able to use his own land for fear of injuring species needs to be taken into account.

Our Response: Possible costs resulting from interplay of the Federal Endangered Species Act and Hawaii State law were 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, 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 purely attributable to a listing decision and do not co-extensively occur because of critical habitat designations. There are no take prohibitions associated with critical habitat.

Issue 5: Economic Issues

(17) *Comment:* A commenter stated that the DEA must take into account the unique local circumstances of landownership and limited economic base of Molokai, which are especially susceptible to detrimental impacts of regulations.

Our Response: The DEA considers all activities that are reasonably foreseeable to affect the proposed critical habitat areas over the next 10 years. The analysis first considers the impact of preexisting State and local land-use restrictions and the likely presence or absence of a Federal nexus on these activities. Subsequently, the analysis estimates the likely direct effects of implementation of section 7 of the Act on the identified reasonably foreseeable activities, as well as discusses the indirect effects associated with potential changes in land use regulations, property values, and other changes. Based on this comprehensive review of

land uses and activities, the DEA estimates the total direct costs associated with implementation of section 7 for the plants would range from $109,070 to $804,750. Subsequently, based on a review of public comments and information from the Service regarding the intended removal or reduction of critical habitat units, the Addendum estimates the revised total direct costs to be approximately $54,470 to $269,150. When considered in the context of the island economy, these revised costs represent, in the worst case, approximately 0.2 percent of the total personal income of Molokai in 2000.

In addition, Chapter VI, Section 5.b. of the DEA addresses the limited economic base of Molokai by examining potential impacts on small entities (small businesses, small organizations, and small governmental jurisdictions) under the Regulatory Flexibility Act (as amended by the Small Business Regulatory Enforcement Fairness Act of 1996). The DEA concludes that a significant economic impact on a substantial number of small entities will not result from the critical habitat designation. After considering the information provided in public comments and the Service's intended reduction or removal of critical habitat units, the Addendum does not revise this conclusion.

(18) *Comment:* A commenter stated that the Service must analyze all economic impacts of critical habitat designation, not merely those impacts that are a ''but for'' result of the critical habitat designation. The commenter further stated that the DEA does not adequately analyze the full scope of economic impacts, but focuses primarily on section 7(a)(2) of the Act, which requires consultation with the Service when Federal permits, funding, or other Federal action is required, and says that other sections of the Act are outside the scope of this economic analysis. The commenter believes that the critical habitat designations will have a significant economic effect extending far beyond the draft's narrow concept of a Federal nexus.

Our Response: The Service has authority under section 7 of the Act to consult on activities on land owned by individuals, organizations, States, or local and tribal governments only if the activities on the land have a Federal nexus. A Federal nexus occurs when the activities require a Federal permit, license, or other authorization, or involve Federal funding. The Service does not have jurisdiction under section 7 to consult on activities occurring on non-Federal lands when the activities are not federally funded, authorized, or carried out. In addition, consultation is not required for activities that are not likely to affect listed species or their critical habitat.

The economic analysis considered 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 examined 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, rather than the designation of critical habitat, that prompts action at the State or local level, the impacts are not attributable to critical habitat designation and are appropriately not considered in the economic analysis of critical habitat designation. For example, there are no take prohibitions associated with critical habitat. Take prohibitions under Hawaii law are purely attributable to a listing decision and do not co-extensively occur because of critical habitat designations. Thus, the economic analysis did not include an analysis of the impact of these other sections of the Act.

(19) *Comment:* A commenter stated that the DEA fails to recognize all the connections between Federal and State law. For example, if the Federal government approves eligibility for flood insurance, flood plain development programs shall become subject to consultations under the Act. Another comment stated that 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, the DEA 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. The commenter elaborated that these requirements also extend to State agencies requiring Federal funds or approvals.

Our Response: The analysis in the DEA, as revised by the Addendum, is based on a review of all ''reasonably foreseeable'' projects, land uses, and activities that may be directly affected by the implementation of section 7 for the species in question. ''Reasonably foreseeable'' projects, land uses, and activities were broadly defined in the analysis as those that are: (1) Currently authorized, permitted, or funded; (2) proposed in plans currently available to the public; or (3) projected or likely to occur within the next ten years, based on (a) recent economic or land-use trends, development patterns, evolving technologies, competitive advantages, etc., and (b) limits imposed by land-use controls, access, terrain, infrastructure, and other restrictions on development. After determining the ''reasonably foreseeable'' projects, land uses, and activities that could affect the physical and biological features of the proposed critical habitat units, the next step in the analysis was to determine Federal involvement. Thus, while the economic analysis did not evaluate all possible activities with Federal nexus, it was focused on the most relevant subset of these activities—those that are ''reasonably foreseeable.'' The results of this analysis are presented in TableVI–3 in the DEA and Table Add-2 in the Addendum.

More specifically, the critical habitat units as modified overlap slightly with areas identified by the Federal Emergency Management Agency as within the flood zone. No residential or commercial development is located or planned within this area. Thus, no consultations for eligibility for flood insurance or flood plain development programs are anticipated within the next ten years.

(20) *Comment:* One commenter stated that several economic impacts are acknowledged in the DEA, but their impacts are not quantified in summary tables. These include: (1) The value of hunting estimated at $1,430,000; (2) economic loss of up to $675,000,000 if the State places critical habitat in the Protective Subzone of the Conservation District; and (3) indirect costs beyond section 7 costs.

Our Response: (1) The DEA does not estimate the value of hunting on Molokai at $1,430,000. Instead, the DEA reported a number of figures that act as indicators of the value of hunting. Specifically, the DEA reported that hunting on Molokai generates approximately $340,000 in direct sales, $670,000 in direct and indirect sales, $280,000 in income, and $140,000 in surplus value. These estimates reflect separate methods to illustrate the total value of hunting and are not intended to be added together. Moreover, it should be noted that some of these estimates were updated in Section 5 of the Addendum to incorporate data from the Service's 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Specifically, the revised estimates indicate that hunting generates approximately $317,000 in direct sales, $563,000 in total direct and indirect sales, and $185,000 in income.

(2) The potential economic loss associated with a reduction in property value due to redistricting of all Agricultural land to the Protective Subzone of the Conservation District has been significantly reduced due to the modification of critical habitat units. While the economic loss as estimated for the modified designation could approach $715,000, the probability of redistricting is estimated to be small, resulting in a low expected property value loss.

(3) In addition to property value losses, the DEA and associated Addendum do address several types of indirect costs, including the possibility of mandated conservation management, loss in hunting revenue, and others. However, although the economic analysis does provide stylized and/or worst-case estimates of some of the potential indirect costs, the actual probability of these impacts occurring is not estimated due to the limited information regarding the likelihood of these impacts. As a result, the expected value of the impacts is not reported. Rather than report the stylized and/or worst-case estimates, the analysis presents qualitative descriptions of the magnitude of the impacts to account for the fact that the expected values are not known.

(21) *Comment:* One commenter stated that the Service is unaware of a significant number of future housing or resort development activities in coastal areas on Molokai that might trigger section 7 consultation by requiring permits from Federal agencies.

Our Response: Chapter VI, Section 3.e. of the DEA discussed potential residential development within the critical habitat and concluded that no resort or residential development was anticipated within the next 10 years. This estimate reflected information gathered that the lands within the proposed designation are either: (1) Managed by landowners who stated that they do not have plans to develop; (2) within a recreational preserve; (3) governed by agreements under the East Molokai Watershed Partnership; or (4) do not have publicly available development plans. No new information has been provided that contradicts this conclusion; thus, no changes have been made to the DEA in this regard.

(22) *Comment:* One commenter noted that critical habitat Units F and G are potential sites for groundwater exploration, and Federal funding or agencies may be involved.

Our Response: Chapter VI, Section 3.g. of the DEA discussed section 7 costs associated with water system development as part of the Molokai Irrigation System or by Molokai Ranch. The Addendum analyzes additional information from the Maui County Department of Water Supply regarding a proposed backup well and concludes that the planned well and accompanying access road are located outside the critical habitat, as modified. As such, no additional costs were included in the Addendum for this project.

(23) *Comment:* One commenter stated that the designation of critical habitat in Units F and G would require hundreds of Kapaakea subdivision future beneficiaries to conduct an environmental assessment and section 7 consultation in order to construct their home and prepare ground for farming. The commenter further noted that Department of Hawaiian Homeland's homesteading program uses Federal programs to guarantee and insure the mortgages of homesteaders, and Federal funds may be used to construct site improvements and homes.

Our Response: The economic analysis focused primarily on the ''reasonably foreseeable'' projects, land uses, and activities that could affect the physical and biological features of the proposed critical habitat units as these are the activities that could be affected by the critical habitat designation. As previously discussed, ''Reasonably foreseeable'' projects, land uses, and activities were defined in the DEA as those which are: (1) Currently authorized, permitted, or funded; (2) proposed in plans currently available to the public; or (3) projected or likely to occur within the next 10 years based on (a) recent economic or land-use trends, development patterns, evolving technologies, competitive advantages, etc., and (b) limits imposed by land-use controls, access, terrain, infrastructure, and other restrictions on development. The economic analysis did not discuss future development within Kapaakea because none of the information available indicated that new residential development or new agricultural activity was likely within the next 10 years; thus, these activities were not considered ''reasonably foreseeable.''

Units F and G have been modified, and as a result, the total amount of DHHL land within critical habitat has been reduced by two-thirds, from approximately 1,350 ha (3,336 ac) to 425 ha (1,049 ac). The DHHL land remaining in critical habitat is located mauka (towards the mountains) and eastward of the existing Kapaakea Homestead, and most is adjacent to the Molokai Forest Reserve. There are no publicly available plans for development of this area within the next 10 years, nor has DHHL indicated that development of this area within the next 10 years is likely. Thus, no section 7 costs for residential development by Native Hawaiian beneficiaries in Units F and G subdivision were included in the Addendum.

(24) *Comment:* One commenter stated that Molokai hunters were concerned about the potential loss of hunting areas and questioned whether or not fences to exclude ungulates will be constructed, and, if so, where construction will take place. Another commenter questioned why a cost was associated with project modifications to the management of game hunting on State managed lands, because Molokai does not have any State hunting areas that are managed to maintain or enhance game mammal populations. The commenter also questioned the methodology used to estimate the project modification cost because game mammals travel freely.

Our Response: Chapter VI, Section 3.a. of the DEA discussed the direct impacts of section 7 implementation on hunting taking place on DLNR lands on Molokai. The analysis estimated future project modifications associated with game mammal management by extrapolating from historical consultation records. These records indicate that DLNR generally installs fencing around bird watering stations as a project modification stemming from consultations with the Service. As a result, the analysis assumed that fencing would continue to occur around watering stations in the future.

The DEA goes on to estimate an increase in the number of watering stations to be fenced under the assumption that the proposed habitat area would extend beyond the area historically considered in consultations with the Service on the listed plants. The DEA presents a cost estimate of $17,600 to $148,000. However, public comment suggested that consultations already do address areas both occupied and unoccupied by the listed plants because ungulates are assumed to roam freely across the island. As such, there would likely not be an increase in the number of watering stations fenced. Adopting this new assumption, and also incorporating the intended reductions in the designation as indicated by the Service, the Addendum revised the estimate to a range of $4,400 to $37,000. This conclusion is based on discussions with DLNR, other stakeholders familiar with the issue, and decades of public testimony by hunters.

(25) *Comment:* One commenter requested that its lands not be designated as critical habitat due to the following reasons: (1) Land values

would be detrimentally affected; (2) designation may conflict with existing operations of an economically vital surface water collection system that is maintained in Kaunakakai ahupuaa and Kawela Forest Reserve lands; and (3) lands proposed for designation on the west end of the ranch are used for grazing and recreation.

Our Response: As modified, the designated acreage of land owned by Molokai Ranch is approximately 226 ha (558 ac) (reduced for biological reasons from the 1,080 ha (2,670 ac) proposed for designation). Approximately 77 ha (190 ac) are located near the northern coastline on the west side of Molokai, in a remote area. Most of the 77 ha (190 ac) are in the Agricultural District, but a portion of the land along the coastline is within the Conservation District. The remaining 149 ha (367 ac) are located in the Conservation District within the Molokai Forest Reserve.

