Federal Register

Monday,
January 28, 2002

Part II

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Revised Determinations of Prudency and Proposed Designations of Critical Habitat for Plant Species From the Islands of Kauai and Niihau, Hawaii; Proposed Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AG71

Endangered and Threatened Wildlife and Plants; Revised Determinations of Prudency and Proposed Designations of Critical Habitat for Plant Species From the Islands of Kauai and Niihau, Hawaii

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Revised proposed rule and notice of determinations of whether designation of critical habitat is prudent.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), originally determined that designation of critical habitat was prudent, and proposed designation of critical habitat for 76 plants from the islands of Kauai and Niihau on November 7, 2000. We incorporate those 76 prudency determinations here. In this proposal we have revised the proposed designations to incorporate new information, and/or address comments and new information received during the comment periods.

In the November 7, 2000, proposal we did not propose critical habitat for three species of loulu palms, *Pritchardia aylmer-robinsonii, P. napaliensis*, and *P. viscosa.* We determined that critical habitat designation was not prudent because it would likely increase the threats from vandalism or collection of these species on Kauai and Niihau, and no change is made to that determination here. We also did not propose critical habitat for two species, *Melicope quadrangularis* and *Phyllostegia waimeae*, which had not been seen in the wild and for which no viable genetic material of these species was known to exist. Due to new information received during the comment periods regarding the rediscovery of *Phyllostegia waimeae* on Kauai, we have reconsidered our earlier finding and determine that critical habitat is prudent for this species. Designation of critical habitat is proposed for this species on Kauai. No change is made here to the November 7, 2000, not prudent determination for *Melicope quadrangularis.*

In the November 7, 2000, proposal we did not determine prudency nor propose designation of critical habitat for 14 species that no longer occur on Kauai and Niihau but are reported from one or more other islands. We determined that critical habitat was prudent and proposed designation of critical habitat for nine of these species (*Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Hibiscus brackenridgei, Ischaemum byrone, Mariscus pennatiformis, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis*) in other proposed rules published on December 18, 2000 (Maui and Kahoolawe), on December 27, 2000 (Lanai), and on December 29, 2000 (Molokai). In this proposal we incorporate the prudency determinations for these nine species and propose designation of critical habitat for *Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Ischaemum byrone, Mariscus pennatiformis.* Critical habitat is not proposed for *Hibiscus brackenridgei, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis* on the islands of Kauai and Niihau because we are unable to determine habitat which is essential to their conservation on these islands. We determined that critical habitat was not prudent for *Acaena exigua*, a species known only from Kauai and Maui, in the proposal published on December 18, 2000 (Maui and Kahoolawe). This species had not been seen recently in the wild and no viable genetic material was known to exist. No change is made here to the earlier prudency determination for this species.

In this proposal, we determine that critical habitat is prudent for four other species (*Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans*, and *Solanum incompletum*) for which prudency determinations have not been made previously, and that no longer occur on Kauai but are reported from one or more other islands. Critical habitat is proposed at this time for *Phlegmariurus nutans* on Kauai based on new information and information received during the comment periods on the November 7, 2000, proposal. Critical habitat is not proposed for *Achyranthes mutica, Isodendrion pyrifolium,* and *Solanum incompletum* on the islands of Kauai and Niihau because we are unable to determine habitat which is essential to their conservation on these islands.

We are now proposing critical habitat for 83 of the 95 species from the islands of Kauai and Niihau. Critical habitat is not proposed for seven of the 95 species (*Achyranthes mutica, Hibiscus brackenridgei, Isodendrion pyrifolium, Phlegmariurus mannii, Silene lanceolata, Solanum incompletum,* and *Vigna o-wahuensis*) which no longer occur on the islands of Kauai or Niihau, and for which we are unable to determine any habitat that is essential to their conservation on the islands of Kauai or Niihau. Critical habitat is not proposed for three species of loulu palm, *Pritchardia aylmer-robinsonii, P. napaliensis,* and *P. viscosa* for which we determined, on November 7, 2000, that critical habitat designation is not prudent because it would likely increase the threats from vandalism or collection of these species on Kauai and Niihau, and no change is made to that determination here. Critical habitat is not proposed for two species, *Melicope quadrangularis* and *Acaena exigua*, for which we determined, on November 7, 2000, and December 18, 2000, respectively, that critical habitat was not prudent because they had not been seen recently in the wild, and no viable genetic material of these species was known. No change is made to that determination here.

We propose critical habitat designations for 83 species within 15 critical habitat units totaling approximately 40,147 hectares (ha) (99,206 acres (ac)) on the island of Kauai, and within one critical habitat unit totaling approximately 282 ha (697 ac) on the island of Niihau.

If this proposal is made final, section 7 of the Act requires Federal agencies to ensure that actions they carry out, fund, or authorize do not destroy or adversely modify critical habitat to the extent that the action appreciably diminishes the value of the critical habitat for the survival and recovery of the species. Section 4 of the Act requires us to consider economic and other relevant impacts of specifying any particular area as critical habitat.

We solicit data and comments from the public on all aspects of this proposal, including data on the economic and other impacts of the designations. We may revise or further refine critical habitat boundaries prior to final designation based on habitat and plant surveys, public comment on the revised proposed critical habitat rule, and new scientific and commercial information.

DATES: We will accept comments until March 29, 2002. Wewill hold one public hearing on this proposed rule. The public hearing will be held from 6:00 p.m. to 8:00 p.m., Wednesday, February 13, 2002, on the island of Kauai, Hawaii. Prior to the public hearing, we will be available from 3:30 to 4:30 p.m. to provide information and to answer questions. Registration for the hearing will begin at 5:30 p.m.

ADDRESSES: If you wish to comment, you may submit your comments and materials concerning this proposal by any one of several methods:

You may submit written comments and information to the Field Supervisor,

U.S. Fish and Wildlife Service, Pacific Islands Office, 300 Ala Moana Blvd., Room 3–122, P.O. Box 50088, Honolulu, HI 96850–0001.

You may hand-deliver written comments to our Pacific Islands Office at the address given above.

You may view comments and materials received, as well as supporting documentation used in the preparation of this proposed rule, by appointment, during normal business hours at the above address. The public hearing will be held at the Radisson Kauai Beach Resort, 4331 Kauai Beach Drive, Lihue, Kauai. Additional information on this hearing can be found under ''Public Hearing'' found in the Background section of this rule.

FOR FURTHER INFORMATION CONTACT: Paul Henson, Field Supervisor, Pacific Islands Office (see **ADDRESSES** section) (telephone 808/541–3441; facsimile 808/541–3470).

SUPPLEMENTARY INFORMATION:

Background

In the Lists of Endangered and Threatened Plants (50 CFR 17.12), there are 95 plant species that, at the time of listing, were reported from the islands of Kauai and Niihau (Table 1).

TABLE 1.— SUMMARY OF ISLAND DISTRIBUTION OF 95 SPECIES FROM KAUAI AND NIIHAU

Species	Island distribution						
	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	*N.W.* Isles, *Kahoolawe* *Nii*hau
Acaena exigua (liliwai)	H				H		
Achyranthes mutica (No Common Name (NCN)).	H					C	
Adenophorus periens (pendent kihi fern).	C	H	C	R	H	C	
Alectryon macrococcus (mahoe)	C	C	C		C		
Alsinidendron lychnoides (kuawawaenohu).	C						
Alsinidendron viscosum (NCN)	C						
Bonamia menziesii (NCN)	C	C	H	C	C	C	
Brighamia insignis (olulu)	C						Ni (C)
Centaurium sebaeoides (awiwi)	C	C	C	C	C		
Chamaesyce halemanui (NCN)	C						
Ctenitis squamigera (pauoa)	H	C	C	C	C	H	
Cyanea asarifolia (haha)	C						
Cyanea recta (haha)	C						
Cyanea remyi (haha)	C						
Cyanea undulata (NCN)	C						
Cyperus trachysanthos (puukaa)	C	C	H	H			Ni (C)
Cyrtandra cyaneoides (mapele)	C						
Cyrtandra limahuliensis (haiwale)	C						
Delissea rhytidosperma (NCN)	C						
Delissea rivularis (oha)	C						
Delissea undulata (NCN)	C				H	C	Ni (H)
Diellia erecta (asplenium-leaved diellia).	C	H	C	H	C	C	
Diellia pallida (NCN)	C						
Diplazium molokaiense (NCN)	H	H	H	H	C		
Dubautia latifolia (naenae)	C						
Dubautia pauciflorula (naenae)	C						
Euphorbia haeleeleana (akoko)	C	C					
Exocarpos luteolus (heau)	C						
Flueggea neowawraea (mehamehame).	C	C	H		C	C	
Gouania meyenii (NCN)	C	C					
Hedyotis cookiana (awiwi)	C	H	H			H	
Hedyotis st.-johnii (Na Pali beach hedyotis).	C						
Hesperomannia lydgatei (NCN)	C						
Hibiscadelphus woodii (hau kuahiwi)	C						
Hibiscus brackenridgei (mao hau hele)	H	C	H	C	C	C	Ka (R)
Hibiscus clayi (Clay's hibiscus)	C						
Hibiscus waimeae ssp. *hannerae* (kokio keokeo).	C						
Ischaemum byrone (Hilo ischaemum)	C	H	C		C	C	
Isodendrion laurifolium (aupaka)	C	C					
Isodendrion longifolium (aupaka)	C	C					
Isodendrion pyrifolium (wahine noho kula).		H	H	H	H	C	Ni (H)
Kokia kauaiensis (kokio)	C						
Labordia lydgatei (kamakahala)	C						
Labordia tinifolia var. *wahiawaensis* (kamakahala).	C						
Lipochaeta fauriei (nehe)	C						
Lipochaeta micrantha (nehe)	C						