Chapter VI, Section 4.g. of the DEA discussed the potential indirect impact that the designation of critical habitat could have on property values. The DEA noted that the worst-case scenario—and one that is not expected over the long term because uncertainties about the implications of the designation are likely to dissipate over time—would be a perception among potential buyers that the land should be valued as if it were subject to the same restrictions as land in the Conservation District. The DEA also states that land values on Molokai could drop between $1,000 per acre for remote agricultural land to $75,000 per acre for land suitable for development as a result of redistricting to the Conservation District. The commenter did not provide alternative numbers.

Thus, an estimate of the potential impact on Molokai Ranch's land values is as follows: The 149 ha (367 ac) are not likely to lose value due to critical habitat designation because of their presence within the Conservation District. While the total decrease in value for the approximately 77 ha (190 ac) in the Agricultural District could range from $190,000 to $14.2 million, any loss in value due to redistricting is more likely to be on the lower end of the range due to the remote location and distance from infrastructure of these 77 ha (190 ac).

No costs are expected to occur from impacts to the existing water collection system because none of the designated species are stream-dependent for their survival and therefore would not cause a reduction in water diversion. In addition, water infrastructure is considered a manmade feature and therefore its operation and maintenance are not considered critical habitat, as these features and structures normally do not contain, and are not likely to develop, any primary constituent elements.

No costs are expected to occur from impacts to designated lands on the west end of the ranch that are used for grazing and recreation. As noted in Chapter III of the DEA, the Service does not have jurisdiction under section 7 to consult on activities occurring on non-Federal lands when the activities are not federally funded, authorized, or carried out. Because there is no known Federal involvement in the grazing and recreational activities identified by the commenter, no costs are anticipated to occur as a result of critical habitat designation.

(26) *Comment:* One commenter stated that because unemployment is so high on Molokai, restrictions on subsistence activities, such as hunting and fishing, may cause a much greater economic impact than is suggested in the DEA.

Our Response: Chapter VI, Section 4.d. of the DEA discussed the economic impact critical habitat designation may have on subsistence activities. The designation of critical habitat by itself will not directly impact subsistence activities, as critical habitat designation does not require: (1) Creating any reserve, refuge, or wilderness areas; (2) fencing for any reason; (3) removing ungulates; or (4) closing areas to hunters or gatherers. Instead, it requires only that if the State or a private landowner seeks to undertake an activity that may affect the designated area using Federal funding or with a Federal permit, the Federal Action agency consult with the Service.

However, the DEA recognized that there is some risk that designation of critical habitat could have an indirect impact on subsistence activities if, as a result of a future lawsuit, a court mandated actions that reduce the ability of individuals to practice subsistence activities in these areas. However, the probability of a lawsuit being filed, the likelihood of its success, and the role of critical habitat in the suit are unknown. In addition, the DEA recognized the possibility that the State or private landowners could adopt a policy of restricting access into areas that overlap critical habitat units without a judicial mandate. The likelihood of voluntary landowner restrictions is also unknown. Based on professional judgment, however, the probability of a complete restriction of subsistence activities within critical habitat as a result of lawsuits or voluntary action was deemed unlikely.

The DEA was unable to quantify this indirect impact because of (1) The lack of information on the amount of the subsistence harvest; (2) the lack of information on the proportion of the subsistence harvest derived from areas within versus outside of critical habitat; and (3) the lack of information on the cultural significance of the subsistence activities conducted within critical habitat. Thus, the DEA concluded that while there could be a significant loss associated with the restriction of subsistence activities within the proposed critical habitat, the probability of subsistence activities actually being restricted within the proposed critical habitat was undetermined but generally unlikely.

(27) *Comment:* One commenter notes that a Federal nexus exists for the nonpoint source water discharge program. This commenter was concerned that if water discharge into critical habitat does not meet water quality standards, a permit could be denied. The commenter suggested that the effect on agriculture may be devastating since some runoff from agricultural activities is unavoidable.

Our Response: The State Department of Health Polluted Runoff Control Program and the State Office of Planning, Coastal Zone Management Program, work together to address nonpoint source pollution through outreach and education and programs that utilize incentives. Under the Coastal Zone Act Reauthorization Amendments, Section 6217, the State is required to meet various conditions for approval of the State's Coastal Nonpoint Pollution Control Program by the U.S. Environmental Protection Agency. To meet these conditions, the State Department of Health is developing administrative rules to create State-wide enforceable policies and mechanisms to address nonpoint source pollution. These draft rules are currently the subject of public informational meetings. Public comments and suggestions received during these meetings will be considered before final rules are drafted and proposed to the Governor.

At the present time, there is no permit requirement for nonpoint source pollution. Moreover, the proposed rules regarding nonpoint source pollution make no reference to critical habitat. The proposed rules simply provide a general prohibition on nonpoint source pollution and allow for exemption of violation under certain conditions (for example, if best management practices are utilized). The probability that these rules will be adopted without significant changes is impossible to

determine, as the recent elections resulted in an administration change and the new Governor's position on the issue of non-point source water pollution is not yet known. Moreover, at this point, critical habitat does not appear to play any role in the proposed rules. Thus, the possible economic impact, if any, caused by the interplay of nonpoint source pollution requirements and the designation of critical habitat is entirely speculative and unable to be estimated.

(28) *Comment:* One comment stated that the DEA fails to consider economic impacts of critical habitat that result through interaction with State law, specifically Hawaii's Land Use Law. Critical habitat could result in downzoning under State law. HRS Sec. 205–2(e) states that Conservation Districts shall include areas necessary for conserving endangered species. HRS Sec.195D–5.1 states that the DLNR shall initiate amendments in order to include the habitat of rare species. Even if the DLNR does not act, the State Land Use Commission may initiate such changes, or they may be forced by citizen suits. Areas for endangered species may be placed in the Protective 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, reduce market value, and make the land unmortgageable. Additionally, forced redistricting from Agricultural to Conservation could increase real property taxes even while driving down the real value of the property.

Our Response: Both the DEA and this Addendum attempt to quantify the potential impacts from downzoning. As indicated earlier in this Addendum, the Service has indicated that it plans to remove most of the land in the Agricultural District from the final critical habitat designation. The intended modification would result in the inclusion of about 2,608 acres of Agricultural lands in the revised designation. Limited grazing takes place in these Agricultural lands. As discussed in section 5.c. of the Addendum, assuming Agricultural land in reserves would not lose value and assuming relatively low land values due to the remoteness of the Agricultural lands designated, reduction in land values due to redistricting land within the intended critical habitat designation from Agricultural to Conservation District could approach $715,000. As discussed in section 5.c. of the Addendum, redistricting these lands to the Conservation District is not likely to interfere with the use of the land or significantly reduce its economic value. The remaining privately owned land (715 acres) is considered remote Agricultural land. Therefore, utilizing the value from the lower end of the range, an estimate of the total drop in property value should redistricitng of all privately owned Agricultural land occur would be $715,000 (715 × $1,000). 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 reasonably certain.

(29) *Comment:* One comment stated that the DEA fails to consider economic impacts of listing and critical habitat that result through interaction with State law, specifically Hawaii's Endangered Species Act. *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: 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, 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 purely attributable to a listing decision and do not co-extensively occur because of critical habitat designations. There are no take prohibitions associated with critical habitat.

(30) *Comment:* A commenter stated that 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 Sec. 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 Sec. 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 also stated the following: The DEA fails to evaluate the practical effect that 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 it impossible to develop.

Another commenter stated that 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. The commenter provided the example of the Service's 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. The commenter concluded that the failure of the Service to address these activities in the DEA is a fundamental error of the analysis.

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, increased risk of litigation over approvals, etc., 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 in areas designated as critical habitat highly unlikely: (1) As modified, approximately 89 percent of critical habitat is in the Conservation District where development is already limited; (2) the approximately 11 percent of critical habitat in the Agricultural District is in arid areas or areas lined with gulches or steep cliffs that generally support limited, if any, grazing; (3) there are no known plans for development within the proposed critical habitat as modified; and (4) as modified, most of the land being designated as critical habitat in the Special Management Area is also within the Conservation District, where development is severely limited. In general, the Service does not intervene in local land use decisions, except to provide information on potential effects

to threatened or endangered species or trust resources, when asked to do so.

(31) *Comment:* A commenter stated that the DEA fails to consider economic impacts of critical habitat that result through interaction with State law, specifically the State Water Code. HRS Sec. 174C–2 states that ''adequate provision shall be made for protection of fish and wildlife.'' HRS Sec. 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. Another commenter stated that 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.

Our Response: No costs are expected to occur from such impacts to water systems, because none of the 41 species are stream-dependent for their survival and therefore would not cause a reduction in water diversion. In addition, water infrastructure is considered a manmade feature and therefore its operation and maintenance are not subject to the critical habitat provisions of section 7, because these features and structures normally do not contain, and are not likely to develop, any primary constituent elements.

(32) *Comment:* One commenter stated that the DEA fails to discuss economic impacts that may occur if opponents of water diversions use critical habitat designations to delay and confuse water use decisions on the grounds that any water diversion upstream of critical habitat may increase an endangered plant's risk of extinction. Furthermore, the burden of proof that diversions will not cause extinction will be placed on those diverting water. Proof will be difficult because so little is known about the needs of these species.

Our Response: Chapter VI, Section 3.g.(1) of the DEA states that it is highly unlikely that a new ditch system or major expansion to an existing one (including new diversions) would be proposed or approved in the proposed critical habitat. This assessment is made due to the existing protections provided by the baseline environmental regulations, current environmental and cultural concerns, current economic and financial constraints, probable public opposition to stream diversions, and difficulties in obtaining permits.

(33) *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 the 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 commenter pointed out that the DEA estimates that the Palila court decision may be interpreted to mandate private conservation and therefore the proposed critical habitat designation could cost Molokai landowners $840,000 to $2,240,000 per year, or $8.4 million to $22.4 million over 10 years. However, Table VI–3 of the DEA dismisses these costs as minor and does not add them to the total cost estimate. The commenter suggested that these costs 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 established. However, Chapter VI, Section 4.c. of the DEA does discuss the potential mandate for conservation management pursuant to litigation and the resulting costs for the proposed designation on Molokai. 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, increased risk of litigation over approvals, etc., are not expected since there are no known development plans within the proposed designation, as modified. Furthermore, the following factors make future development projects in the designated critical habitat highly unlikely: (1) As modified, approximately 89 percent of the proposed critical habitat is in the Conservation District where development is already limited; (2) the approximately 11 percent of the proposed critical habitat in the Agricultural District are in arid areas or areas lined with gulches or steep cliffs that generally host only limited, if any, grazing; (3) there are no known plans for development within the proposed critical habitat as modified; and (4) as modified, most of the land being designated as critical habitat in the Special Management Area is also within the Conservation District. 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 due to scant historical evidence for the 41 plant species.

(34) *Comment:* Several commenters stated that the cost of potential citizen suits preventing certain activities or requiring some sort of management in critical habitat was not discussed in the DEA. Litigation regarding land management requirements is not only foreseeable, but is likely. Critical habitat designation will bring unnecessary and costly litigation, thus creating an economic disaster that would severely challenge one private landowner's economic viability. Another commenter also stated that even if litigation is unrealistic, expectations of litigation alone can lower property values.

Our Response: As discussed in the DEA and in the Addendum, an undetermined probability exists that a Federal or State court could mandate certain indirect impacts as a result of critical habitat. While the economic analysis did not assess the legal merits of the arguments for or against the various indirect impacts, the DEA and the Addendum present the worst-case scenario of the costs associated with the potential outcomes of third-party lawsuits whenever possible. For example, for the sake of illustration, the DEA and Addendum assume a worst-case scenario whereupon mountainous areas (approximately 95 percent of the designated area) are subject to required conservation management. While the illustrative cost of such a scenario is estimated to be $695,000 to $1.85 million per year, the probability of such a conservation mandate is unclear due to the inability to predict whether a suit would be filed, its likelihood of success, or the extent of its coverage if successful. The Service believes the likelihood of the worst case scenario occurring is extremely low, and has not occurred in areas designated as critical habitat in Hawaii.

(35) *Comment:* One commenter stated that the Service did not adequately address the takings of private property as a result of designating critical habitat for the Molokai plant species. 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. Additionally, the landowner may incur the cost of litigation against the government to make it pay just compensation.

Our Response: The possible costs associated with redistricting land were discussed in the DEA under indirect costs. Since the publication of the DEA, we have removed most of the land in the Agricultural District from the final critical habitat designation. As noted above, redistricting the remaining parcels to the Conservation District is not likely to significant reduce the value of the land because: (1) Any areas that have been historically grazed are likely to be put in a subzone that will allow grazing (*i.e.*, not the Protective Subzone); and (2) the economic use of the land is already constrained by topography, remote location, and other existing restrictions.

(36) *Comment:* One commenter stated that precise mapping of manmade objects is needed and that the estimate of the time to investigate the implications of critical habitat is too low given the size of the proposed designated areas, the vagueness of the regulations concerning these unmapped holes, and the real costs of obtaining all necessary approvals for a development project in Hawaii. Another commenter questioned whether the indirect cost of investigating the implications of critical habitat should be considered a ''sunk'' cost of the critical habitat designation process rather than a potential future cost of a final designation.

Our Response: To address these concerns, the Addendum revisited the hour estimates presented in the DEA. Chapter VI, Section 4.f. of 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 the commenters did not provide an estimate of time or cost incurred in order to investigate implications of critical habitat, the Addendum conservatively doubled the estimate of hours spent by the landowner and/or his attorneys or professional staff on investigating the issues. Using these new assumptions, the analysis estimated that total section 7 costs range from $73,500 to $218,500, all of which are attributable to critical habitat.

While some landowners may expend time and money to investigate the implications of critical habitat on their land during the designation process, many landowners may not do so until after final designation is complete. Thus, the DEA and the Addendum treated these costs as a cost attributable to the final designation and nondesignation.

(37) *Comment:* One commenter stated that the DEA lacks a thorough benefits analysis. The commenter maintained that the DEA does not include the benefits of watershed protection and improvement, protection of other stream and riparian biota, and the value of the designated plant species as an indicator of ecological health. Other multiple 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 commenter also noted that the Service must use the tools available, such as the University of Hawaii (UH) Secretariat for Conservation Biology study that estimated the value of ecosystem services, 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: There is little disagreement in the published economic literature that real social welfare benefits can result from the conservation and recovery of endangered and threatened species (Bishop 1978, 1980; Brookshire and Eubanks 1983; Boyle and Bishop 1986; Hageman 1985; Samples *et al.* 1986; Stoll and Johnson 1984). Such benefits have also been ascribed to preservation of open space and biodiversity (see examples in Pearce and Moran (1994) and Fausold and Lilieholm (1999)), both of which are associated with species conservation.

Chapter VI, Section 6.c. of the DEA and Section 6 of the Addendum discuss the potential benefits addressed in the above comments. However, the DEA and Addendum also indicate that these benefits are not quantified due to lack of information available on: (1) Quantified data on the value of the 41 species; and (2) quantified data on the change in the quality of the ecosystem and the species as a result of the designation (for example, how many fewer ungulates will roam into the critical habitat, how many fewer invasive plants will be introduced as a result, and therefore how many more individuals of the 41 species will be present in the area).

Although the UH study does value ecosystem services, it has limited applicability for valuing the benefits of the proposed critical habitat designation for the 41 species 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 versus the value of the more limited benefits provided by the proposed critical habitat for the 41 species on the island of Molokai. 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 of critical habitat for the 41 species. For example, the value of water recharge in the UH study reflects projected water supply and demand conditions on Oahu, an island which is more than twice the size of Molokai but has a population more than 115 times that of Molokai. 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 and 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 critical habitat for the 41 species. Most of the Molokai critical habitat units are in mountainous areas with steep slopes and difficult access or on coastal cliffs. Perhaps more importantly, a critical habitat designation provides no guarantee of public use of or access to the property. It therefore is not clear to what extent a study which derived values from expectations of public use would be applicable to critical habitat designations.

(38) *Comment:* One commenter stated that although agricultural production areas are excluded from the proposed critical habitat units, agricultural resources appear to be included, particularly the source for the Molokai Irrigation System in Waikolu Valley.

The commenter requested assurance that long term improvements to the irrigation system will not be precluded by critical habitat designation.

Our Response: Chapter VI, Section 3.g. of the DEA and Section 4.g. of the Addendum address impacts of the proposed critical habitat designation on the Molokai Irrigation System. The economic analysis indicates that the lack of any current plant for new improvements, coupled with the difficulty of obtaining funding, completing impact studies, and securing permits were new improvements to be envisioned, makes it extremely unlikely that any new water improvements will be proposed or approved within the next 10 years. In addition, this final rule, existing man-made features and structures within the critical habitat units, including but not limited to aqueducts and other water system features such as diversions, flumes, pumping stations, irrigation ditches, pipelines, siphons, tunnels, water tanks, gaging stations, intakes, and wells do not contain the primary constituent elements essential for the conservation of each species and, therefore, are not included in the critical habitat designations.

Even if new projects were proposed, a number of circumstances must occur before there would be any direct impact of section 7 on water improvement proposals. Chapter III of the DEA noted that section 7(a)(2) of the Act requires Federal agencies to consult with us to ensure that activities they fund, authorize, permit, or carry out do not result in destruction or adverse modification of critical habitat. Further, the DEA noted that we do not have jurisdiction under section 7 to consult on activities occurring on non-Federal lands when the activities are not federally funded, authorized, or carried out. Thus, because the Molokai Irrigation System is not located on Federal land, critical habitat designation will have no direct impact on any long-term improvements constructed by the State unless the improvements involve Federal funding or require Federal permits. In addition, even if Federal funding or permitting is identified and a consultation is initiated, no direct impacts will result unless the Service (1) finds that the activity may jeopardize the continued existence of a listed species and/or destroy or adversely modify the critical habitat; and (2) can identify reasonable and prudent alternatives that will keep the action below the thresholds of jeopardy and/or adverse modification.

Thus, long-term improvements to the Molokai Irrigation System will not be precluded by critical habitat designation, but under a worst-case scenario, long-term improvements to the Molokai Irrigation System may involve the development of reasonable and prudent alternatives to prevent adverse modification of the critical habitat.

(39) *Comment:* One commenter stated that the designation of critical habitat in unoccupied areas may effectively extinguish the potential for intensive or extensive agricultural use or irrigation water resource development.

Our Response: As noted above, Chapter III of the DEA noted that section 7(a)(2) of the Act requires Federal agencies to consult with the Service to ensure that activities they fund, authorize, permit, or carry out do not result in destruction or adverse modification of critical habitat. Further, the DEA noted that the Service does not have jurisdiction under section 7 to consult on activities occurring on non-Federal lands when the activities are not federally funded, authorized, or carried out.

As a result, future intensive or extensive agricultural use or irrigation water resource development in unoccupied areas of designated critical habitat will not be subject to section 7 consultation unless it involves Federal funding or requires Federal permits.

The involvement of Federal funding and/or Federal permits will not extinguish the potential for intensive or extensive agricultural use or irrigation water resource development. Instead, the Federal agency with the nexus to the activity initiates consultation with the Service. The consultation between the Federal Action agency and the Service may involve informal consultation, formal consultation in the case of adverse impacts, or both. If during informal consultation the Federal Action agency determines that its action (as originally proposed or revised and taking into account direct and indirect effects) ''is not likely to adversely affect'' listed species or critical habitat (*e.g.*, the effects are beneficial, insignificant or discountable), and the Service agrees with that determination, then the Service provides concurrence in writing, and no further consultation is required.

If, however, the proposed action, as revised during informal consultation, is still likely to adversely affect listed species or critical habitat, the Action agency must request in writing initiation of formal consultation with the Service. If the Service finds, in its biological opinion, that a proposed action is not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify the critical habitat, even though the action may adversely affect listed species or critical habitat, then the action likely can be carried out without violating section 7(a)(2) of the Act.

On the other hand, if the Service finds that a proposed action is likely to jeopardize the continued existence of a listed species and/or destroy or adversely modify the critical habitat, then the Service provides the Action agency with reasonable and prudent alternatives that will keep the action below the thresholds of jeopardy and/or adverse modification, if any can be identified. The Service works with Action agencies and Applicants in developing reasonable and prudent alternatives. A reasonable and prudent alternative is one that: (1) Can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the Action agency's legal authority and jurisdiction; and (3) is economically and technologically feasible. The Service will, in most cases, defer to the Action agency's expertise and judgment as to the feasibility of an alternative. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of a project. Costs associated with implementing reasonable and prudent alternatives vary accordingly.

In summary, the potential for intensive or extensive agricultural use or irrigation water resource development will not be extinguished as a direct result of critical habitat designation. Rather, and only if Federal funding or Federal permits are involved, the Federal Action agency will consult with the Service to determine if the activity ''is likely to adversely affect'' the critical habitat. In the worst case, the proposed agricultural use or irrigation water development may involve the development of reasonable and prudent alternatives to prevent adverse modification of the critical habitat.

Chapter VI, Section 4.e. of the DEA and Section 5.c. of the Addendum discuss the indirect impacts resulting from the redistricting of private land in the Agricultural District into the Conservation District. The DEA noted that under a worst-case scenario, areas designated as critical habitat could be placed in the Protective Subzone with the most severe restrictions, which could prevent a new agricultural use or interfere with irrigation water development. As indicated in the Addendum, the likelihood of mandated redistricting is undetermined, but is expected to be small. The assessment of the probabilities of certain indirect impacts in the DEA is based on State

and local laws and regulations; discussions with State and local officials, landowners, and lawyers; and professional judgment. As discussed in the Addendum, the total drop in property value should redistricting of all privately owned Agricultural land occur is estimated at $715,000.

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) We published 88 single species critical habitat units for 41 plant species on Molokai.

(2) The scientific names were changed for the following associated species found in the ''*Supplementary Information*: *Discussion of the Plant Taxa*'' section: *Chenopodium oahuensis* changed to *Chenopodium oahuense* in the discussions of *Schiedea sarmentosa; Cocculus trilobus* changed to *Cocculus orbiculatus* in the discussion of *Brighamia rockii; Elephantopus spicatus* changed to *Pseudoelephantopus spicatus* in the discussion of *Peucedanum sandwicense; Jacquemontia sandwicensis* changed to *Jacquemontia ovalifolia* ssp. *sandwicensis* in the discussion of *Sesbania tomentosa; Lipochaeta integrifolia* changed to *Melanthera integrifolia* in the discussion of *Centaurium sebaeoides*, *Peucedanum sandwicense*, *Sesbania tomentosa*, and *Tetramolopium rockii; Mariscus phleoides* changed to *Cyperus phleoides* in the discussions of *Brighamia rockii* and *Centaurium sebaeoides; Phymatosorus scolopendria* changed to *Phymatosorus grossus* in the discussions of *Brighamia rockii; Pluchea symphytifolia* changed to *Pluchea carolinensis* in the discussions of *Brighamia rockii; Psychotria hexandra* changed to *Psychotria* spp. in the discussions of *Adenophorus periens; Styphelia tameiameiae* changed to *Leptecophylla tameiameiae* in the discussions of *Adenophorus periens*, *Bidens wiebkei*, *Canavalia molokaiensis*, *Diellia erecta*, *Isodendrion pyrifolium*, *Neraudia sericea*, *Platanthera holochila*, *Pritchardia munroi*, *Schiedea lydgatei*, *Schiedea sarmentosa*, *Silene alexandri*, *Silene lanceolata*, *Spermolepis hawaiiensis*, *Stenogyne bifida*, *Vigna o-wahuensis*, and *Zanthoxylum hawaiiense; Tetramolopium cassia* changed to *Tetramolopium* spp. in the discussion of *Brighamia rockii;* and *Viola robusta* changed to *Viola chamissoniana* ssp. *robusta* in the discussion of *Adenophorus periens*.