TABLE 1.— SUMMARY OF ISLAND DISTRIBUTION OF 95 SPECIES FROM KAUAI AND NIIHAU—Continued

Species	Island distribution						
	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	*N.W.* Isles, *K*ahoolawe *Ni*ihau
Lipochaeta waimeaensis (nehe)	C						
Lobelia niihauensis (NCN)	C	C					Ni (H)
Lysimachia filifolia (NCN)	C	C					
Mariscus pennatiformis (NCN)	H	H			C	H	NW (C)
Melicope haupuensis (alani)	C						
Melicope knudsenii (alani)	C				C		
Melicope pallida (alani)	C	C					
Melicope quadrangularis (alani)	H						
Munroidendron racemosum (NCN)	C						
Myrsine linearifolia (kolea)	C						
Nothocestrum peltatum (aiea)	C						
Panicum niihauense (lau ehu)	C						Ni (H)
Peucedanum sandwicense (makou)	C	C	C		C		
Phlegmariurus mannii (wawaeiole)	H				C	C	
Phlegmariurus nutans (wawaeiole)	H	C					
Phyllostegia knudsenii (NCN)	C						
Phyllostegia waimeae (NCN)	C						
Phyllostegia wawrana (NCN)	C						
Plantago princeps (laukahi kuahiwi)	C	C	C		C	H	
Platanthera holochila (NCN)	C	H	C		C		
Poa mannii (Mann's bluegrass)	C						
Poa sandvicensis (Hawaiian bluegrass).	C						
Poa siphonoglossa (NCN)	C						
Pritchardia aylmer-robinsonii (wahane)							Ni (C)
Pritchardia napaliensis (loulu)	C						
Pritchardia viscosa (loulu)	C						
Pteralyxia kauaiensis (kaulu)	C						
Remya kauaiensis (NCN)	C						
Remya montgomeryi (NCN)	C						
Schiedea apokremnos (maolioli)	C						
Schiedea helleri (NCN)	C						
Schiedea kauaiensis (NCN)	C						
Schiedea membranacea (NCN)	C						
Schiedea nuttallii (NCN)	C	C	C		R		
Schiedea spergulina var. *leiopoda* (NCN).	C						
Schiedea spergulina var. *spergulina* (NCN).	C						
Schiedea stellarioides (NCN)	C						
Sesbania tomentosa (ohai)	C	C	C	H	C	C	NW (C), Ka
Silene lanceolata (NCN)	H	C	C	H		C	
Solanum incompletum (popolo ku mai)	H		H	H	H	C	
Solanum sandwicense (aiakeakua, popolo).	C	H					
Spermolepis hawaiiensis (NCN)	C	C	C	C	C	C	
Stenogyne campanulata (NCN)	C						
Vigna o-wahuensis (NCN)		H	C	C	C	C	Ni (H), Ka
Viola helenae (NCN)	C						
Viola kauaiensis var. *wahiawaensis* (nani waialeale).	C						
Wilkesia hobdyi (dwarf iliau)	C						
Xylosma crenatum (NCN)	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.

Fifty-seven of these species are endemic to the islands of Kauai and/or Niihau, while 38 species are reported from one or more other islands, as well as Kauai and/or Niihau.

We originally determined that designation of critical habitat was prudent, and proposed designation of critical habitat, for 76 plants from the islands of Kauai and Niihau on November 7, 2000. These species are: *Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea*

rivularis, Delissea undulata, Diellia pallida, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus clayi, Hibiscus waimeae ssp. *hannerae, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hobdyi, Xylosma crenatum,* and *Zanthoxylum hawaiiense.* No change is made to these prudency determinations in this revised proposal and they are hereby incorporated by reference (65 FR 66808). In this proposal we have revised the proposed designations for the 76 plants based on new information received during the comment periods. In addition, we incorporate new information, and/or address comments and new information received during the comment periods on the November 7, 2000, proposal.

In the November 7, 2000, proposal we did not propose critical habitat for three species of loulu palm, *Pritchardia aylmer-robinsonii, P. napaliensis,* and *P. viscosa.* We determined that critical habitat designation was not prudent because it would likely increase the threats from vandalism or collection of these species on Kauai and Niihau. No change is made to these determinations here and they are hereby incorporated by reference (65 FR 66808).

In the November 7, 2000, proposal we also determined that critical habitat was not prudent for *Melicope quadrangularis* and *Phyllostegia waimeae,* two species endemic to Kauai, because they had not been seen recently in the wild, and no viable genetic material of these species was known to exist. Due to new information received during the comment periods regarding the rediscovery of *Phyllostegia waimeae* on Kauai, we have reconsidered our earlier finding and determine that critical habitat is prudent for this species because we believe that such designation would be beneficial to this species. Designation of critical habitat is proposed for this species on Kauai. No change is made here to the November 7, 2000, not prudent determination for *Melicope quadrangularis* and it is hereby incorporated by reference (65 FR 66808).

In the November 7, 2000, proposal we did not determine prudency nor propose designation of critical habitat for 14 species that no longer occur on Kauai and Niihau but are reported from one or more other islands. We determined that critical habitat was prudent and proposed designation of critical habitat for nine of these species (*Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Hibiscus brackenridgei, Ischaemum byrone, Mariscus pennatiformis, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis*) in other proposed rules published on December 18, 2000 (Maui and Kahoolawe), on December 27, 2000 (Lanai), and on December 29, 2000 (Molokai). No change is made to these prudency determinations for these nine species in this proposal and they are hereby incorporated by reference (65 FR 79192, 65 FR 82086, 65 FR 83158). In this proposal, we propose designation of critical habitat for *Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Ischaemum byrone,* and *Mariscus pennatiformis* on the island of Kauai, based on new information and information received during the comment periods on the November 7, 2000, proposal. Critical habitat is not proposed for *Hibiscus brackenridgei, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis* on the islands of Kauai and Niihau because we are unable to determine habitat which is essential to their conservation on these islands.

No change is made here to the prudency determination for *Acaena exigua,* a species known only from Kauai and Maui, published in the proposed rule for Maui and Kahoolawe on December 18, 2000, and it is hereby incorporated by reference (65 FR 79192). In that proposal, we determined that critical habitat was not prudent for *Acaena exigua* because it had not been seen recently in the wild, and no viable genetic material was known to exist.

In this proposal, we determine that critical habitat is prudent for four other species (*Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans, Solanum incompletum*) for which prudency determinations have not been made previously, and that no longer occur on Kauai but are reported from one or more other islands. These four plants were listed as endangered species under the Endangered Species Act of 1973, as amended (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 determine that critical habitat is prudent for these four species because we believe that such designation would be beneficial to these species. Critical habitat is proposed at this time for *Phlegmariurus nutans* on Kauai based on new information and information received during the comment periods on the November 7, 2000, proposal. Critical habitat is not proposed for *Achyranthes mutica, Isodendrion pyrifolium,* and *Solanum incompletum* on the islands of Kauai and Niihau because we are unable to determine habitat which is essential to their conservation on these islands.

Critical habitat for 83 of the 95 species from the islands of Kauai and Niihau is proposed at this time. Critical habitat is not proposed for seven of the 95 species (*Achyranthes mutica, Hibiscus brackenridgei, Isodendrion pyrifolium, Phlegmariurus mannii, Silene lanceolata, Solanum incompletum,* and *Vigna o-wahuensis*) which no longer occur on the islands of Kauai or Niihau, and for which we are unable to determine any habitat that is essential to their conservation on the islands of Kauai or Niihau. However, proposed critical habitat designations, or non-designations, for these species will be included in other future Hawaiian plants proposed critical habitat proposed rules (Table 2).

TABLE 2.—LIST OF PROPOSED RULES IN WHICH CRITICAL HABITAT DESIGNATIONS OR NON-DESIGNATIONS WILL BE MADE FOR SEVEN SPECIES FOR WHICH WE ARE UNABLE TO DETERMINE HABITAT ESSENTIAL FOR THEIR CONSERVATION ON THE ISLANDS OF KAUAI AND NIIHAU

Species	Proposed rules in which critical habitat designations will be made
Achyranthes mutica	Hawaii Island.
Hibiscus brackenridgei	Maui and Kahoolawe reproposal; Lanai reproposal; Molokai reproposal; Hawaii Island; Oahu.
Isodendrion pyrifolium	Maui and Kahoolawe reproposal; Lanai reproposal; Molokai reproposal; Hawaii Island; Oahu.
Phlegmariurus mannii	Maui and Kahoolawe reproposal; Hawaii Island.
Silene lanceolata	Molokai reproposal; Lanai reproposal; Hawaii Island; Oahu.
Solanum incompletum	Maui and Kahoolawe reproposal; Lanai reproposal; Molokai reproposal; Hawaii Island.
Vigna o-wahuensis	Maui and Kahoolawe reproposal; Lanai reproposal; Molokai reproposal; Hawaii Island; Oahu.

Critical habitat is not proposed for three species of loulu palm, *Pritchardia aylmer-robinsonii, P. napaliensis,* and *P. viscosa* for which we determined, on November 7, 2000, that critical habitat designation is not prudent because it would likely increase the threats from vandalism or collection of these species on Kauai and Niihau. No change is made to these prudency determinations in this proposal and they are hereby incorporated by reference (65 FR 66808). Critical habitat is not proposed for two species, *Melicope quadrangularis* and *Acaena exigua,* for which we determined, on November 7, 2000, and December 18, 2000, respectively, that critical habitat was not prudent because they had not been seen recently in the wild, and no viable genetic material of these species was known to exist. No change is made to these prudency determinations here and they are hereby incorporated by reference (65 FR 66808, 65 FR 79192).

The Islands of Kauai and Niihau

Because of its age and relative isolation, Kauai has levels of floristic diversity and endemism that are higher than on any other island in the Hawaiian archipelago. However, the vegetation of Kauai has undergone extreme alterations because of past and present land use. Land with rich soils was altered by the early Hawaiians, and more recently, converted to agricultural use or pasture (Gagne and Cuddihy 1999). Intentional or inadvertent introduction of non-native plant and animal species has also contributed to the reduction of native vegetation on the island of Kauai. Native forests are now limited to the upper elevation mesic (moist) and wet regions within Kauai's conservation district. The land that supports the habitat essential to the conservation of the 83 plant taxa is owned by various private parties, the State of Hawaii (including State parks, forest reserves, natural area reserves, and a wilderness area), and the Federal Government. Most of the taxa included in this proposed rule persist on steep slopes, precipitous cliffs, valley headwalls, and other regions where unsuitable topography has prevented agricultural development, or where inaccessibility has limited encroachment by non-native plant and animal species.

Niihau's relative isolation and severe environmental conditions have produced a few endemic species. Unfortunately, human disturbance, primarily ungulate ranching, has drastically changed the vegetation and hydrologic parameters of the island, leaving few of the native vegetation communities. Niihau has been privately owned since 1864 and access has been, and continues to be, restricted (Department of Geography 1998). Therefore, current information on plant locations and population status is extremely limited.

Discussion of Plant Taxa

Species Endemic to Kauai and Niihau

Alsinidendron lychnoides (kuawawaenohu)

Alsinidendron lychnoides, a member of the pink family (Caryophyllaceae), is a weakly climbing or sprawling subshrub, woody at the base, with a dense covering of fine glandular hairs throughout. This short-lived perennial species is distinguished from others in this endemic Hawaiian genus by the weakly climbing or sprawling habit, color of the sepals (modified leaves), number of flowers per cluster, and size of the leaves. It is closely related to *Alsinidendron viscosum,* which differs primarily in having narrower leaves, fewer capsule valves, and fewer flowers per cluster (Wagner *et al.* 1999).

This species was observed with fruits during February. No additional life history information for this species is currently known (Service 1998a).

Historically, *Alsinidendron lychnoides* was found on the east rim of Kalalau Valley near Keanapuka, the western and southeastern margins of the Alakai Swamp, and southwest of the Swamp near Kaholuamano on the island of Kauai. Currently, there are two populations with a total of 10 individual plants. This species is extant on State-owned land in the Alakai Swamp, the Mohihi Waialae Trail, Keanapuka and Pihea in the Alakai Wilderness Preserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve (Hawaii Natural Heritage Program (HINHP) Database 2000; Geographic Decision Systems International (GDSI) 2000).

Alsinidendron lychnoides typically grows on steep riparian clay or silty soil banks in montane wet forests dominated by *Metrosideros polymorpha* (ohia) and *Cheirodendron* spp. (olapa), or by *Metrosideros polymorpha* and *Dicranopteris linearis* (uluhe), and at elevations between 828 and 1,344 meters (m) (2,715 and 4,408 feet (ft)). Associated native plant species include *Asplenium* spp. (No Common Name (NCN)), *Astelia* spp. (painiu), *Broussaisia arguta* (kanawao), *Carex* spp. (NCN), *Cyrtandra* spp. (haiwale), *Diplazium sandwichianum* (hoio), *Elaphoglossum* spp. (ekaha), *Hedyotis terminalis* (manono), *Machaerina* spp. (uki), *Peperomia* spp. (ala ala wai nui), or *Vaccinium* spp. (ohelo) (61 FR 53070; Ken Wood, National Tropical Botanical Garden (NTBG), pers. comm., 2001).

The major threats to this species are competition from the aggressive non-native plant species *Rubus argutus* (prickly Florida blackberry); habitat degradation by feral pigs (*Sus scrofa*); trampling by humans; risk of extinction from naturally occurring events, such as landslides or hurricanes; and reduced reproductive vigor due to the small

number of extant individuals (61 FR 53070).

Alsinidendron viscosum (NCN)

Alsinidendron viscosum, a member of the pink family (Caryophyllaceae), is a weakly climbing or sprawling subshrub densely covered with fine glandular hairs. This short-lived perennial species is distinguished from others in this endemic Hawaiian genus by the weakly climbing or sprawling habit, color of the sepals, number of flowers per cluster, and size of the leaves. It is closely related to *Alsinidendron lychnoides,* which differs primarily in having wider leaves and more capsule valves and flowers per cluster (Wagner *et al.* 1999).

Alsinidendron viscosum was observed in flower during January, February, and April 1995. No additional life history information for this species is currently known (Service 1998a).

Historically, *Alsinidendron viscosum* was found at Kaholuamano, Kokee, Halemanu, Nawaimaka, and Waialae areas of northwestern Kauai. Currently, there are a total of five populations containing about 263 individuals on the island of Kauai. These populations are on State-owned land at the Halemanu Kokee Trail, Mohihi Waialae Trail, Kawaiiki Valley, Waialae Falls, and Nawaimaka Valley in the Alakai Wilderness Preserve, Kokee State Park, and the Na Pali-Kona Forest Reserve (61 FR 53070; HINHP Database 2000; GDSI 2000).

Alsinidendron viscosum is typically found at elevations between 754 and 1,224 m (2,474 and 4,016 ft), on steep slopes in *Acacia koa* (koa)—*Metrosideros polymorpha* lowland, montane mesic forest. Associated native plant species include *Alyxia oliviformis* (maile), *Asplenium polydon* (NCN), *Bidens cosmoides* (poola nui), *Bobea* spp. (ahakea), *Carex meyenii* (NCN), *Carex wahuensis* (NCN), *Coprosma* spp. (pilo), *Dryopteris unidentata* (NCN), *Dryopteris glabra* (hohiu), *Dodonaea viscosa* (aalii), *Dubautia laevigata* (naenae), *Dianella sandwicensis* (ukiuki), *Dryopteris wallichiana* (ionui), *Doodia kunthiana* (ohupukupulauii), *Gahnia* spp. (NCN), *Ilex anomala* (aiea), *Melicope* spp. (alani), *Panicum nephelophilum* (konakona), *Pteridium aquilinum* var. *decompositum* (bracken fern), *Pleomele* spp. (hala pepe), *Psychotria* spp. (kopiko), *Schiedea stellarioides* (laulihilihi), or *Vaccinium dentatum* (ohelo) (K. Wood, pers. comm., 2001).

The major threats to this species are destruction of habitat by feral pigs and goats (*Capra hircus*); competition with the non-native plant species *Rubus argutus, Lantana camara* (lantana), and *Melinis minutiflora* (molasses grass); and a risk of extinction from naturally occurring events, such as landslides or hurricanes; and reduced reproductive vigor due to the small number of extant populations and individuals (61 FR 53070).

Brighamia insignis (olulu)

Brighamia insignis, a 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 short-lived perennial species is a member of a unique endemic Hawaiian genus with only one other species, *B. rockii,* presently known only from Molokai, from which it differs by the color of its petals, its shorter calyx lobes, and its longer flower stalks (59 FR 9304; Lammers 1999).

Current reproduction is not thought to be sufficient to sustain populations, with poor seedling establishment due to competition with non-native grasses as the limiting factor. Pollination by native sphingid moths (Sphingidae family) is likely; however, pollination failure is common, due to either a lack of pollinators or a reduction in genetic variability. The flower structure appears to favor out crossing (pollination between different parent plants). Some vegetative cloning has been observed and flower and leaf size appear to be dependent on moisture availability. Seeds of this species are undoubtedly dispersed by gravity. Although they may be blown for short distances, they are not obviously adapted for wind dispersal, being ovoid to ellipsoid, smooth, and lacking any sort of wing or outgrowth (59 FR 9304; Service 1995).

Historically, *Brighamia insignis* was known from the headland between Hoolulu and Waiahuakua Valleys along the Na Pali Coast on the island of Kauai, and from Kaali Spring on the island of Niihau. Currently, there are a total of four populations containing a total of about 65 individuals on the islands of Kauai and Niihau. It is reported on State land (Hono O Na Pali Natural Area Reserve) and privately owned lands at Hoolulua and Waiahuakua Valleys, Haupu, and Keopaweo, and on the privately owned island of Niihau (Service 1995; GDSI 2000; HINHP Database 2000; Steve Perlman, NTBG, pers. comm., 2000).

Brighamia insignis is found at elevations between 0 and 748 m (0 and 2,453 ft) on rocky ledges with little soil or on steep sea cliffs in lowland dry grasslands or shrublands with annual rainfall that is usually less than 165 cm (65 in.). Associated native plant species include *Artemisia australis, Chamaesyce celastroides, Eragrostis variabilis, Heteropogon contortus, Hibiscus kokio, Hibiscus kokio* ssp. *saintjohnianus, Lepidium serra, Lipochaeta succulenta* (nehe), *Munroidendron racemosum,* or *Sida fallax* (59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to this plant are browsing and habitat degradation by feral goats; human disturbance; fire; the introduced Carmine spider mite (*Tetranychus cinnabarinus*); a risk of extinction from naturally occurring events, such as landslides or hurricanes, due to the small number of individuals; restricted distribution; reduced reproductive vigor; and competition from non-native plant species such as *Melinis minutiflora, Setaria gracilis, Sporobolus africanus* (smutgrass), *Lantana camara, Psidium cattleianum, Psidium guajava, Kalanchoe pinnata, Ageratum conyzioides* (maile hohono), or *Stachytarpheta dichotoma* (59 FR 9304).

Chamaesyce halemanui (NCN)

Chamaesyce halemanui, a short-lived perennial member of the spurge family (Euphorbiaceae), is a scandent (climbing) shrub. It is distinguished from closely related species by its decussate leaves (arranged in pairs at right angles to the next pair above or below), persistent stipules (bract-or leaf-like structures), more compact flower clusters, shorter stems on cyathia, and smaller capsules (57 FR 20580; Koutnik 1987; Koutnik and Huft 1999).

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

Historically, *Chamaesyce halemanui* was found in Kauhao and Makaha Valleys in the Na Pali-Kona Forest Reserve, Mahanaloa Valley in Kuia NAR, the Halemanu drainage in Kokee State Park, and Olokele Canyon on the island of Kauai. Currently, there are a total of six populations, containing about 143 individuals, in Kuia Valley, Poopooiki Valley, Kauhao Valley, Kaha Ridge, Awaawapuhi Valley, Waipio Falls, Halemanu, and Kaluahaulu in the Kokee State Park, Kuia Natural Area Reserve, and Na Pali-Kona Forest Reserve on State-owned land (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000; K. Wood, pers. comm., 2001).

Chamaesyce halemanui is typically found on the steep slopes of gulches in mesic *Acacia koa* forests at elevations

between 556 and 1,202 m (1,825 and 3,944 ft). Associated native plant species include *Asplenium* spp., *Alphitonia ponderosa* (kauila), *Antidesma platyphyllum* (hame), *Bobea brevipes* (ahakea lau lii), *Carex meyenii, Carex wahuensis, Cheirodendron trigynum* (olapa), *Coprosma* spp., *Diospyros sandwicensis* (lama), *Dodonaea viscosa, Elaeocarpus bifidus* (kalia), *Hedyotis terminalis, Kokia kauaiensis* (kokio), *Metrosideros polymorpha, Melicope haupuensis* (alani), *Microlepia strigosa* (NCN), *Panicum nephelophilum, Pisonia* spp. (papala kepau), *Pittosporum* spp. (hoawa), *Pleomele aurea* (hala pepe), *Psychotria mariniana* (kopiko), *Psychotria greenwelliae* (kopiko), *Pouteria sandwicensis* (alaa), *Santalum freycinetianum* (iliahi), or *Styphelia tameiameiae* (pukiawe) (57 FR 20580; K. Wood, pers. comm., 2001).

The major threats to this species are competition from non-native plants, such as *Lantana camara, Psidium cattleianum* (strawberry guava), and *Stenotaphrum secundatum* (St. Augustine grass); habitat degradation by feral pigs; restricted distribution; small population size; increased potential for extinction resulting from naturally occurring events, such as landslides or hurricanes; and depressed reproductive vigor (57 FR 20580).

Cyanea asarifolia (haha)

Cyanea asarifolia, a member of the bellflower family (Campanulaceae), is a sparingly branched shrub. This short-lived perennial species is distinguished from others of the genus that grow on Kauai by the shape of the leaf base, the leaf width in proportion to the length, and the presence of a leaf stalk (59 FR 9304; Lammers 1999).

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

Historically, *Cyanea asarifolia* was known only from along the bank of Anahola Stream on Kauai. Currently, one population with approximately five individuals is reported from the headwaters of the Wailua River in central Kauai on State-owned land in the Lihue-Koloa Forest Reserve (HINHP Database 2000; GDSI 2000).