(3) In order to avoid confusion regarding the number of location occurrences for each species (that do not necessarily represent viable populations) and the number of recovery populations (*e.g.*, 8 to 10 with 100, 300, or 500 reproducing individuals) we changed the word ''population'' to ''occurrence'' and updated the number of occurrences for the following species found in the **SUPPLEMENTARY INFORMATION:** *Discussion of the Plant Taxa* section and ''Table 2.—Summary of existing occurrences on Molokai, and landownership for 51 species reported from Molokai'': *Alectryon macrococcus*, changed from three populations to six occurrences; *Bidens wiebkei*, changed from three populations to five occurrences; *Brighamia rockii*, changed from four populations to five occurrences; *Canavalia molokaiensis*, changed from five populations to seven occurrences; *Centaurium sebaeoides*, changed from five populations to two occurrences; *Clermontia oblongifolia* ssp. *brevipes*, changed from three populations to five occurrences; *Cyanea mannii*, changed from three populations to eight occurrences; *Cyanea procera*, changed from two populations to five occurrences; *Diellia erecta*, changed from three populations to four occurrences; *Hibiscus arnottianus* ssp. *immaculatus*, changed from two populations to three occurrences; *Lysimachia maxima*, changed from two populations to one occurrence; *Peucedanum sandwicense*, changed from four populations to five occurrences; *Schiedea sarmentosa*, changed from two populations to five occurrences; *Sesbania tomentosa*, changed from six populations to nine occurrences; *Tetramolopium rockii*, changed from three populations to four occurrences; and *Zanthoxylum hawaiiense*, changed from two populations to four occurrences.

(4) We updated the number of individuals for the following species found in the **SUPPLEMENTARY INFORMATION:** *Discussion of the Plant Taxa* section: *Schiedea lydgatei* and *Schiedea sarmentosa* changed to greater than 1,000; *Stenogyne bifida* changed to less than 13; *Cyanea grimesiana* ssp. *grimesiana* changed to less than 7; *Hesperomannia arborescens* and *Melicope mucronulata* changed to 3; and *Sesbania tomentosa* changed to over 2,000.

(5) We revised the list of excluded, manmade features in the *Criteria Used to Identify Critical Habitat* and section 17.99 to include additional features based on information received during the public comment periods.

(6) 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.

(7) As discussed in detail in the ''*Analysis of Impacts Under Section 4(b)(2)*,'' we have determined that the benefits of excluding TNCH's Molokai preserves as critical habitat outweigh the benefits of including them as critical habitat for *Bidens wiebkei*, *Canavalia molokaiensis*, *Centaurium sebaeoides*, *Clermontia oblongifolia* ssp. *brevipes*, *Cyanea mannii*, *Cyanea procera*, *Hedyotis mannii*, *Labordia triflora*, *Lysimachia maxima*, *Mariscus fauriei*, *Melicope mucronulata*, *Phyllostegia mannii*, *Phyllostegia mollis*, *Platanthera holochila*, *Schiedea sarmentosa*, *Silene alexandrii*, *Stenogyne bifida*, *Tetramolopium rockii*, and *Vigna o-wahuense*.

(8) In accordance with the revisions described in (5), we revised sections 17.12 *Endangered and threatened plants* and 17.99 § 17.99 *Critical habitat; plants on the islands of Kauai, Niihau, and Molokai, HI*, as appropriate.

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

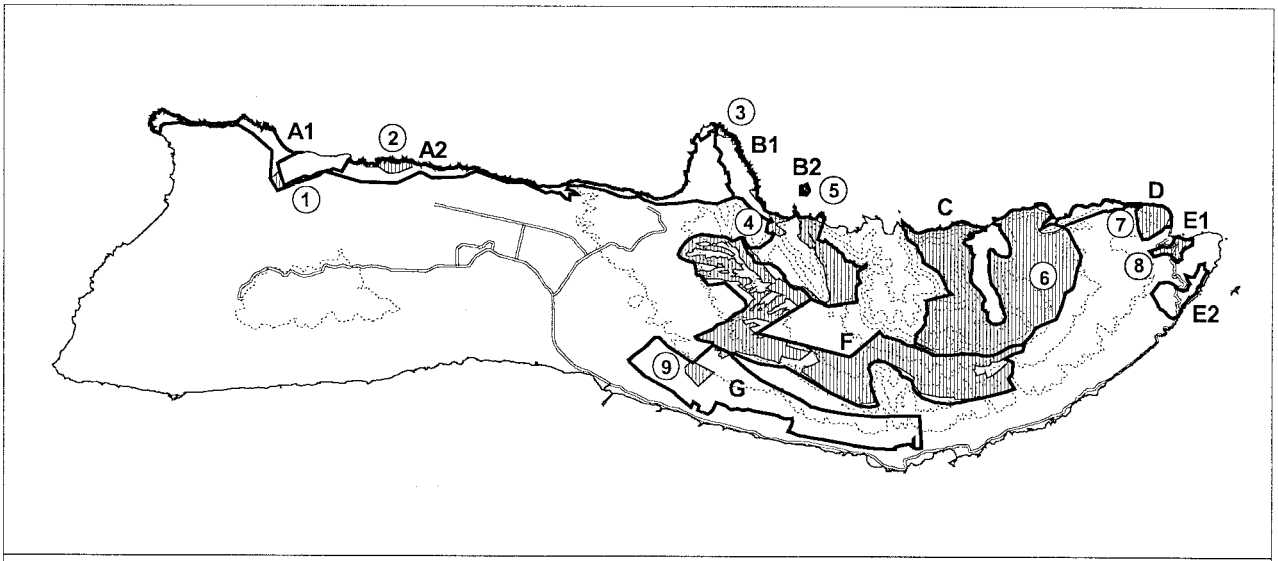

Figure 1
Summary of Changes from Proposed Rule to Final Rule

Final Molokai Critical Habitat Unit
Proposed Molokai Critical Habitat Unit
Major Roads
Coastline
Elevation (1,000-ft. contours)

BILLING CODE 4310–55–C

Molokai A1

This unit was proposed as critical habitat for three species: *Centaurium sebaeoides, Marsilea villosa*, and *Tetramolopium rockii.* We excluded the proposed critical habitat for *Centaurium sebaeoides*, a multi-island species. This area is not essential for the conservation of *Centaurium sebaeoides* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of *Centaurium sebaeoides*, and is not currently managed for conservation of this species. In addition, there are at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout its historical range on Molokai and other islands. Habitat also exists on Molokai for *Centaurium sebaeoides* within Moomomi Preserve. The area designated as critical habitat for *Tetramolopium rockii* provides habitat within its historical range for one population.

This modification resulted in the reduction from 472 ha (1,167 ac) to 68 ha (167 ac). This unit was renamed Molokai 1—*Tetramolopium rockii*—a.

In the April 5, 2002, revised proposal, we stated that there was critical habitat for *Marsilea villosa* within Molokai A1. Upon further inspection, we discovered that the actual areas that contain the suitable habitat for this species were inadvertently left out of the proposed unit Molokai A1. We are unable at this time to publish proposed critical habitat for *Marsilea villosa* in this final rule. Critical habitat is proposed for this species on the island of Oahu. We plan to publish a proposed rule to designate critical habitat for *Marsilea villosa* on Molokai subsequent to publication of this final rule for 41 plants on Molokai.

Molokai A2

This unit was proposed as critical habitat for three species: *Centaurium sebaeoides, Sesbania tomentosa*, and *Tetramolopium rockii.* This area is not essential for the conservation of *Centaurium sebaeoides* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of *Centaurium sebaeoides*, and is not currently managed for conservation of this species. In addition, there are at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout the historical range on Molokai and other islands. Habitat also exists on Molokai for *Centaurium sebaeoides* within Moomomi Preserve. The areas designated as critical habitat for *Tetramolopium rockii* and *Sesbania tomentosa* provides habitat within their historical range for one population of each species.

This modification resulted in the reduction from 1,532 ha (3,786 ac) to 131 ha (325 ac). This unit was renamed Molokai 2—*Sesbania tomentosa*—a and Molokai 2—*Tetramolopium rockii*—b.

Molokai B1

This unit was proposed as critical habitat for 18 species: *Adenophorus periens, Brighamia rockii, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Cyanea dunbarii, Cyanea grimesiana* ssp. *grimesiana, Cyanea*

procera, Hedyotis mannii, Hibiscus arnottianus ssp. *immaculatus, Ischaemum byrone, Lysimachia maxima, Peucedanum sandwicense, Phyllostegia mannii, Plantago princeps, Platanthera holochila, Schiedea nuttallii, Stenogyne bifida*, and *Tetramolopium rockii.* Modifications were made to this unit to exclude areas not essential to the conservation of *Centaurium sebaeoides, Cyanea grimesiana* ssp. *grimesiana*, and *Peucedanum sandwicense*, all multi-island species. Areas proposed for these three species were excluded because we have proposed adequate habitat elsewhere on Molokai and on other islands within their historical ranges.

We excluded the proposed critical habitat for *Hedyotis mannii, Ischaemum byrone, Plantago princeps*, and *Platanthera holochila*, all multi-island species. This area is not essential to the conservation of these four species because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of these four species, and is not currently managed for the conservation of these species. In addition, there are at least eight other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout their historical ranges on other islands. There is habitat designated elsewhere on Molokai for *Ischaemum byrone* and *Plantago princeps.* Habitat exists on Molokai for *Hedyotis mannii* and *Platanthera holochila* within Pelekunu Preserve.

We excluded the proposed critical habitat for *Stenogyne bifida*, an island-endemic species. This area is not essential for the conservation of *Stenogyne bifida* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of *Stenogyne bifida*, and is not currently managed for conservation of this species. In addition, there are at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout its historical range on Molokai. In addition, habitat for *Stenogyne bifida* exists within Kamakou and Pelekunu Preserves.

The area designated as critical habitat for the following island-endemic species provides habitat within their historical ranges for one population each of *Hibiscus arnottianus* ssp. *immaculatus* and *Tetramolopium rockii*, two populations of *Clermontia oblongifolia* ssp. *brevipes*, three populations of *Cyanea procera*, six populations of Lysimachia maxima, and seven populations of *Cyanea dunbarii.*

The area designated as critical habitat for the following multi-island species provides habitat within their historical ranges for one population each of *Adenophorus periens, Brighamia rockii, Centaurium sebaeoides, Peucedanum sandwicense*, and *Schiedea nuttallii*, and two populations of *Phyllostegia mannii.*

These modifications resulted in the reduction from 2,179 ha (5,384 ac) to 909 ha (2,246 ac). This unit was renamed Molokai 3—*Centaurium sebaeoides*—a, Molokai 3—*Tetramolopium rockii*—c, Molokai 4—*Brighamia rockii*—a, Molokai 4—*Hibiscus arnottianus* ssp. *immaculatus*—a, Molokai 6—*Adenophorus periens*—a, Molokai 6—*Brighamia rockii*—c, Molokai 6—*Clermontia oblongifolia* ssp. *brevipes*—a, Molokai 6—*Cyanea dunbarii*—a, Molokai 6—*Cyanea procera*—a, Molokai 6—*Hibiscus arnottianus* ssp. *immaculatus*—b, Molokai 6—*Lysimachia maxima*—a, Molokai 6—*Lysimachia maxima*—b, Molokai 6—*Peucedanum sandwicense*—b, Molokai 6—*Phyllostegia mannii*—a, and Molokai 6—*Schiedea nuttallii*—a.

Molokai B2

This unit was proposed as critical habitat for four species: *Brighamia rockii, Ischaemum byrone, Peucedanum sandwicense*, and *Tetramolopium rockii.* We excluded the proposed critical habitat for *Ischaemum byrone*, a multi-island species. This area is not essential for the conservation of *Ischaemum byrone* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of *Ischaemum byrone*, and is not currently managed for conservation of this species. There are also at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout its historical range on Molokai and other islands. The area designated as critical habitat for the island-endemic species *Tetramolopium rockii* provides habitat within its historical range for one population. The area designated as critical habitat for the multi-island species *Brighamia rockii* and *Peucedanum sandwicense* provides habitat within their historical ranges for one population of each species.

This modification resulted in a reduction from 20 ha (50 ac) to 4 ha (10 ac). This unit was renamed Molokai 5—*Brighamia rockii*—b, Molokai 5—*Peucedanum sandwicense*—a, and Molokai 5—*Tetramolopium rockii*—d.