This species typically grows in pockets of soil on sheer wet rock cliffs and waterfalls in lowland wet forests at elevations between 182 and 1,212 m (597 and 3,976 ft). Associated native plant species include ferns, *Bidens* spp. (kookoolau), *Dubautia plantaginea* (naenae), *Hedyotis centranthoides* (NCN), *Hedyotis elatior* (awiwi), *Lysimachia filifolia* (kolokolo kuahiwi), *Machaerina angustifolia* (uki), *Metrosideros polymorpha,* or *Panicum lineale* (NCN) (59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to this species are a risk of extinction from naturally occurring events, such as hurricanes and rock slides, and/or reduced reproductive vigor due to the small number of existing individuals; predation by introduced slugs and rodents (rats (*Rattus rattus*) and mice (*Mus musculus*)); and habitat degradation by feral pigs (59 FR 9304).

Cyanea recta (haha)

Cyanea recta, a member of the bellflower family (Campanulaceae), is an unbranched shrub with densely hairy flowers. This short-lived perennial species is distinguished from other species in the genus that grow on Kauai by the following collective characteristics: horizontal or ascending inflorescence; narrowly elliptic leaves 12 to 28 centimeters (cm) (4.7 to 11 inches (in.).) long, flat leaf margins; and purple berries (Lammers 1990).

Little is known about the life history of *Cyanea recta.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Cyanea recta* was found in upper Hanalei Valley, Waioli Valley, Hanapepe Valley, Kalalau cliffs, Wainiha Valley, Makaleha Mountains, Limahuli Valley, Power line Trail, and the Lehua Makanoe-Alakai area on the island of Kauai. Currently, there is a total of seven populations, with approximately 609 individuals, on State and private lands in the following areas: Waioli Valley, the left and right branches of Wainiha Valley, Makaleha Mountains, and Puu Eu, including areas in Halelea Forest Reserve, Kealia Forest Reserve, and the Lihue-Koloa Forest Reserve (GDSI 2000; HINHP Database 2000).

Cyanea recta grows in lowland wet or mesic *Metrosideros polymorpha* forest or shrubland, usually in gulches or on slopes, and typically at elevations between 234 and 1,406 m (768 and 4,613 ft). Associated native plant species include *Dicranopteris linearis, Psychotria* spp., *Antidesma* spp. (hame), *Cheirodendron platyphyllum* (lapalapa), *Cibotium* spp. (hapuu), or *Diplazium* spp. (NCN) (61 FR 53070; K. Wood, pers. comm., 2001).

The major threats to this species are bark removal and other damage by rats; habitat degradation by feral pigs; browsing by goats; unidentified slugs that feed on the stems; and competition with the non-native plant species *Blechnum occidentale* (blechnum fern), *Lantana camara, Rubus rosifolius* (thimbleberry), *Clidemia hirta* (Koster's curse), *Crassocephalum crepidioides* (NCN), *Deparia petersenii* (NCN), *Erechtites valerianifolia* (fireweed), *Melastoma candidum* (NCN), *Paspalum conjugatum* (Hilo grass), *Sacciolepis indica* (Glenwood grass), or *Youngia japonica* (Oriental hawksbeard) (61 FR 53070).

Cyanea remyi (haha)

Cyanea remyi, a member of the bellflower family (Campanulaceae), is a shrub with generally unbranched, unarmed (lacking prickles) stems which are hairy toward the base. This short-lived perennial species is distinguished from others in the genus that grow on Kauai by its shrubby habit, relatively slender, unarmed stems, smooth or minutely toothed leaves, densely hairy flowers, the shape of the calyx (outer whorl of flower consisting sepals) lobes, length of the calyx and corolla (part of flower consisting of separate or fused petals), and length of the corolla lobe relative to the floral tube (Lammers 1999).

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

Currently, there are seven known populations with approximately 374 plants among them on the island of Kauai. *Cyanea remyi* is reported from Pali Eleele, Waioli Valley, Makaleha, Blue Hole, Kawaikini, and Kapalaoa on privately and State-owned lands, including the Halelea and Lihue-Koloa Forest Reserves (Lammers and Lorence 1993; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Cyanea remyi is usually found in tight drainages and wet stream banks in lowland wet forest or shrubland at elevations between 215 and 1,167 m (704 and 3,829 ft). Associated native plant species include various ''finger'' (ferns in the Grammitaceae family) and ''filmy'' (ferns in the Hymenophyllaceae family) fern species, *Adenophorus* spp. (pendant fern), *Antidesma* spp., *Cheirodendron* spp., *Cyrtandra* spp., *Diplazium sandwichianum, Eragrostis grandis* (kawelu), *Bidens* spp., *Broussaisia arguta, Metrosideros polymorpha, Freycinetia arborea* (ieie), *Hedyotis terminalis, Machaerina angustifolia, Perrottetia sandwicensis* (olomea), *Pipturus* spp. (mamaki),

Psychotria hexandra (kopiko), *Syzygium sandwicensis* (ohia ha), *Thelypteris* spp. (palapalaia), *Touchardia* spp. (olona), or *Urera glabra* (opuhe) (61 FR 53070; K. Wood, pers. comm., 2001).

The major threats to this species are competition with the non-native plant species *Erechtites valerianifolia, Paspalum conjugatum, Psidium cattleianum, Rubus rosifolius,* or *Melastoma candidum;* habitat degradation by feral pigs; browsing by feral goats; predation by rats; unidentified slugs that feed on the stems; and a risk of extinction from naturally occurring events, such as landslides or hurricanes, due to the small number of remaining populations (61 FR 53070).

Cyanea undulata (NCN)

Cyanea undulata is an unbranched (or the stem is occasionally forked) shrub or undershrub with fine rust-colored hairs covering the lower surface of the leaves (Lammers 1999).

Native members of the Campanulaceae (bellflower) family, including the genus *Cyanea,* are generally believed to have adapted to pollination by native nectar-eating passerine birds, such as the Hawaiian ''honeycreepers.'' The long, tubular, slightly curved flowers of *C. undulata* fit this model, but field observations are lacking. The fleshy orange fruits of this species are adapted for bird dispersal like other species of Cyanea. Although recognized as a short-lived perennial species, specific details of the life history of this species, such as growth rates, age plants begin to flower, and longevity of plants, are unknown (Lorence and Flynn 1991; Service1994).

Historically, *Cyanea undulata* was known only from the Wahiawa Bog area on Kauai. Currently, one population with a total of 28 plants is reported on privately owned land along the bank of a tributary of the Wahiawa Stream in the Wahiawa Drainage (HINHP Database 2000; GDSI 2000).

Cyanea undulata typically grows in tight drainages and wet stream banks in *Metrosideros polymorpha* dry to montane wet forest or shrubland at elevations between 145 and 1,066 m (476 and 3,497 ft). Associated native species include various grammitid and filmy ferns, *Adenophorus* spp., *Antidesma* spp., *Broussaisia arguta, Cheirodendron* spp., *Diplazium sandwichianum, Dryopteris glabra, Eragrostis grandis, Bidens* spp, *Freycinetia arborea, Machaerina angustifolia, Mariscus* spp. (NCN), *Melicope feddei* (alani), *Perrottetia sandwicensis, Pipturus* spp., *Psychotria mariniana, Psychotria hexandra, Sadleria pallida* (amau), *Sadleria squarrosa* (amau), *Smilax melastomifolia* (pioi), *Sphenomeris chinensis* (palaa), *Syzygium sandwicensis,* or *Thelypteris* spp. (Service 1994; K. Wood, pers. comm., 2001).

The primary threats to this species include competition with the non-native plant species *Psidium cattleianum, Melastoma candidum, Rhodomyrtus tomentosa* (rose myrtle), *Clidemia hirta, Melaleuca quinquenervia* (paperbark tree), *Stachytarpheta dichotoma* (owi), *Rubus rosifolius, Elephantopus mollis* (NCN), *Erechtites valerianifolia, Youngia japonica, Pluchea carolinensis* (sourbush), *Oplismenus hirtellus* (basketgrass), *Paspalum conjugatum, Paspalum urvillei* (Vasey grass), *Sacciolepis indica, Setaria gracilis* (yellow foxtail), *Deparia petersenii,* or *Cyathea cooperi* (Australian tree fern); trampling by feral pigs; landslides; seed predation by rats; herbivory by introduced slugs; loss of pollinators; hurricanes; and decreased reproductive vigor, restricted distribution, and extinction due to unforseen circumstances because of small population size (56 FR 47695; Service 1994).

Cyrtandra cyaneoides (mapele)

Cyrtandra cyaneoides, a member of the African violet family (Gesneriaceae), is an erect or ascending, fleshy, usually unbranched shrub with opposite toothed leaves which have impressed veins on the lower surface that are sparsely covered with long hairs. This short-lived perennial species differs from others of the genus that grow on Kauai by being a succulent, erect or ascending shrub and having a bilaterally symmetrical calyx that is spindle-shaped in bud and falls off after flowering, leaves that are 41 to 56 cm (16 to 22 in.) long and 23 to 35 cm (9 to 14 in.) wide and have a wrinkled surface, and berries with shaggy hairs (Wagner *et al.* 1999).

Little is known about the life history of *Cyrtandra cyaneoides.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Cyrtandra cyaneoides* was known to occur only along the trail to Waialae Valley on Kauai until recently discovered in other areas. It is currently known from five populations, containing about 404 individuals, on private and State lands (including Halelea Forest Reserve and Alakai Wilderness Preserve) at Pihea, Waioli Valley, Lumahai, the left branch of Wainiha Valley, and Makaleha (61 FR 53070; GDSI 2000; HINHP Database 2000).

Cyrtandra cyaneoides typically grows on talus rubble on steep slopes or cliffs with water seeps running below, near streams or waterfalls in lowland or montane wet forest or shrubland dominated by *Metrosideros polymorpha* or a mixture of *Metrosideros polymorpha, Cheirodendron* spp., and *Dicranopteris linearis* at elevations between 157 and 1,406 m (514 and 4,614 ft). Associated native species include *Bidens* spp., *Boehmeria grandis* (akolea), *Cyanea* spp. (haha), *Cyrtandra longifolia* (haiwale), *Cyrtandra kauaiensis* (haiwale), *Cyrtandra limahuliensis* (haiwale), *Coprosma* spp., *Diplazium sandwichianum, Freycinetia arborea, Gunnera* spp. (ape ape), *Hedyotis terminalis, Hedyotis tryblium* (NCN), *Machaerina* spp., *Melicope clusiifolia* (kolokolo mokihana), *Melicope puberula* (alani), *Perrottetia sandwicensis, Pipturus* spp., *Psychotria* spp., *Pritchardia* spp. (loulu), or *Stenogyne purpurea.* (NCN) (61 FR 53070; K. Wood, pers. comm., 2001).

The major threats to this species are competition with non-native plant species such as *Paspalum conjugatum, Rubus rosifolius, Deparia petersenii,* and *Drymaria cordata* (pipili); predation of seeds by rats; reduced reproductive vigor and a risk of extinction from naturally occurring events, such as landslides and hurricanes, due to the small number of populations; and habitat degradation by feral pigs (61 FR 53070).

Cyrtandra limahuliensis (haiwale)

Cyrtandra limahuliensis, a member of the African violet family (Gesneriaceae), is an unbranched or few-branched shrub with moderately or densely hairy leaves. The following combination of characteristics distinguishes this short-lived perennial species from others of the genus: the leaves are usually hairy (especially on lower surfaces), the usually symmetrical calyx is tubular or funnel-shaped and encloses the fruit at maturity, and the flowers are borne singly (Wagner *et al.* 1990).

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

Historically, *Cyrtandra limahuliensis* was known from three locations on Kauai: Wainiha Valley, Lumahai Valley, and near Kilauea River until recently discovered in additional areas. Currently, a total of 11 populations,

containing approximately 822 plants, are reported on private and State lands (including the Halelea Forest Reserve, Kealia Forest Reserve, and the Lihue-Koloa Forest Reserve) at Limahuli Falls, Lumahai Valley, Waipa Valley, Waioli Valley, Kekoiki, Makaleha, the right fork of Wainiha Valley, Kualapa and Blue Hole, Kepalaoa, and Puu Kolo. However, it has been estimated that the total number of plants on Kauai may be as high as a few thousand (HINHP Database 2000; GDSI 2000).

This species typically grows along stream banks in lowland wet forests at elevations between 208 and 1,594 m (681 and 5,228 ft). Associated native plant species include *Antidesma* spp., *Boehmeria grandis, Bidens* spp., *Charpentiera* spp. (papala), *Cibotium glaucum* (hapuu), *Cyanea* spp., *Cyrtandra kealiae* (haiwale), *Dicranopteris linearis, Diplazium sandwichianum, Dubautia* spp. (naenae), *Eugenia* spp. (nioi), *Gunnera kauaiensis* (ape ape), *Hedyotis terminalis, Hibiscus waimeae* (kokio keokeo), *Metrosideros polymorpha, Perrottetia sandwicensis, Pisonia* spp., *Pipturus* spp., *Pritchardia* spp., *Psychotria* spp., *Touchardia latifolia* (olona), or *Urera glabra* (59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to this species are competition from non-native plant species (*Psidium cattleianum, Paspalum conjugatum, Melastoma candidum, Psidium guajava* (common guava), *Hedychium flavescens* (yellow ginger), *Rubus rosifolius, Youngia japonica, Erechtites valerianifolia, Blechnum occidentale*, or *Clidemia hirta*); habitat degradation by feral pigs; natural landslides; and hurricanes (59 FR 9304).

Delissea rhytidosperma (NCN)

Delissea rhytidosperma, a member of the bellflower family (Campanulaceae), is a branched shrub with lance-shaped or elliptic toothed leaves. This short-lived perennial species differs from other species of the genus by the shape, length, and margins of the leaves and by having hairs at the base of the anthers (part of stamen that produces pollen and usually is borne on a stalk) (Lammers 1999).

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

Historically, *Delissea rhytidosperma* was known from as far north as Wainiha and Limahuli Valleys, as far east as Kapaa and Kealia, and as far south as Haupu Range, between the elevations of 122 and 915 m (400 and 3,000 ft) on the island of Kauai. Currently, three populations, on private and State lands (including Kuia Natural Area Reserve), with a total of 19 individuals, are reported from Kuia Valley, Puhakukane, and the Haupu range (HINHP Database 2000; GDSI 2000).

This species generally grows in well-drained soils with medium or fine-textured subsoil in *Diospyros* diverse lowland mesic or diverse *Metrosideros polymorpha-Acacia koa* forests at elevations between 167 and 895 m (547 and 2,935 ft). Associated native plant species include grammitid ferns, *Adenophorus oligadenus* (pendant fern), *Cyanea* spp., *Dianella sandwicensis, Diospyros sandwicensis, Dodonaea viscosa, Doodia kunthiana, Euphorbia haeleeleana* (akoko), *Hedyotis* spp. (NCN), *Microlepia strigosa, Nestegis sandwicensis* (olopua), *Psychotria hobdyi* (kopiko), *Pisonia* spp., *Pteralyxia* spp.(kaulu), or *Styphelia tameiameiae* (59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to this species are predation and/or habitat degradation by mule or black-tailed deer (*Odocoileus hemionus columbianus*), feral pigs, and goats; herbivory by rats and introduced slugs; fire; and competition with the non-native plants *Lantana camara, Passiflora ligularis* (sweet granadilla), *Cordyline fruticosa* (ti), and *Passiflora mollissima* (banana poka); and a risk of extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of existing individuals (59 FR 9304; Service 1995).

Delissea rivularis (oha)

Delissea rivularis, a member of the bellflower family (Campanulaceae), is a shrub, unbranched or branched near the base, with hairy stems and leaves arranged in a rosette at the tips of the stems. This short-lived perennial species is distinguished from others of the genus by the color, length, and curvature of the corolla, shape of the leaves, and presence of hairs on the stems, leaves, flower clusters, and corolla (Lammers 1999).

Little is known about the life history of *Delissea rivularis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Delissea rivularis* was found at Waiakealoha Waterfall, Waialae Valley, Hanakoa Valley, and Kaholuamanu on the island of Kauai (61 FR 53070). Currently, this species is known from two populations with a total of 40 individuals. The populations are reported from Moaalele and Hanakapiai on State land within the Hono o Na Pali Natural Area Reserve (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Delissea rivularis is found on steep slopes near streams in *Metrosideros polymorpha-Cheirodendron trigynum* montane wet or mesic forest at elevations between 722 and 1,306 m (2,370 and 4,286 ft). Associated native plant species include *Boehmeria grandis, Broussaisia arguta, Carex* spp., *Coprosma* spp., *Dubautia knudsenii* (naenae), *Diplazium sandwichianum, Hedyotis foggiana* (NCN), *Ilex anomala, Machaerina angustifolia, Melicope clusiifolia, Melicope anisata* (mokihana), *Pipturus* spp., *Psychotria hexandra*, or *Sadleria* spp. (amau) (61 FR 53070; K. Wood, pers. comm., 2001).

The major threats to this species are competition with the encroaching non-native plant *Rubus argutus*; habitat destruction by feral pigs; predation by rats; and reduced reproductive vigor and a risk of extinction from naturally occurring events, such as landslides or hurricanes, due to the small number of remaining individuals (61 FR 53070; Service 1998a).

Diellia pallida (NCN)

Diellia pallida, a member of the spleenwort family (Aspleniaceae), is a plant that grows in tufts of three to four light green, lance-shaped fronds along with a few persistent dead ones, and reproduces by spores, the minute, reproductive dispersal unit of ferns and fern allies. This short-lived perennial species differs from others of this endemic Hawaiian genus by the color and sheen of the midrib, the presence and color of scales on the midrib, and the frequent fusion of sori (a group or cluster of spore cases) (Wagner 1952, 1987).

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

Diellia pallida was known historically from Halemanu on the island of Kauai. More recently additional populations have been found and currently, there is a total of four populations with 20 to 25 individuals in Mahanaloa and Kuia Valleys, Makaha Valley, Waimea Canyon, and Koaie Canyon, all on State-owned land including Kuia Natural Area Reserve, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve (59 FR 9304; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

This species grows on bare granular soil with dry to mesophytic leaf litter with pH of 6.9 to 7.9. on steep, talus slopes in lowland mesic forests at elevations between 445 and 1,027 m (1,460 and 3,371 ft). Associated native plant species include *Acacia koa, Alectryon macrococcus, Alphitonia ponderosa, Alyxia oliviformis, Antidesma platyphyllum, Asplenium spp., Carex meyenii, Diospyros hillebrandii* (lama), *Diospyros sandwicensis, Doodia kunthiana, Hedyotis knudsenii* (NCN), *Metrosideros polymorpha, Microlepia strigosa, Myrsine lanaiensis* (kolea), *Nestegis sandwicensis, Psychotria mariniana, Psydrax odoratum* (alahee), *Pteralyxia kauaiensis* (kaulu), *Rauvolfia sandwicensis* (hao), *Styphelia tameiameiae, Tetraplasandra kauaiensis* (ohe ohe), *Wilkesia gymnoxiphium* (iliau), or *Zanthoxylum dipetalum* (ae) (59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to this species include competition with the non-native plants *Lantana camara, Melia azedarach* (Chinaberry), *Stenotaphrum secundatum, Oplismenus hirtellus, Aleurites moluccana* (kukui) or *Cordyline fruticosa;* predation and habitat degradation by feral goats, pigs, and deer; fire; and a risk of extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of existing individuals (59 FR 9304).

Dubautia latifolia (naenae)

Dubautia latifolia, a member of the aster family (Asteraceae), is a diffusely branched, woody perennial vine with leaves which are conspicuously net-veined, with the smaller veins outlining nearly square areas. A vining habit, distinct petioles (stalks), and broad leaves with conspicuous net veins outlining squarish areas separate this from closely related species (Carr 1982b, 1985, 1999a).

Individual plants of this species do not appear to be able to fertilize themselves. Since at least some individuals of *Dubautia latifolia* require cross-pollination, the wide spacing of individual plants (*e.g.*, each 0.5 kilometer (km) (0.3 mile (mi)) apart) may pose a threat to the reproductive potential of the species. The very low seed set noted in plants in the wild indicates a reproductive problem, possibly asynchronous flowering or lack of pollinators. Seedling establishment and survival to juvenile stage is also rare. *Dubautia latifolia* experiences seasonal vegetative decline during the spring and summer, often losing most of its leaves. New growth and flowering occur in the fall, with fruits developing in November. Pollinators and seed dispersal agents are unknown (Carr 1982b; Service 1995).