Molokai C

This unit was proposed as critical habitat for 14 species: *Adenophorus periens, Brighamia rockii, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Cyanea grimesiana* ssp. *grimesiana, Diplazium molokaiense, Hesperomannia arborescens, Hibiscus arnottianus* ssp. *immaculatus, Ischaemum byrone, Lysimachia maxima, Melicope reflexa, Peucedanum sandwicense, Phyllostegia mannii*, and *Pteris lidgatei.* Modifications were made to this unit to exclude areas not essential to the conservation of *Ischaemum byrone* and *Peucedanum sandwicense*, both multi-island species. Areas proposed for these two species were excluded because we have proposed adequate habitat elsewhere on Molokai and on other islands within their historical ranges. We excluded the proposed critical habitat for *Centaurium sebaeoides*, a multi-island species. This area is not essential for the conservation of *Centaurium sebaeoides* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of *Centaurium sebaeoides*, and is not currently managed for conservation of this species. There are also at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout its historical range on Molokai and other islands. Habitat also exists on Molokai for *Centaurium sebaeoides* within Moomomi Preserve.

The area designated as critical habitat for the following island-endemic species provides habitat within their historical ranges for three populations of *Lysimachia maxima*, four to five populations of *Hibiscus arnottianus* ssp. *immaculatus*, five to six populations of *Clermintia oblongifolia* ssp. *brevipes*, and eight populations of *Melicope reflexa.*

The area designated as critical habitat for the following multi-island species provides habitat within their historical ranges for one population each of *Diplazium molokaiense* and *Peucedanum sandwicense:* two populations each of *Cyanea grimesiana* ssp. *grimesiana, Hesperomannia arborescens*, and *Ischaemum byrone;* three populations each of *Adenophorus periens, Brighamia rockii*, and *Pteris lydgatei;* and five populations of *Phyllostegia mannii.*

These modifications resulted in the reduction from 4,507 ha (11,138 ac) to

4,423 ha (10,930 ac). This unit was renamed Molokai 6—*Adenophorus periens*—b, Molokai 6—*Adenophorus periens*—c, Molokai 6—*Brighamia rockii*—d, Molokai 6—*Brighamia rockii*—e, Molokai 6—*Clermontia oblongifolia* ssp. *brevipes*—b, Molokai 6—*Clermontia oblongifolia* ssp. *brevipes*—c, Molokai 6—*Cyanea grimesiana* ssp. *grimesiana*—a, Molokai 6—*Diplazium molokaiense*—a, Molokai 6—*Hesperomannia arborescens*—a, Molokai 6—*Hesperomannia arborescens*—b, Molokai 6—*Hibiscus arnottianus* ssp. *immaculatus*—c, Molokai 6—*Hibiscus arnottianus* ssp. *immaculatus*—d, Molokai 6—*Ischaemum byrone*—a, Molokai 6—*Ischaemum byrone*—b, Molokai 6—*Lysimachia maxima*—c, Molokai 6—*Melicope reflexa*—a, Molokai 6—*Melicope reflexa*—b, Molokai 6—*Peucedanum sandwicense*—c, Molokai 6—*Phyllostegia mannii*—b, Molokai 6—*Phyllostegia mannii*—c, and Molokai 6—*Pteris lidgatei*—a.

Molokai D

This unit was proposed as critical habitat for four species: *Bidens wiebkei, Centaurium sebaeoides, Ischaemum byrone*, and *Peucedanum sandwicense.* We excluded the proposed critical habitat for *Centaurium sebaeoides, Ischaemum byrone*, and *Peucedanum sandwicense*, all multi-island species. This area is not essential for the conservation of *Centaurium sebaeoides, Ischaemum byrone*, and *Peucedanum sandwicense* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of these species, is not currently managed for conservation of this species. In addition, there are at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout their historical ranges on Molokai and other islands. Habitat also exists on Molokai for *Centaurium sebaeoides* within Moomomi Preserve. The area designated as critical habitat for the island-endemic species, *Bidens wiebkei*, provides habitat within its historical range for two populations.

These modifications resulted in the reduction from 466 ha (1,153 ac) to 240 ha (593 ac). This unit was renamed Molokai 7—*Bidens wiebkei*—b.

Molokai E1

This unit was proposed as critical habitat for one species: *Bidens wiebkei.* Modifications were made to this unit to exclude areas not essential to the conservation of *Bidens wiebkei*, an island-endemic, because we have designated adequate habitat elsewhere on Molokai within its historical range. Habitat also exists within Pelekunu and Kamakou preserves. The area designated as critical habitat for *Bidens wiebkei* provides habitat within its historical range for two populations.

These modifications resulted in the reduction from 127 ha (315 ac) to 124 ha (305 ac). This unit was renamed Molokai 8—*Bidens wiebkei*—c.

Molokai E2

This unit was proposed as critical habitat for one species: *Bidens wiebkei.* This unit was excluded from critical habitat because the area is not essential to the conservation of this species. The area is highly degraded. This area is not essential for the conservation of *Bidens wiebkei* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of *Bidens wiebkei*, and is not currently managed for conservation of this species. In addition, there are at least 8 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout its historical range on Molokai. Habitat also exists on Molokai for *Bidens wiebkei* within Kamakou and Pelekunu preserves. This modification resulted in the complete removal of this unit (332 ha (821 ac)) from the final designation.

Molokai F

This unit was proposed as critical habitat for 34 species: *Adenophorus periens, Alectryon macrococcus, Bidens wiebkei, Canavalia molokaiensis, Clermontia oblongifolia* ssp. *brevipes, Ctenitis squamigera, Cyanea dunbarii, Cyanea grimesiana* ssp. *grimesiana, Cyanea mannii, Cyanea procera, Diellia erecta, Eugenia koolauensis, Flueggea neowawraea, Hedyotis mannii, Labordia triflora, Lysimachia maxima, Mariscus fauriei, Melicope mucronulata, Melicope reflexa, Neraudia sericea, Phyllostegia mannii, Phyllostegia mollis, Platanthera holochila, Plantago princeps, Schiedea lydgatei, Schiedea nuttallii, Schiedea sarmentosa, Sesbania tomentosa, Silene alexandri, Silene lanceolata, Spermolepis hawaiiensis, Stenogyne bifida, Vigna o-wahuensis*, and *Zanthoxylum hawaiiense.* Modifications were made to this unit to exclude areas not essential to the conservation of *Alectryon macrococcus, Diellia erecta, Flueggea neowawraea, Mariscus fauriei, Melicope mucronulata, Neraudia sericea, Plantago princeps*, and *Spermolepis hawaiiensis*, all multi-island species. Areas proposed for these eight species were excluded because we have designated more adequate and more appropriate habitat elsewhere on Molokai and on other islands within their historical ranges. Habitat also exists on Molokai for *Mariscus fauriei* and *Melicope mucronulata* within Pelekunu Preserve. Modifications were also made to this unit to exclude areas not essential to the conservation of *Canavalia molokaiensis, Cyanea dunbarii, Cyanea mannii, Cyanea procera, Schiedea lydgatei, Schiedea sarmentosa, Silene alexandri*, and *Stenogyne bifida*, all island-endemic species. Areas proposed for these eight species were excluded because we have designated adequate and more appropriate habitat elsewhere on Molokai within their historical ranges. Habitat also exists on Molokai for *Canavalia molokaiensis, Cyanea mannii, Cyanea procera, Schiedea sarmentosa, Silene alexandri*, and *Stenogyne bifida* within Kamakou Preserve. We excluded the proposed critical habitat for *Cyanea grimesiana* ssp. *grimesiana*, a multi-island species. This area is not essential for the conservation of *Cyanea grimesiana* ssp. *grimesiana* because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of *Cyanea grimesiana* ssp. *grimesiana*, and is not currently managed for conservation of this species. There are also at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations throughout its historical range on Molokai and other islands. We excluded the proposed critical habitat for *Hedyotis mannii, Phyllostegia mollis, Platanthera holochila*, and *Vigna o-wahuensis*, all multi-island species. This area is not essential for the conservation of these four species because it lacks one or more of the primary constituent elements, has a lower proportion of associated native species than other areas we consider to be essential to the conservation of these four species, and is not currently managed for conservation of these species. In addition, there are at least 10 other locations that have been identified to meet the recovery goal of 8 to 10 populations per species throughout their historical ranges on other islands. Habitat also exists on Molokai for all four of these species within Pelekunu Preserve.

The area designated as critical habitat for the following island-endemic species provides habitat within their historical

ranges for one population of *Bidens wiebkei*; 3 populations each of *Clermontia oblongifolia* ssp. *brevipes* and *Stenogyne bifida*; 5 populations of *Canavalia molokaiense* and *Cyanea mannii*; 6 populations of *Cyanea procera, Lysimachia maxima*, and *Melicope reflexa*; 7 populations of *Schiedea sarmentosa* and *Silene alexandrii*; 8 populations of *Labordia triflora*; and 10 populations of *Cyanea dunbarii* and *Schiedea lydgatei.* The area designated as critical habitat for the following multi-island species provides habitat within their historical ranges for one population each of *Adenophorus periens, Alectryon macrococcus, Ctenitis squamigera, Diellia erecta, Fluggea neowawraea, Plantago princeps, Schiedea nuttallii, Spermolepis hawaiiensis*, and *Zanthoxylum hawaiiense*; two populations of *Eugenia koolauensis, Phyllostegia mannii*, and *Silene lanceolata*; four populations of *Mariscus fauriei* and *Melicope mucronulata*; and six populations of *Neraudia sericea.*

These modifications resulted in the reduction from 4,956 ha (12,247 ac) to 3,819 ha (9,436 ac). This unit was renamed Molokai 6—*Adenophorus periens*—b, Molokai 6—*Alectryon macrococcus*—a, Molokai 6—*Bidens wiebkei*—a, Molokai 6—*Canavalia molokaiensis*—a, Molokai 6—*Canavalia molokaiensis*—b, Molokai 6—*Canavalia molokaiensis*—c, Molokai 6—*Clermontia oblongifolia* ssp. *brevipes*—b, Molokai 6—*Ctenitis squamigera*—a, Molokai 6—*Cyanea dunbarii*—a, Molokai 6—*Cyanea dunbarii*—b, Molokai 6—*Cyanea dunbarii*—c, Molokai 6—*Cyanea mannii*—a, Molokai 6—*Cyanea mannii*—b, Molokai 6—*Cyanea mannii*—c, Molokai 6—*Cyanea mannii*—d, Molokai 6—*Cyanea mannii*—e, Molokai 6—*Cyanea procera*—a, Molokai 6—*Cyanea procera*—b, Molokai 6—*Diellia erecta*—a, Molokai 6—*Eugenia koolauensis*—a, Molokai 6—*Flueggea neowawraea*—a, Molokai 6—*Labordia triflora*—a, Molokai 6—*Labordia triflora*—b, Molokai 6—*Labordia triflora*—c, Molokai 6—*Labordia triflora*—d, Molokai 6—*Lysimachia maxima*—a, Molokai 6—*Lysimachia maxima*—b, Molokai 6—*Mariscus fauriei*—a, Molokai 6—*Mariscus fauriei*—b, Molokai 6—*Melicope mucronulata*—a, Molokai 6—*Melicope mucronulata*—b, Molokai 6—*Melicope mucronulata*—c, Molokai 6—*Melicope mucronulata*—d, Molokai 6—*Melicope mucronulata*—e, Molokai 6—*Melicope reflexa*—b, Molokai 6—*Neraudia sericea*—a, Molokai 6—*Phyllostegia mannii*—b, Molokai 6—*Plantago princeps*—a, Molokai 6—*Schiedea lydgatei*—a, Molokai 6—*Schiedea lydgatei*—b, Molokai 6—*Schiedea nuttallii*—b, Molokai 6—*Schiedea sarmentosa*—a, Molokai 6—*Schiedea sarmentosa*—b, Molokai 6—*Silene alexandri*—a, Molokai 6—*Silene alexandri*—b, Molokai 6—*Silene lanceolata*—a, Molokai 6—*Spermolepis hawaiiensis*—a, Molokai 6—*Stenogyne bifida*—a, and Molokai 6—*Zanthoxylum hawaiiense*—a.