Historically, *Dubautia latifolia* was found in the Makaha, Awaawapuhi, Waialae, Kawaiula, and Kauhao Valleys of the Na Pali-Kona Forest Reserve, Nualolo Trail and Valley in Kuia Natural Area Reserve; Halemanu in Kokee State Park; along Mohihi Road in both Kokee State Park and Na Pali-Kona Forest Reserve, along the Mohihi-Waialae Trail on Mohihi and Kohua Ridges in both Na Pali-Kona Forest Reserve and Alakai Wilderness Preserve; and at Kaholuamanu on the island of Kauai. Currently, there are a total of nine populations containing approximately 80 individuals on State-owned land in Kauhao Valley, Makaha Valley headwaters, Kuia Valley, Kawaiula Valley, Kumuwela Ridge, Awaawapuhi Valley, Waiakoali picnic area, Alakai picnic area, Honopu Trail, Nualolo Trail, Waineke Swamp, Noe Stream, Kumuwela Ridge, Mohihi Ditch, Mohihi Waialae Trail, and Kaluahaulu Ridge in the Alakai Wilderness Preserve, Kokee State Park, Kuia Natural Area Reserve, Na Pali-Kona Forest Reserve, and the Waimea Canyon State Park (Carr 1982b; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

This species typically grows on gentle to steep slopes in well drained soil and in semi-open or closed, diverse montane mesic forest dominated by *Acacia koa* and/or *Metrosideros polymorpha*, at elevations between 544 and 1,277 m (1,786 and 4,189 ft). Commonly associated native plant species are *Alphitonia ponderosa*, *Antidesma* spp., *Bobea* spp., *Claoxylon sandwicense* (poola), *Coprosma waimeae* (olena), *Cyrtandra* spp., *Dicranopteris linearis, Diplazium sandwichianum, Dodonaea viscosa, Elaeocarpus bifidus, Hedyotis terminalis, Ilex anomala, Melicope anisata, Nestegis sandwicensis, Pleomele* spp., *Pouteria sandwicensis, Psychotria mariniana, Scaevola* spp. (naupaka), or *Xylosma* spp. (maua) (59 FR 9304; K. Wood, pers. comm., 2001).

The threats to this species include competition from the non-native plants *Passiflora mollissima, Rubus argutus, Lonicera japonica* (Japanese honeysuckle), *Acacia mearnsii* (black wattle), *Hedychium* spp. (ginger), *Erigeron karvinskianus* (daisy fleabane), or *Psidium cattleianum*; damage from trampling and grazing by feral pigs and deer; vehicle traffic and road maintenance; seasonal dieback; small number of extant individuals; and restricted distribution (59 FR 9304).

Dubautia pauciflorula (naenae)

Dubautia pauciflorula, a member of the aster family (Asteraceae), is a somewhat sprawling shrub or erect small tree with narrowly lance-shaped or elliptic leaves clustered toward the ends of the stems. The tiny, two- to four-flowered heads distinguish this short-lived perennial species from its relatives (Carr 1985, 1999a).

Few details are known about the life history of any *Dubautia* species under natural conditions. Certain species produce viable seed when self-pollinated (self-fertile), although others fail to do so (self-infertile). Low pollinator numbers resulting in reduced cross-pollination and consequently low numbers of viable seeds could explain the small population sizes. Because of their structure and small size, flowers of *D. pauciflorula* are presumably pollinated by small generalist insects, although field observations are lacking. The bristle-like pappus (tuft of appendages that crowns the ovary or fruit) probably represents an adaptation for wind dispersal. Very little is known about the life cycle of this species, including growth rates, longevity of the plants, and number of years the plants remain reproductive (56 FR 47695; Carr 1985; Service 1994).

Historically and currently, this species is found only on State (including the Lihue-Koloa Forest Reserve) and privately owned lands in the Wahiawa Drainage on Kauai. There are two populations containing 42 individual plants (HINHP Database 2000; GDSI 2000).

These populations are found in *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest within stream drainages at elevations between 564 and 1,093 m (1,849 and 3,587 ft). Associated native plant species include *Antidesma platyphyllum*, *Broussaisia arguta*, *Cheirodendron* spp., *Dubautia laxa* (naenae pua melemele), *Embelia pacifica* (kilioe), *Hesperomannia lydgatei, Labordia waialealae* (kamakahala lau lii), *Melicope* spp., *Nothoperanema rubiginosa* (NCN), *Pritchardia* spp., *Psychotria* spp., *Sadleria* spp., *Scaevola mollis* (naupaka kuahiwi), *Syzygium sandwicensis,* or *Tetraplasandra* spp. (ohe ohe) (K. Wood, pers. comm., 2001).

The threats to this plant include direct competition with the non-native plant species such as *Psidium cattleianum* or *Melastoma candidum*, and potential threats from *Rhodomyrtus tomentosa*, *Clidemia hirta, Melaleuca quinquenervia, Stachytarpheta dichotoma, Rubus rosifolius, Elephantopus mollis, Erechtites*

valerianifolia, Youngia japonica, Pluchea carolinensis, Oplismenus hirtellus, Paspalum conjugatum, Paspalum urvillei, Sacciolepis indica, Setaria gracilis, Deparia petersenii, or *Cyathea cooperi*; trampling by feral pigs; landslides and erosion; restricted distribution; and hurricanes (56 FR 47695; Service 1994).

Exocarpos luteolus (heau)

Exocarpos luteolus, a member of the sandalwood family (Santalaceae), is a moderately to densely branched shrub with knobby branches and leaves which are either minute scales or typical leaves. This short-lived perennial species is distinguished from others of the genus by its generally larger fruit with four indentations and by the color of the receptacle and fruit (Wagner *et al.* 1999).

Little is known about the life history of *Exocarpos luteolus.* This species tends to grow at habitat edges where there is adequate light and is likely to be semi-parisitic. Flowering cycles, pollination vectors, seed dispersal agents, longevity, other specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Exocarpos luteolus* was known from three general locations on Kauai: Wahiawa Bog, Kaholuamanu, and Kumuwela Ridge. Currently, there is a total of eight populations containing approximately 75 individual plants. This species has a scattered distribution on State (Kuia Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve) and privately owned lands and is reported from Pohakuao, the right fork of Kalalau Valley, the left fork of Kalalau Valley, Hipalau Valley, Koaie Canyon, Mahanaloa Valley, Kuia Valley, Poopooiki Valley, Nualolo Trail, Makaha Valley, and Haeleele Valley (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

This species is found at elevations between 361 and 1,465 m (1,183 and 4,808 ft) in wet places bordering swamps or open bogs; open, dry ridges in lowland or montane mesic *Acacia koa-Metrosideros polymorpha* dominated forest communities with *Dicranopteris linearis.* Associated native plant species include *Cheirodendron trigynum, Pouteria sandwicensis, Dodonaea viscosa, Pleomele aurea, Psychotria mariniana, Psychotria greenwelliae, Bobea brevipes, Hedyotis terminalis, Elaeocarpus bifidus, Melicope haupuensis, Dubautia laevigata, Dianella sandwicensis, Poa sandvicensis* (Hawaiian bluegrass), *Schiedea stellarioides, Peperomia macraeana* (ala ala wai nui), *Claoxylon sandwicense, Santalum freycinetianum,* or *Styphelia tameiameiae* (59 FR 9304; Service 1995; K. Wood, pers. comm., 2001).

The major threats to this species are feral goats and pigs; competition with the non-native plants *Erigeron karvinskianus, Acacia mearnsii, Corynocarpus laevigata* (karakanut), *Myrica faya* (firetree), or *Rubus argutus;* seed predation by rats; fire; and erosion (59 FR 9304; Service 1995).

Hedyotis st.-johnii (Na Pali beach hedyotis)

Hedyotis st.-johnii, a member of the coffee family (Rubiaceae), is a succulent perennial herb with slightly woody, trailing, quadrangular stems and fleshy leaves clustered towards the base of the stem. This species is distinguished from related species by its succulence, basally clustered fleshy leaves, shorter floral tube, and large leafy calyx lobes when in fruit (Wagner *et al.* 1999).

Little is known about the life history of *Hedyotis st.-johnii.* Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Currently, there are a total of four populations, containing approximately 296 individuals, on State-owned land in Nualolo Valley, Nualolo Kai, Kaahole Valley, Keawanui, Kawaiula Valley, Milolii Spring, Makaha Point, Polihale Spring, Kalepa Valley, and Nakeikionaiwi Caves within the Na Pali Coast State Park and Puu Ka Pele Forest Reserve (HINHP Database 2000; GDSI 2000).

This plant grows in the crevices of north-facing, near-vertical coastal cliff faces in sparse dry coastal shrubland at elevations between 0 and 187 m (0 and 613 ft). Associated native plant species include *Artemisia australis* (ahinahina), *Bidens* spp., *Capparis sandwichiana* (maia pilo), *Chamaesyce celastroides* (akoko), *Eragrostis variabilis* (kawelu), *Heteropogon contortus* (pili grass), *Lipochaeta connata* (nehe), *Lycium sandwicense* (ohelo kai), *Myoporum sandwicense* (naio), *Nototrichium sandwicense* (kului), or *Schiedea apokremnos* (maolioli) (56 FR 49639, K. Wood, pers. comm., 2001).

The major threats to this species are herbivory and habitat degradation by feral goats; competition from non-native plant species, especially *Pluchea carolinensis;* landslides; fire; trampling and grazing by cattle (*Bos taurus*); and a risk of extinction due to naturally occurring events, such as landslides or hurricanes, as well as decreased reproductive vigor because of the small population sizes and restricted distribution (56 FR 49639; Service 1995).

Hesperomannia lydgatei (NCN)

Hesperomannia lydgatei, a member of the aster family (Asteraceae) is a sparsely branched, small, long-lived perennial tree 2 to 4 m (6.5 to 13 ft) tall with alternately arranged, lance-shaped, or elliptic leaves that are 10 to 30 cm (4 to 12 in.) long and 3.5 to 9 cm (1.4 to 3.5 in.) wide, broader above the middle and paler beneath. The flower heads are in groups of four or five on slender stems and are clustered at the ends of branches and pendant when mature. The flower heads consist of four to eight circles of overlapping bracts, the outer are purplish or brownish and the inner are silver, that surround the slender, tubular yellow florets, which are 2.2 to 2.5 cm (0.9 to 1 in.) long (Wagner *et al.* 1999).

Almost no mature fruits develop, and it is possible that it is self-infertile and fails to set seed unless cross-pollinated with other individuals. The flower heads with long, tubular yellow florets suggest pollination by long-tongued insects such as moths or butterflies, although field observation is required to confirm this. Absence of the appropriate pollinator(s) could be responsible for the observed lack of viable seeds. The plume-like hairs crowning the fruit strongly suggests dispersal by wind, as in many members of the aster family. This species grows almost exclusively along streams, however, so dispersal by water currents is also likely. Specific details regarding growth rates, age trees begin flowering in the wild, length of time they remain reproductive, and longevity of the plants are unknown (Service 1994).

Historically, *Hesperomannia lydgatei* was found in the Wahiawa Mountains of Kauai. Currently, this species is known from State (Halelea Forest Reserve) and privately owned lands in the Pali Eleele, Waiole Valley, Wahiawa and Kapalaoa areas. There are three populations containing a total of 295 individual plants (K. Wood, *in litt.* 1999; GDSI 2000; HINHP Database 2000).

Hesperomannia lydgatei is found at elevations between 405 and 1,570 m (1,329 and 5,151 ft) along stream banks and forested slopes in rich brown soil and silty clay in *Metrosideros polymorpha* or *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest. Associated native plant species include *Adenophorus periens, Antidesma* spp., *Broussaisia arguta, Cheirodendron* spp., *Cyanea* spp., *Dubautia knudsenii, Dubautia*

laxa, Dubautia pauciflorula, Dubautia raillardioides (naenae), *Elaphoglossum* spp., *Freycinetia arborea, Hedyotis terminalis, Labordia lydgatei, Machaerina angustifolia, Peperomia* spp., *Pritchardia* spp., *Psychotria hexandra,* or *Syzygium sandwicensis* (Service 1994; HINHP Database 2000; K. Wood, pers. comm., 2001).

Threats to the species include non-native plants, feral goats, rats, landslides, and erosion (Service 1994).

Hibiscadelphus woodii (hau kuahiwi)

Hibiscadelphus woodii, a member of the mallow family (Malvaceae), is a small branched, long-lived perennial tree with a rounded crown. *Hibiscadelphus woodii* differs from the other Kauai species by differences in leaf surface and characteristics of the whirled leaves or bract and flower color (Lorence and Wagner 1995; Bates 1999).

Flowering material has been collected in March, April, and September, but no fruit set has been observed in spite of efforts to manually outcross and bag the flowers. A museum specimen of a liquid-preserved flower has been identified that contains three adult Nitidulidae (sap) beetles, probably an endemic species. The damage by these larvae may be responsible for the observed lack of fruit set in *Hibiscadelphus woodii* (Lorence and Wagner 1995; Service 1998a). No additional life history information for this species is currently known.

Hibiscadelphus woodii has been found only at the site of its original discovery on State-owned land in left branch of the Kalalau Valley, within the Na Pali Coast State Park on Kauai; only two trees of this species are currently known (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 2001).

Hibiscadelphus woodii is found at elevations between 219 and 1,197 m (717 and 3,926 ft) on basalt talus or cliff walls in *Metrosideros polymorpha* montane mesic forest. These forests contain one or more of the following associated native plant species: *Artemisia australis, Bidens sandvicensis* (kookoolau), *Carex meyenii, Chamaesyce celastroides* var. *hanapepensis* (akoko), *Dubautia* spp., *Hedyotis* spp., *Lepidium serra* (anaunau), *Lipochaeta* spp.(nehe), *Lobelia niihauensis* (NCN), *Lysimachia glutinosa* (kolokolo kuahiwi), *Melicope pallida* (alani), *Myrsine* spp. (kolea), *Nototrichium* spp. (kului), *Panicum lineale, Poa mannii* (NCN), or *Stenogyne campanulata* (NCN) (Lorence and Wagner 1995; 61 FR 53070; HINHP Database 2000; K. Wood, pers. comm., 2001).

Major threats to *Hibiscadelphus woodii* are habitat degradation by feral goats and pigs; competition from the non-native plant species *Erigeron karvinskianus;* nectar robbing by Japanese white-eye (*Zosterops japonicus*), an introduced bird; and a risk of extinction from naturally occurring events (*e.g.,* rock slides), and reduced reproductive vigor due to the small number of existing individuals at the only known site (61 FR 53070; Lorence and Wagner 1995).

Hibiscus clayi (Clay's hibiscus)

Hibiscus clayi, a member of the mallow family (Malvaceae), is a long-lived perennial shrub or small tree. This species is distinguished from other native Hawaiian members of the genus by the lengths of the calyx, calyx lobes, and capsule and by the margins of the leaves (Bates 1999).

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

Historically, *Hibiscus clayi* was known from scattered locations on Kauai: the Kokee region on the western side of the island, Moloaa Valley to the north, Nounou Mountain in Wailua to the east, and as far south as Haiku near Halii Stream. At this time, only the population on State land in the Nounou Mountains, with a total of six trees, is known to be extant (HINHP Database 2000; GDSI 2000).

Hibiscus clayi generally grows on slopes at elevations between 9 and 380 m (29 and 1,245 ft) in *Acacia koa* or *Diospyros* spp.-*Pisonia* spp.-*Metrosideros polymorpha* lowland dry or mesic forest with *Artemisia australis, Bidens* spp., *Cyanea hardyi* (haha), *Hedyotis acuminata* (au), *Gahnia* spp., *Munroidendron racemosum* (NCN), *Pandanus tectorius* (hala), *Panicum tenuifolium* (mountain pili), *Pleomele aurea, Pipturus* spp., *Psychotria* spp., or *Psydrax odoratum* (59 FR 9304; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to this species are herbivory and habitat degradation by feral pigs; competition from non-native plant species, *Psidium cattleianum* and *Araucaria columnaris* (Norfolk Island pine); trampling by humans; and a risk of extinction due to naturally occurring events, such as landslides or hurricanes, as well as decreased reproductive vigor because of the small population sizes and restricted distribution (59 FR 9304; HINHP Database 2000).

Hibiscus waimeae ssp. *hannerae* (kokio keokeo)

Hibiscus waimeae ssp. *hannerae,* a member of the mallow family (Malvaceae), is a gray-barked tree with star-shaped hairs densely covering its leaf and flower stalks and branchlets. The long-lived perennial species is distinguished from others of the genus by the position of the anthers along the staminal column, length of the staminal column relative to the petals, color of the petals, and length of the calyx. Two subspecies, ssp. *hannerae* and ssp. *waimeae,* both endemic to Kauai, are recognized. Subspecies *hannerae* is distinguishable from ssp. *waimeae* by its larger leaves and smaller flowers (Bates 1999).

Little is known about the life history of *Hibiscus waimeae* ssp. *hannerae.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Hibiscus waimeae* ssp. *hannerae* was known from Kalihiwai and adjacent Valleys, Limahuli Valley, and Hanakapiai Valley. This subspecies is no longer extant at Kalihiwai. Currently, there are three populations containing 27 individuals on State (Na Pali Coast State Park) and privately owned lands in Hanakapiai Valley, Limahuli Valley, and Pohakuao (Bates 1999; HINHP Database 2000; GDSI 2000).

Hibiscus waimeae ssp. *hannerae* grows at elevations between 174 and 1,154 m (570 and 3,787 ft). It is found in *Metrosideros polymorpha-Dicranopteris linearis* or *Pisonia* spp.-*Charpentiera elliptica* (papala) lowland wet or mesic forest with *Antidesma* spp., *Psychotria* spp., *Pipturus* spp., *Bidens* spp., *Bobea* spp., *Sadleria* spp., *Cyrtandra* spp., *Cyanea* spp., *Cibotium* spp., *Perrottetia sandwicensis,* or *Syzygium sandwicensis* (Service 1998a; Bates 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

Major threats to *Hibiscus waimeae* ssp. *hannerae* are habitat degradation by feral pigs, competition with non-native plant species, and a risk of extinction from naturally occurring events (*e.g.,* landscapes and hurricanes) and/or reduced reproductive vigor due to the small number of remaining populations (61 FR 53070; HINHP Database 2000).

Kokia kauaiensis (kokio)

Kokia kauaiensis, a member of the mallow family (Malvaceae), is a small tree. This long-lived perennial species is distinguished from others of this endemic Hawaiian genus by the length

of the bracts surrounding the flower head, number of lobes and the width of the leaves, the length of the petals, and the length of the hairs on the seeds (Bates 1999).

Little is known about the life history of *Kokia kauaiensis.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Kokia kauaiensis* was found at seven scattered populations on northwestern Kauai. Currently, there are a total of five populations with 166 individuals, found in Pohakuao, the left branch of Kalalau Valley, Paaiki Valley, Kuia Valley, Koaie Canyon, Kipalau Valley, and Kawaiiki Valley, all on State-owned land within Kuia Natural Area Reserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Kokia kauaiensis typically grows in diverse mesic forest at elevations between 215 and 1,037 m (707 and 3,402 ft). Associated native plant species include *Acacia koa, Alyxia oliviformis, Antidesma* spp., *Bobea* spp., *Chamaesyce celastroides, Claoxylon sandwicense, Dicranopteris linearis, Diellia pallida, Diospyros hillebrandii, Diospyros sandwicensis, Dodonaea viscosa, Flueggea neowawraea, Hibiscus* spp. (aloalo), *Hedyotis* spp., *Isodendrion laurifolium* (aupaka), *Lipochaeta fauriei* (nehe), *Melicope* spp., *Metrosideros polymorpha, Nestegis sandwicensis, Nototrichium* spp., *Pisonia* spp., *Pleomele aurea, Pouteria sandwicensis, Psydrax odoratum, Pteralyxia kauaiensis, Rauvolfia sandwicensis, Santalum freycinetianum* var. *pyrularium* (iliahi), *Streblus pendulinus* (aiai), *Syzygium sandwicensis, Tetraplasandra* spp., or *Xylosma* spp. (Service 1998a; Bates 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

Competition with and habitat degradation by invasive non-native plant species, substrate loss from erosion, habitat degradation and browsing by feral goats and deer, and seed predation by rats are the major threats affecting the survival of *Kokia kauaiensis* (Wood and Perlman 1993; Service 1998a; HINHP Database 2000).

Labordia lydgatei (kamakahala)

Labordia lydgatei, a member of the logania family (Loganiaceae), is a much-branched perennial shrub or small tree with sparsely hairy, square stems. The small size of the flowers and capsules borne on sessile (attached to the base) inflorescences (a flower cluster) distinguish it from other members of the genus growing in the same area (Wagner *et al.* 1999).

Immature fruits were seen on two plants during surveys in 1991 and 1992 by botanists from NTBG, and remnants of old fruiting bodies were seen on another, suggesting that the plants are able to self-fertilize. It is also suspected that the fruits of this species are adapted for bird dispersal. Due to a lack of bird or other native pollinators, pollination may be inhibited. Micro-habitat requirements for seed germination and growth may also be extremely specific. Virtually nothing is known about the life history or ecology of this species (Service 1994).

This species was originally known from the Wahiawa Drainage, Waioli Stream Valley, and Makaleha Mountains on Kauai. *Labordia lydgatei* is currently known from six populations, consisting of 37 individual plants, located on State (Lihue-Koloa Forest Reserve and Halelea Forest Reserve) and privately owned lands at Pali Eleele, Waioli Valley, Leleiwi, Lumahai Valley, and Kapalaoa (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Labordia lydgatei is found on streambanks in *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest at elevations between 182 and 1,140 m (597 and 3,740 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii* (hame), *Cyanea* spp., *Cyrtandra* spp., *Dubautia knudsenii, Hedyotis terminalis, Ilex anomala, Labordia hirtella* (NCN), *Psychotria* spp., or *Syzygium sandwicensis* (Service 1994; HINHP Database 2000; K. Wood, pers. comm., 2001).