Molokai G

This unit was proposed as critical habitat for four species: *Hibiscus brackenridgei, Isodendrion pyrifolium, Mariscus fauriei*, and *Sesbania tomentosa.* Modifications were made to this unit to exclude areas not essential to the conservation of these multi-island species. Areas proposed for these four species were excluded because we have designated adequate habitat elsewhere on Molokai and on other islands within their historical ranges. Habitat exists for *Mariscus fauriei* within Pelekunu Preserve. The area designated as critical habitat for these four multi-island species provides habitat within their historical ranges for one population each of *Hibiscus brackenridgei, Isodendrion pyrifolium*, and *Sesbania tomentosa*, and three populations of *Mariscus fauriei.*

These modifications resulted in the reduction from 3,023 ha (7,471 ac) to 130 ha (321 ac). This unit was renamed Molokai 9—*Isodendrion pyrifolium*—a, Molokai 9—*Hibiscus brackenridgei*—a, Molokai 6—*Mariscus fauriei*—b, Molokai 9—*Sesbania tomentosa*—b.

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 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 requirement that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. Section 7 also requires conferences with us 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, ''* * * a 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 it is recovery can be achieved; thus, the concepts of long-term survival and recovery are linked. However, in the March 15, 2001, decision of the United States Court of Appeals for the Fifth Circuit (*Sierra Club* v. *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. Nevertheless, because consultation under section 7 of the Act does not apply to activities on private or other non-Federal lands that do not involve a Federal nexus, critical habitat designation would not result in any regulatory requirements for these actions.

In order to be included in a critical habitat designation, the habitat must first contain physical and biological features to 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 lifecycle 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 containing physical and biological features

essential for the conservation of the species. 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 one or more 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 as critical habitat areas outside the geographical area presently occupied by a 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.

Habitat is often dynamic, and populations may move from one area to another over time. 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. For these reasons, all should 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) of the Act 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.

A. Prudency

Designation of critical habitat is not prudent when the species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of such threat to the species (50 CFR 424.12(a)(1)).

Due to low numbers of individuals and/or populations and their inherent immobility, the 51 plants may be vulnerable to unrestricted collection, vandalism, or disturbance. We examined the evidence currently available for each of these taxa and found specific evidence of vandalism, disturbance, and/or the threat of unrestricted collection for one species of *Pritchardia,* the native palm, on Molokai. At the time of listing, we determined that designation of critical habitat was not prudent for Pritchardia munroi because it would increase the degree of threat from vandalism or collecting, and would provide no benefit (57 FR 46325). We received information on the commercial trade in palms conducted through the Internet (Grant Canterbury, USFWS, in litt. 2000). Several nurseries advertise and sell seedlings and young plants, including 13 species of Hawaiian *Pritchardia.* Seven of these species are federally protected, including *Pritchardia munroi.* In light of this information, we believe that designation of critical habitat would likely increase the threat from vandalism or collection to this species of *Pritchardia* on Molokai. First, it is easy to identify, and second, it may be attractive to collectors of rare palms either for their personal use or to trade or sell for personal gain (Johnson 1996). We believe that the evidence shows that this species of palm may be attractive to such collectors. Although the final listing rule and proposed critical habitat do not list vandalism or overcollection as a threats, in light of documented vandalism and overcollection events on species in the same genus on Kauai, we believe that *Pritchardia munroi* is vulnerable to the same types of threats because of the similarity in appearance of the species.

In addition, we believe that designation would not provide significant benefits that would outweigh these increased risks. First, *Pritchardia munroi* does not occur on Federal land. It is in a remote location, not accessible to standard vehicles. It is, therefore, unlikely that the land on which it is found will be developed. Since there does not appear to be any actions in the future that would involve a Federal agency, designation of critical habitat would not provide any additional protection to the species that it does not already have through listing alone. If however in the future any Federal involvement did occur, such as through the permitting process or funding by the U.S. Department of Agriculture, the U.S. Department of Interior, the Corps through section 404 of the Clean Water Act, the U.S. Federal Department of Housing and Urban Development or the Federal Highway Administration, the actions would be subject to consultation under section 7 of the Act.

We acknowledge that critical habitat designation, in some situations, provides additional value to the species, (*e.g.*, by identifying areas important for conservation and calling attention to those areas in need of special protection). However, for this species, we believe that the benefits of designating critical habitat do not outweigh the potential increased threats from vandalism or collection. Given all of the above considerations, we determine that designation of critical habitat for *Pritchardia munroi* is not prudent.

We made final prudent findings for the following 29 multi-island species in other published final critical habitat rules: *Adenophorus periens, Alectryon macrococcus, Bonamia menziesii, Brighamia rockii, Centaurium sebaeoides, Ctenitis squamigera, Cyanea grimesiana ssp. grimesiana, Cyperus trachysanthos, Diellia erecta, Diplazium molokaiense, Flueggea neowawraea,*

Hedyotis mannii, Hesperomannia arborescens, Hibiscus brackenridgei, Ischaemum byrone, Isodendrion pyrifolium, Labordia triflora, Mariscus fauriei, Melicope munroi, Peucedanum sandwicense, Plantago princeps, Platanthera holochila, Schiedea nuttallii, Sesbania tomentosa, Silene lanceolata, Solanum incompletum, Spermolepis hawaiiensis, Vigna o-wahuensis, and *Zanthoxylum hawaiiense* (64 FR 48307, 68 FR 1220, 68 FR 9116)

Three species no longer occur on Molokai but are reported from one or more other islands. To find whether critical habitat would be prudent for these three species, we analyzed the potential threats and benefits for each species in accordance with the court's orders. These three plants were listed as endangered species under the Act between 1991 and 1996. At the time each plant was listed, we determined that designation of critical habitat was not prudent because designation would increase the degree of threat to the species and/or would not benefit the plant. We examined the evidence available for these three species and have not, at this time, found specific evidence of taking, vandalism, collection, or trade of these species or of similar species. Consequently, while we remain concerned that these activities could potentially threaten *Eugenia koolauensis, Phyllostegia mollis,* or *Pteris lidgatei* 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 these species are currently threatened by taking or other human activity, which would be exacerbated by the designation of critical habitat. In the absence of finding that critical habitat would increase threats to a species, if there are any benefits to critical habitat designation, then a prudent finding is warranted. The potential benefits include: (1) Triggering section 7 consultation in new areas where it would not otherwise occur because, for example, it is or has become unoccupied or the occupancy is in question; (2) focusing conservation activities on the most essential areas; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species. In the case of *Eugenia koolauensis, Phyllostegia mollis,* and *Pteris lidgatei* there would be some benefits to designating critical habitat. The primary regulatory effect of critical habitat is the section 7 requirement that Federal agencies refrain from taking any action that destroys or adversely modifies critical habitat. None of these three species are reported from Federal lands on Molokai where actions are subject to section 7 consultation. However, all three of these species are reported from Federal lands or lands that are administered by a Federal agency on Oahu (*Eugenia koolauensis* is reported from the United States Army's Kahuku Training Area; *Phyllostegia mollis* is reported from the United States Army's Schofield Barracks Military Reservation/ Schofield Barracks East Range; and *Pteris lidgatei* is reported from the United States Army's Schofield Barracks Military Reservation/Schofield Barracks East Range and Kawailoa Training Area, as well as the Service's Oahu Forest National Wildlife Refuge). While a critical habitat designation for habitat currently occupied by *Eugenia koolauensis, Phyllostegia mollis,* and *Pteris lidgatei* would not likely change the section 7 consultation outcome there may be instances where section 7 consultation would be triggered only if critical habitat were designated. There may also be some educational or informational benefits to the designation of critical habitat. Educational benefits include the notification of landowner(s), 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. Therefore, we find that designating critical habitat is prudent for *Eugenia koolauensis, Phyllostegia mollis,* and *Pteris lidgatei.*

We examined the evidence available for the other 18 taxa and have not, at this time, found specific evidence of taking, vandalism, collection, or trade of these taxa or of similar species. Consequently, while we remain concerned that these activities could potentially threaten these 18 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 would be exacerbated by the designation of critical habitat.

In the absence of finding that critical habitat would increase threats to a species a prudent finding is warranted. The potential benefits include: (1) Triggering section 7 consultation in new areas where it would not otherwise occur because, for example, it is or has become unoccupied; (2) focusing conservation activities; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species.

In the case of these 18 species, there would be some benefits to critical habitat. The primary regulatory effect of critical habitat is the section 7 requirement that Federal agencies refrain from taking any action that destroys or adversely modifies critical habitat. One of these species is reported on or near Federal lands (*see* Table 2), where actions are subject to section 7 consultation. Although a majority of the species considered in this rule are located exclusively on non-Federal lands with limited Federal activities, there could be Federal actions affecting these lands in the future. While a critical habitat designation for habitat currently occupied by these species would not likely change the section 7 consultation outcome, there may be instances where section 7 consultation would be triggered only if critical habitat were designated. There would also be some educational or informational benefits to the designation of critical habitat. Benefits of designation would include the notification of land owners, 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.

Therefore, designation of critical habitat is prudent for these 18 plant species: *Bidens wiebkei, Canavalia molokaiensis, Clermontia oblongifolia* ssp. *brevipes, Cyanea dunbarii, Cyanea mannii, Cyanea procera, Hibiscus arnottianus* ssp. *immaculatus, Lysimachia maxima, Marsilea villosa, Melicope mucronulata, Melicope reflexa, Neraudia sericea, Phyllostegia mannii, Schiedea lydgatei, Schiedea sarmentosa, Silene alexandri, Stenogyne bifida,* and *Tetramolopium rockii.*

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 *Adenophorus periens, Alectryon macrococcus, Bidens wiebkei, Brighamia rockii, Canavalia molokaiensis, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Ctenitis squamigera, Cyanea dunbarii, Cyanea grimesiana* ssp. *grimesiana, Cyanea mannii, Cyanea procera, Diellia erecta, Diplazium molokaiense, Eugenia koolauensis, Flueggea neowawraea, Hesperomannia arborescens, Hibiscus arnottianus* ssp. *immaculatus, Hibiscus brackenridgei, Ischaemum byrone,*

Isodendrion pyrifolium, Labordia triflora, Lysimachia maxima, Mariscus fauriei, Melicope mucronulata, Melicope reflexa, Neraudia sericea, Peucedanum sandwicense, Phyllostegia mannii, Plantago princeps, Pteris lidgatei, Schiedea lydgatei, Schiedea nuttallii, Schiedea sarmentosa, Sesbania tomentosa, Silene alexandri, Silene lanceolata, Spermolepis hawaiiensis, Stenogyne bifida, Tetramolopium rockii, 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 41 species; the December 29, 2000, proposal; the April 5, 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 from landowners, land managers, and interested parties on the island of Molokai; 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 83158; 67 FR 16492).

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 sections 3(5)(A)(i) and 4(b)(1)(A) 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, 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 *Adenophorus periens, Alectryon macrococcus, Bidens wiebkei, Brighamia rockii, Canavalia molokaiensis, Centaurium sebaeoides, Clermontia oblongifolia* ssp. *brevipes, Ctenitis squamigera, Cyanea dunbarii, Cyanea grimesiana* ssp. *grimesiana, Cyanea mannii, Cyanea procera, Diellia erecta, Diplazium molokaiense, Eugenia koolauensis, Flueggea neowawraea, Hesperomannia arborescens, Hibiscus arnottianus* ssp. *immaculatus, Hibiscus brackenridgei, Ischaemum byrone, Isodendrion pyrifolium, Labordia triflora, Lysimachia maxima, Mariscus fauriei, Melicope mucronulata, Melicope reflexa, Neraudia sericea, Peucedanum sandwicense, Phyllostegia mannii, Plantago princeps, Pteris lidgatei, Schiedea lydgatei, Schiedea nuttallii, Schiedea sarmentosa, Sesbania tomentosa, Silene alexandri, Silene lanceolata, Spermolepis hawaiiensis, Stenogyne bifida, Tetramolopium rockii,* and *Zanthoxylum hawaiiense* is described in the ''*Background*'' section of this final rule. We are unable to identify these features for *Bonamia menziesii, Cyperus trachysanthos, Melicope munroi,* and *Solanum incompletum,* which no longer occur on the island of Molokai, 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 Molokai is not known. *Bonamia menziesii, Cyperus trachysanthos,* and *Melicope munroi* were last reported on Molokai between 1910 and 1918. According to David Symon (1999), the known distribution of *Solanum incompletum* included Molokai, as well as Kauai, Lanai, Maui, and the island of Hawaii. It is unclear when *Solanum incompletum* was last reported on Molokai, as there are no collections of this species from Molokai in the HINHP Database or the Bishop Museum (Chris Puttock, Bishop Museum, pers comm, 2002). There is currently no information about the plant communities, associated native plant species, locales, and elevations of these four species on Molokai.

All areas designated as critical habitat are within the historical range of the 41 species at issue and contain one or more of the physical or biological features (primary constituent elements) essential for the conservation of the species.

As described in the discussions for each of the 41 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 Molokai.

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 41 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 1995a, 1995b, 1996a, 1996b, 1996c, 1997, 1998a, 1998b, 1998c). 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, and the proposed critical habitat designations reflect this exception for these species. For example, the recovery goals for *Tetramolopium rockii* are three populations, protected from all threats, with the total number of individuals sustained or exceeded in each population for five consecutive years (Service 1996a). To be considered recovered, the populations of a multi-island species should be distributed among the islands of its known historic range (Service 1995a, 1995b, 1996a, 1996b, 1996c, 1997, 1998a, 1998b, 1998c). 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 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.

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 a 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 variability 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 nonnative 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 that 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 will be necessary to conserve suitable habitat in these unoccupied units, which in turn will allow for the establishment of additional populations through natural recruitment or managed reintroductions. Establishment of these additional populations will increase the likelihood that the species will survive and recover in the face of normal and stochastic events (*e.g.*, hurricanes, fire, and nonnative 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, stream banks), and elevation. The areas we are designating as critical habitat provide some or all of the habitat components essential for the conservation of the 41 plant species.

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

1. We proposed and will designate critical habitat on an island-by-island basis for ease of understanding for landowners and the public, for ease of conducting the public hearing process, and for ease of conducting public outreach. In Hawaii, landowners and the public are most interested and affected by issues centered on the island on which they reside.

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

3. We designated critical habitat units 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. We created polygons by overlaying current and historic plant location points onto digital topographic maps of each of the islands.

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

We further evaluated these shape files of suitable habitat. We used several factors to delineate the proposed critical habitat units from these land areas. We reviewed the recovery objectives (as described above) and 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). We further refined the resulting critical habitat units 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 41 plant species for which critical habitat was proposed on April 5, 2002. We used geographic features (ridge lines, valleys, streams, coastlines, etc.) or manmade features (roads or obvious land use) that created an obvious boundary for a unit as unit area boundaries.

Following publication of the proposed critical habitat rules, some of which were revised, 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 species using the recovery guidelines (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) to determine if we had inadvertently proposed for designation too much or too little 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). Based on comments and information we received during the comment periods, we assessed the proposed critical habitat in order to ascertain which areas contained the

highest quality habitat and had the highest likelihood of conserving the species. We ranked areas of the proposed critical habitat by the quality of the primary constituent elements (*i.e.*, intact native plant communities, predominance of associated native plants versus nonnative plants), potential as a conservation area (*i.e.*, whether the land is zoned conservation and whether the landowner is already participating in plant conservation or recovery actions), and current or expected management of known threats (*e.g.*, ungulate control; weed control; nonnative insect, slug, and snail control). We ranked as most essential areas that contain high quality primary constituent elements, are zoned for conservation, and have ongoing or expected threat abatement actions. This ranking process also included determining which habitats were representative of the historic geographical and ecological distributions of the species (*see* ''Primary Constituent Elements''). Areas that are zoned for conservation or have been identified as a State Forest Reserve, NAR, Wildlife Preserve, State Park, or are managed for conservation by a private landowner have a high likelihood of providing conservation benefit to the species and are therefore more essential than other comparable habitat outside of those types of areas. Of these most essential areas, 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 were not ranked most essential 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.

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 41 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, reservoirs, diversions, flumes, and wells; telecommunications towers and associated structures and equipment; electrical power transmission lines and distribution, and communication facilities and regularly maintained associated rights-of-way and access ways; radars; telemetry antennas; missile launch sites; arboreta and gardens; heiau (indigenous places of worship or shrines) and other archaeological sites; airports; other paved areas; and lawns 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 essential habitat on Molokai to provide for the recovery of these 41 species.

The critical habitat areas described below constitute our best assessment of the physical and biological features needed for the conservation of the 41 plant species and of 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 becomes available, we may consider reevaluating the boundaries of areas that warrant critical habitat designation.

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

TABLE 4.—APPROXIMATE CRITICAL HABITAT AREA DESIGNATED BY UNIT AND LANDOWNERSHIP OR JURISDICTION, MOLOKAI, MAUI COUNTY, HAWAII [1]

Unit name	State/local	Private	Federal	Total
Molokai 1—*Tetramolopium rockii*—a		68 ha (167 ac)		68 ha (167 ac)
Molokai 2—*Sesbania tomentosa*—a	57 ha (142 ac)	< 1 ha (< 1 ac)		58 ha (143 ac)
Molokai 2—*Tetramolopium rockii*—b	103 ha (254 ac)	9 ha (23 ac)		112 ha (278 ac)
Molokai 3—*Centaurium sebaeoides*—a	94 ha (233 ac)		1 ha (3 ac)	95 ha (235 ac)
Molokai 3—*Tetramolopium rockii*—c	104 ha (257 ac)		< 1 ha (< 1 ac)	104 ha (257 ac)
Molokai 4—*Brighamia rockii*—a	20 ha (50 ac)			20 ha (50 ac)
Molokai 4—*Hibiscus arnottianus* ssp. *immaculatus*—a	56 ha (139 ac)			56 ha (139 ac)
Molokai 5—*Brighamia rockii*—b	4 ha (10 ac)			4 ha (10 ac)
Molokai 5—*Peucedanum sandwicense*—a	4 ha (10 ac)			4 ha (10 ac)
Molokai 5—*Tetramolopium rockii*—d	4 ha (10 ac)			4 ha (10 ac)

TABLE 4.—APPROXIMATE CRITICAL HABITAT AREA DESIGNATED BY UNIT AND LANDOWNERSHIP OR JURISDICTION, MOLOKAI, MAUI COUNTY, HAWAII [1]—Continued

Unit name	State/local	Private	Federal	Total
Molokai 6—*Adenophorus periens*—a	79 ha (194 ac)	< 1 ha (< 1 ac)		79 ha (194 ac)
Molokai 6—*Adenophorus periens*—b	49 ha (121 ac)	347 ha (858 ac)		396 ha (980 ac)
Molokai 6—*Adenophorus periens*—c	209 ha (517 ac)	5 ha (12 ac)	214 ha (530 ac)	
Molokai 6—*Alectryon macrococcus*—a	125 ha (309 ac)			125 ha (309 ac)
Molokai 6—*Bidens wiebkei*—a		220 ha (543 ac)		220 ha (543 ac)
Molokai 6—*Brighamia rockii*—c	38 ha (94 ac)			38 ha (94 ac)
Molokai 6—*Brighamia rockii*—d	127 ha (313 ac)	17 ha (42 ac)		144 ha (355 ac)
Molokai 6—*Brighamia rockii*—e	83 ha (205 ac)			83 ha (205 ac)
Molokai 6—*Canavalia molokaiensis*—a	80 ha (197 ac)			80 ha (197 ac)
Molokai 6—*Canavalia molokaiensis*—b	< 1 ha (1 ac)	76 ha (187 ac)		76 ha (188 ac)
Molokai 6—*Canavalia molokaiensis*—c	150 ha (371 ac)			150 ha (371 ac)
Molokai 6—*Clermontia oblongifolia* ssp. *brevipes*—a	130 ha (322 ac)	1 ha (3 ac)		131 ha (325 ac)
Molokai 6—*Clermontia oblongifolia* ssp. *brevipes*—b	104 ha (258 ac)	253 ha (626 ac)		358 ha (884 ac)
Molokai 6—*Clermontia oblongifolia* ssp. *brevipes*—c	422 ha (1,042 ac)	5 ha (12 ac)		427 ha (1,054 ac)
Molokai 6—*Ctenitis squamigera*—a		58 ha (144 ac)		58 ha (144 ac)
Molokai 6—*Cyanea dunbarii*—a	195 ha (481 ac)	133 ha (329 ac)		328 ha (810 ac)
Molokai 6—*Cyanea dunbarii*—b	47 ha (115 ac)	41 ha (102 ac)		88 ha (218 ac)
Molokai 6—*Cyanea dunbarii*—c	23 ha (56 ac)			23 ha (56 ac)
Molokai 6—*Cyanea grimesiana* ssp. *grimesiana*—a	1,898 ha (4,690 ac)	235 ha (581 ac)		2,133 ha (5,272 ac)
Molokai 6—*Cyanea mannii*—a	110 ha (272 ac)			110 ha (272 ac)
Molokai 6—*Cyanea mannii*—b	81 ha (200 ac)			81 ha (200 ac)
Molokai 6—*Cyanea mannii*—c	< 1 ha (< 1 ac)	78 ha (192 ac)		78 ha (192 ac)
Molokai 6—*Cyanea mannii*—d	114 ha (283 ac)	46 ha (114 ac)		161 ha (397 ac)
Molokai 6—*Cyanea mannii*—e	< 1 ha (1 ac)	168 ha (415 ac)		168 ha (416 ac)
Molokai 6—*Cyanea procera*—a	301 ha (744 ac)	47 ha (117 ac)		348 ha (861 ac)
Molokai 6—*Cyanea procera*—b	85 ha (211 ac)	287 ha (710 ac)		373 ha (921 ac)
Molokai 6—*Diellia erecta*—a		99 ha (244 ac)		99 ha (244 ac)
Molokai 6—*Diplazium molokaiense*—a	355 ha (876 ac)	13 ha (32 ac)		368 ha (909 ac)
Molokai 6—*Eugenia koolauensis*—a		471 ha (1,164 ac)		471 ha (1,164 ac)
Molokai 6—*Flueggea neowawraea*—a	61 ha (151 ac)			61 ha (151 ac)
Molokai 6—*Hesperomannia arborescens*—a	158 ha (390 ac)	3 ha (6 ac)		160 ha (397 ac)
Molokai 6—*Hesperomannia arborescens*—b	127 ha (315 ac)	47 ha (117 ac)		175 ha (432 ac)
Molokai 6—*Hibiscus arnottianus* ssp. *immaculatus*—b	108 ha (268 ac)			108 ha (268 ac)
Molokai 6—*Hibiscus arnottianus* ssp. *immaculatus*—c	213 ha (527 ac)	4 ha (11 ac)		218 ha (538 ac)
Molokai 6—*Hibiscus arnottianus* ssp. *immaculatus*—d	146 ha (361 ac)	130 ha (320 ac)		276 ha (681 ac)

TABLE 4.—APPROXIMATE CRITICAL HABITAT AREA DESIGNATED BY UNIT AND LANDOWNERSHIP OR JURISDICTION, MOLOKAI, MAUI COUNTY, HAWAII [1]—Continued

Unit name	State/local	Private	Federal	Total
Molokai 6—*Ischaemum byrone*—a	15 ha (37 ac)	15 ha (36 ac)		30 ha (73 ac)
Molokai 6—*Ischaemum byrone*—b		28 ha (70 ac)		28 ha (70 ac)
Molokai 6—*Labordia triflora*—a	2 ha (5 ac)			2 ha (5 ac)
Molokai 6—*Labordia triflora*—b		2 ha (6 ac)		2 ha (6 ac)
Molokai 6—*Labordia triflora*—c		13 ha (32 ac)		13 ha (32 ac)
Molokai 6—*Labordia triflora*—d	81 ha (201 ac)	442 ha (1,091 ac)		523 ha (1,292 ac)
Molokai 6—*Lysimachia maxima*—a	408 ha (1,008 ac)			408 ha (1,008 ac)
Molokai 6—*Lysimachia maxima*—b	65 ha (161 ac)	376 ha (930 ac)		441 ha (1,091 ac)
Molokai 6—*Lysimachia maxima*—c	400 ha (987 ac)	15 ha (36 ac)		414 ha (1,023 ac)
Molokai 6—*Mariscus fauriei*—a	9 ha (22 ac)			9 ha (22 ac)
Molokai 6—*Mariscus fauriei*—b	304 ha (751 ac)	3 ha (6 ac)		307 ha (758 ac)
Molokai 6—*Melicope mucronulata*—a	84 ha (207 ac)			84 ha (207 ac)
Molokai 6—*Melicope mucronulata*—b	84 ha (207 ac)	< 1 ha (< 1 ac)		84 ha (208 ac)
Molokai 6—*Melicope mucronulata*—c		72 ha (177 ac)		72 ha (177 ac)
Molokai 6—*Melicope mucronulata*—d	113 ha (278 ac)	14 ha (36 ac)		127 ha (314 ac)
Molokai 6—*Melicope mucronulata*—e	60 ha (147 ac)	30 ha (73 ac)		89 ha (221 ac)
Molokai 6—*Melicope reflexa*—a	476 ha (1,176 ac)	8 ha (19 ac)		484 ha (1,195 ac)
Molokai 6—*Melicope reflexa*—b	397 ha (980 ac)	1,829 ha (4,520 ac)		2,226 ha (5,500 ac)
Molokai 6—*Neraudia sericea*—a		116 ha (286 ac)		116 ha (286 ac)
Molokai 6—*Peucedanum sandwicense*—b	61 ha (150 ac)			61 ha (150 ac)
Molokai 6—*Peucedanum sandwicense*—c		84 ha (207 ac)		84 ha (207 ac)
Molokai 6—*Phyllostegia mannii*—a	480 ha (1,185 ac)			480 ha (1,185 ac)
Molokai 6—*Phyllostegia mannii*—b	118 ha (292 ac)	378 ha (934 ac)		496 ha (1,226 ac)
Molokai 6—*Phyllostegia mannii*—c	441 ha (1,089 ac)	11 ha (28 ac)		452 ha (1,117 ac)
Molokai 6—*Plantago princeps*—a		52 ha (129 ac)		52 ha (129 ac)
Molokai 6—*Pteris lidgatei*—a	1,154 ha (2,851 ac)	73 ha (180 ac)		1,227 ha (3,031 ac)
Molokai 6—*Schiedea lydgatei*—a	75 ha (186 ac)	185 ha (458 ac)		261 ha (645 ac)
Molokai 6—*Schiedea lydgatei*—b		163 ha (403 ac)		163 ha (403 ac)
Molokai 6—*Schiedea nuttallii*—a	138 ha (340 ac)			138 ha (340 ac)
Molokai 6—*Schiedea nuttallii*—b		127 ha (313 ac)		127 ha (313 ac)
Molokai 6—*Schiedea sarmentosa*—a	405 ha (1,000 ac)	203 ha (502 ac)		608 ha (1,502 ac)
Molokai 6—*Schiedea sarmentosa*—b		266 ha (657 ac)		266 ha (657 ac)
Molokai 6—*Silene alexandri*—a	405 ha (1,000 ac)	203 ha (502 ac)		608 ha (1,502 ac)
Molokai 6—*Silene alexandri*—b		266 ha (657 ac)		266 ha (657 ac)
Molokai 6—*Silene lanceolata*—a		289 ha (714 ac)		289 ha (714 ac)

TABLE 4.—APPROXIMATE CRITICAL HABITAT AREA DESIGNATED BY UNIT AND LANDOWNERSHIP OR JURISDICTION, MOLOKAI, MAUI COUNTY, HAWAII [1]—Continued

Unit name	State/local	Private	Federal	Total
Molokai 6—*Spermolepis hawaiiensis*—a		85 ha (211 ac)		85 ha (211 ac)
Molokai 6—*Stenogyne bifida*—a	105 ha (259 ac)	480 ha (1,185 ac)		585 ha (1,444 ac)
Molokai 6—*Zanthoxylum hawaiiense*—a		259 ha (640 ac)		259 ha (640 ac)
Molokai 7—*Bidens wiebkei*—b		240 ha (593 ac)		240 ha (593 ac)
Molokai 8—*Bidens wiebkei*—c	123 ha (303 ac)	1 ha (2 ac)		124 ha (305 ac)
Molokai 9—*Isodendrion pyrifolium*—a	101 ha (249 ac)			101 ha (249 ac)
Molokai 9—*Hibiscus brackenridgei*—a	107 ha (264 ac)			107 ha (264 ac)
Molokai 9—*Sesbania tomentosa*—b	88 ha (217 ac)			88 ha (217 ac)
Grand Total*	4,958 ha (12,251 ac)	4,884 ha (12,068 ac)	1 ha (3 ac)	9,843 ha (24,333 ac)

[1] Area differences due to digital mapping discrepancies between TMK data (GDSI 2000) and USGS coastline, or differences due to rounding.
*Totals take into consideration overlapping individual species units.

Critical habitat includes habitat for these 41 species in the northwestern, northeastern, central, and southern portions of Molokai. Lands designated as critical habitat have been divided into a total of 88 units. A brief description of each unit is presented alphabetically below.

Descriptions of Critical Habitat Units

Molokai 6—*Adenophorus periens*—a

This unit is critical habitat for *Adenophorus periens* and is 79 ha (194 ac) on State (Puu Alii NAR) and private land and contains a portion of the eastern ridge of Waikolu Valley. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *Adenophorus periens* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Metrosideros polymorpha* trunks in *M. polymorpha-Cibotium glaucum* lowland wet forest and cloud forests in well-developed, closed canopy, providing deep shade and high humidity. In addition, it is some distance away from the other critical habitat for this species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 6—*Adenophorus periens*—b

This unit is critical habitat for *Adenophorus periens* and is 396 ha (980 ac) on State (Molokai Forest Reserve) and private land. The unit contains a portion of Kaholoapele, Kamakou, Pakui, Puu o Wahaula, and Uapa Summits, and Kalapa, Konomanu, and Kuana Ridges. This unit provides habitat for 2 populations of 300 mature, reproducing individuals of the short-lived perennial *Adenophorus periens* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Molokai in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Metrosideros polymorpha* trunks in *M. polymorpha-Cibotium glaucum* lowland wet forest and cloud forests in well-developed, closed canopy, providing deep shade and high humidity. In addition, it is some distance away from the other critical habitat for this species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 6—*Adenophorus periens*—c

This unit is critical habitat for *Adenophorus periens* and is 214 ha (530 ac) on State (Molokai Forest Reserve and Olokui NAR) and private land. The unit contains a portion of Kapapa Pali, Olokui and Pohakuulaula Summits. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *Adenophorus periens* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Molokai in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Metrosideros polymorpha* trunks in *M. polymorpha-Cibotium glaucum* lowland wet forest and cloud forests in well-developed, closed canopy, providing deep shade and high humidity. In addition, it is some distance away from the other critical habitat for this species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 6—*Alectryon macrococcus*—a

This unit is critical habitat for *Alectryon macrococcus* and is 125 ha (309 ac) on State land (Molokai Forest Reserve), containing a portion of Kupaia Gulch. This unit provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *Alectryon macrococcus* and is currently occupied by 5 plants. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is essential for the expansion of the present population, which is currently considered nonviable. The habitat features contained in this unit that are essential for this species include, but are not limited to talus slopes or gulches within dry or mesic lowland forest, which are unique to the Molokai range of the species. In addition, it is some distance away from the other critical habitat for this species, in order to avoid all recovery populations from being

destroyed by one naturally occurring catastrophic event.

Molokai 6—*Bidens wiebkei*—a

This unit is critical habitat for *Bidens wiebkei* and is 219 ha (542 ac) on private land (Molokai Forest Reserve), containing a portion of Puu Kolekole Summit. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *Bidens wiebkei* and is currently occupied by one plant. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is essential for the expansion of the present population, which is currently considered nonviable. The habitat features contained in this unit that are essential for this species include, but are not limited to, slopes in *Metrosideros polymorpha*-dominated mesic shrublands or dry or mesic *M. polymorpha-Styphelia tameiameiae* lowland shrubland. This unit is geographically separated from the other two units designated as critical habitat for this island-endemic species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 7—*Bidens wiebkei*—b

This unit is critical habitat for *Bidens wiebkei* and is 240 ha (593 ac) on private land. The unit contains a portion of Kepuna, Kuinaho, and Lamaloa Gulches, and Lamaloa Head Summit. This unit provides habitat for 2 populations of 300 mature, reproducing individuals of the short-lived perennial *Bidens wiebkei* and is currently occupied by over 200 plants. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is essential for the expansion of the present population, which is currently considered nonviable. The habitat features contained in this unit that are essential for this species include, but are not limited to, slopes in *Metrosideros polymorpha*-dominated mesic shrublands or dry or mesic *M. polymorpha-Styphelia tameiameiae* lowland shrubland. This unit is geographically separated from the other two units designated as critical habitat for this island-endemic species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 8—*Bidens wiebkei*—c

This unit is critical habitat for *Bidens wiebkei* and is 124 ha (305 ac) on State and private lands. The unit contains a portion of Alanuipuhipaka and Puu o Hoku Ridges, Papio Gulch, and Koalii Summit. This unit provides habitat for 2 populations of 300 mature, reproducing individuals of the short-lived perennial *Bidens wiebkei* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Molokai in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, slopes in *Metrosideros polymorpha*-dominated mesic shrublands or dry or mesic *M. polymorpha-Styphelia tameiameiae* lowland shrubland. This unit is geographically separated from the other two units designated as critical habitat for this island-endemic species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 4—*Brighamia rockii*—a

This unit is critical habitat for *Brighamia rockii* and is 20 ha (51 ac) on State land (Kalaupapa National Historical Park), containing a portion of Kaala Cape. This unit, in combination with unit 5—*Brighamia rockii*—b and unit 6—*Brighamia rockii*—c, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *Brighamia rockii* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Molokai in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep basalt sea cliffs, within the spray zone, in coastal dry or mesic forest, *Eragrostis variabilis* mixed coastal cliff communities or shrubland, or *Pritchardia* sp. coastal mesic forest. This unit, together with units 5 and 6, provides for one population within this multi-island species' historical range on Molokai that is some distance away from the other critical habitat for this species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 5—*Brighamia rockii*—b

This unit is critical habitat for *Brighamia rockii* and is 4 ha (10 ac) on State land (Mokapu Bird Sanctuary). This unit is Mokapu Island. This unit in combination, with unit 4—*Brighamia rockii*—a and unit 6—*Brighamia rockii*—c, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *Brighamia rockii* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Molokai in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep basalt sea cliffs, within the spray zone, in coastal dry or mesic forest, *Eragrostis variabilis* mixed coastal cliff communities or shrubland, or *Pritchardia* sp. coastal mesic forest. This unit, together with units 4 and 6, provides for one population within this multi-island species' historical range on Molokai that is some distance away from the other critical habitat for this species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 6—*Brighamia rockii*—c

This unit is critical habitat for *Brighamia rockii* and is 38 ha (95 ac) on State land (Kalaupapa National Historical Park), containing a portion of Leinaopapio Point. This unit, in combination with unit 4—*Brighamia rockii*—a and unit 5—*Brighamia rockii*—b, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *Brighamia rockii* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Molokai in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep basalt sea cliffs, within the spray zone, in coastal dry or mesic forest, *Eragrostis variabilis* mixed coastal cliff communities or shrubland, or *Pritchardia* sp. coastal mesic forest. This unit, together with units 4 and 5, provides for one population within this multi-island species' historical range on Molokai that is some distance away from the other critical habitat for this species, in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

Molokai 6—*Brighamia rockii*—d

This unit is critical habitat for *Brighamia rockii* and is 145 ha (358 ac) on State (Olokui NAR) and private lands. The unit contains a portion of Ananoio, Oloupena, and Waipu Beaches, Halekou Cape, Puukaoku