Competition from non-native plants poses the greatest threat to the survival of *Labordia lydgatei* (56 FR 47695). Additional threats include habitat degradation from feral pigs; rats, a potential seed predator; landslides and erosion; and a lack of dispersal, germination or pollination agents (Service 1994).

Labordia tinifolia var. *wahiawaensis* (kamakahala)

Labordia tinifolia var. *wahiawaensis,* a member of the logania family (Loganiaceae), is a shrub or small tree with hairless, cylindrical young branches. This long-lived perennial species differs from others of the genus by having a long common flower cluster stalk, hairless young stems and leaf surfaces, transversely wrinkled capsule valves, and corolla lobes usually 1.7 to 2.3 millimeter (mm) (0.1 to 0.2 in.) long. Three varieties of *Labordia tinifolia* are recognized: var. *lanaiensis* on Lanai and Molokai; var. *tinifolia* on Kauai, Oahu, Molokai, Maui, and Hawaii; and var. *wahiawaensis,* endemic to Kauai. The variety *wahiawaensis* is distinguished from the other two by its larger corolla (Wagner *et al.* 1999).

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

Labordia tinifolia var. *wahiawaensis* has only ever been known from one population with a current total of approximately 100 individual plants on private land in the Wahiawa Drainage in the Wahiawa Mountains (GDSI 2000; HINHP Database 2000).

Labordia tinifolia var. *wahiawaensis* grows along streambanks in lowland wet forests dominated by *Metrosideros polymorpha* at elevations between 458 and 1,006 m (1,502 and 3,301 ft), with *Antidesma platyphyllum, Athyrium microphyllum* (akolea), *Cheirodendron* spp., *Cyrtandra* spp., *Dicranopteris linearis, Hedyotis terminalis,* or *Psychotria* spp. (HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to the remaining individuals of *Labordia tinifolia* var. *wahiawaensis* are competition with non-native plants, habitat degradation by feral pigs, trampling by humans, and a risk of extinction from catastrophic random events or reduced reproductive vigor due to the small number of individuals in a single population (61 FR 53070).

Lipochaeta fauriei (nehe)

Lipochaeta fauriei, a member of the aster family (Asteraceae), is a perennial herb with somewhat woody, erect or climbing stems. This short-lived perennial species differs from other species on Kauai by having a greater number of disk and ray flowers per flower head, longer ray flowers, and longer leaves and leaf stalks (Gardner 1976, 1979; Service 1995; Wagner *et al.* 1985, 1990).

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

Historically and currently, *Lipochaeta fauriei* is known from Olokele Canyon on Kauai. This species is now found on State-owned land in Poopooiki Valley, Kuia Valley, Haeleele Valley, and Kawaiiki Valley with the Kuia Natural Area Reserve, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest

Reserve. Currently there is a total of four populations with 183 individuals. A population in Koaie Canyon previously thought to be *L. fauriei* was later identified as *L. subcordata* (Service 1995; Gardner 1979; K. Wood, *in litt.* 1999; GDSI 2000; HINHP Database 2000).

This species grows most often in moderate shade to full sun and is usually found on the sides of steep gulches in diverse lowland mesic forests at elevations between 436 and 947 m (1,432 and 3,108 ft). Associated native plant species include *Acacia koa, Carex meyenii, Carex wahuensis, Dicranopteris linearis, Diospyros* spp., *Dodonaea viscosa, Euphorbia haeleeleana, Hibiscus waimeae, Kokia kauaiensis, Myrsine lanaiensis, Nestegis sandwicensis, Pleomele aurea, Psychotria greenwelliae, Psychotria mariniana,* or *Sapindus oahuensis* (lonomea) (HINHP Database 2000; K. Wood, pers. comm., 2001).

Major threats to *Lipochaeta fauriei* are predation and habitat degradation by feral goats and pigs and competition with invasive non-native plants. Fire is also a significant threat to *L. fauriei* due to the invasion of *Melinis minutiflora,* a fire-adapted grass that creates unnaturally high fuel loads. The small total number of individuals makes the species susceptible to extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor (59 FR 9304; Service 1995; HINHP Database 2000).

Lipochaeta micrantha (nehe)

Lipochaeta micrantha, a member of the aster family (Asteraceae), is a somewhat woody short-lived perennial herb. The small number of disk florets (one of the small flowers forming the head of a composite plant) separates this species from the other members of the genus on the island of Kauai. The two recognized varieties of this species, var. *exigua* and var. *micrantha,* are distinguished by differences in leaf length and width, degree of leaf dissection, and the length of the ray florets (Gardner 1976, 1979; Wagner *et al.* 1990).

Little is known about the life histories of *Lipochaeta micrantha* var. *exigua* or *L. m.* var. *micrantha.* Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Lipochaeta micrantha* var. *exigua* was only known from the Haupu Range on Kauai. Currently, two populations of *L. micrantha* var. *exigua,* with a total of 110 individuals, are known from privately owned land in the vicinity of Haupu Range and southwest of Hokunui summit. Historically, *L. micrantha* var. *micrantha* was known from Olokele Canyon, Hanapepe Valley, and the Koloa District on Kauai. Currently, this variety is only known from three populations totaling 121 individuals on State land within the Na Pali-Kona Forest Reserve in Koaie Canyon and Kawaiiki Valley (HINHP Database 2000; GDSI 2000).

Lipochaeta micrantha grows on cliffs, ridges, stream banks, or slopes in mesic to wet mixed communities at elevations between 35 and 1,362 m (115 and 4,468 ft). Associated species include *Acacia koa, Artemisia australis, Antidesma* spp., *Bidens sandvicensis, Bobea* spp., *Chamaesyce celastroides* var. *hanapepensis, Diospyros* spp., *Dodonaea viscosa, Eragrostis grandis, Eragrostis variabilis, Hibiscus kokio* (kokio), *Lepidium bidentatum* (anaunau), *Lobelia niihauensis, Melicope* spp., *Metrosideros polymorpha, Neraudia kauaiensis, Nototrichium* spp. *Plectranthus parviflorus* (ala ala wai nui), *Pleomele aurea, Psydrax odoratum, Pipturus* spp., *Rumex albescens* (huahuako), *Sida fallax* (ilima), or *Xylosma hawaiiense* (maua) (Service 1995; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to both varieties of *Lipochaeta micrantha* are habitat degradation by feral pigs and goats; and competition with non-native plant species, such as *Lantana camara, Pluchea carolinensis, Erigeron karvinskianus,* or *Stachytarpheta dichotoma.* The species is also threatened by extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of existing populations (Lorence and Flynn 1991; Service 1995; HINHP Database 2000).

Lipochaeta waimeaensis (nehe)

Lipochaeta waimeaensis, a member of the aster family (Asteraceae), is a low growing, somewhat woody, short-lived perennial herb. This species is distinguished from other *Lipochaeta* on Kauai by leaf shape and the presence of shorter leaf stalks and ray florets (Gardner 1976, 1979; Wagner *et al.* 1990).

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

Lipochaeta waimeaensis has been known only from the original site of discovery along the rim of Kauai's Waimea Canyon on State-owned land. There are no more than 100 individuals (HINHP Database 2000; GDSI 2000).

This species grows on eroded soil on a precipitous, shrub-covered gulch in a diverse lowland forest at elevations between 44 and 460 m (145 and 1,509 ft) with *Artemisia australis, Chamaesyce celastroides, Dodonaea viscosa, Lipochaeta connata, Santalum ellipticum* (iliahialoe), *Schiedea spergulina,* or *Panicum* spp. (NCN) (Wagner *et al.* 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Lipochaeta waimeaensis* are competition from non-native plants and habitat destruction by feral goats, whose presence exacerbates the existing soil erosion problem at the site. The single population, and thus the entire species, is threatened by extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of existing individuals (59 FR 9304).

Melicope haupuensis (alani)

Melicope haupuensis, a member of the rue family (Rutaceae), is a small long-lived perennial tree. Unlike other species of this genus on Kauai, the exocarp (outermost layer of a fruit) and endocarp (innermost layer of a fruit) are hairless and the sepals are covered with dense hairs (Stone *et al.* 1999).

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

For 62 years, *Melicope haupuensis* was known only from the site of its original discovery on the north side of Haupu Ridge on Kauai. This population is now gone. The species is now known from four populations with a total of five individuals on State-owned land within the Alakai Wilderness Preserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve in Kalahu, Awaawapuhi Valley, and Koaie Canyon (K. Wood, *in litt.* 1999; GDSI 2000; HINHP Database 2000).

Melicope haupuensis grows on moist talus slopes in *Metrosideros polymorpha* dominated lowland mesic forests or *Metrosideros polymorpha-Acacia koa* montane mesic forest at elevations between 111 and 1,141 m (364 and 3,745 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii, Bobea brevipes, Cheirodendron trigynum, Claoxylon sandwicensis, Cryptocarya mannii* (holio), *Dianella sandwicensis,*

Diospyros hillebrandii, Diospyros sandwicensis, Dodonaea viscosa, Elaeocarpus bifidus, Hedyotis terminalis, Melicope anisata, M. barbigera (alani), *M. ovata* (alani), *Pleomele aurea, Pouteria sandwicensis, Pritchardia minor* (loulu), *Psychotria mariniana, P. greenwelliae, Tetraplasandra waimeae* (oheohe), or *Zanthoxylum dipetalum* (HINHP Database 2000; K. Wood, pers. comm., 2001).

Habitat degradation by feral goats and competition with invasive non-native plant species are the major threats to *Melicope haupuensis*. In addition, this species may be susceptible to the black twig borer (*Xylosandrus compactus*). The existence of only five known trees constitutes an extreme threat of extinction from naturally occurring events, such as landslides or hurricanes, or reduced reproductive vigor (59 FR 9304; Hara and Beardsley 1979; Medeiros *et al*. 1986; HINHP Database 2000).

Melicope quadrangularis (alani)

Melicope quadrangularis, a member of the rue family (Rutaceae), is a shrub or small tree. Young branches are generally covered with fine yellow fuzz but become hairless with age. The thin, leathery, elliptical leaves, are oppositely arranged. The upper leaf surface is hairless, and the lower surface is sparsely hairy, especially along the veins. Flowers are solitary or in clusters of two. The specific floral details are not known. The fruits are somewhat cube-shaped, flattened capsules, with a conspicuous central depression at the top of the fruit. The capsules are four-lobed and completely fused. The exocarp is sparsely hairy, and the endocarp is hairless. This species differs from others in the genus in having the following combination of characters: oppositely arranged leaves, only one or two flowers per cluster, cube-shaped capsules with fused lobes, and a deep central depression at the top of the fruit (Stone *et al*. 1999).

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

Melicope quadrangularis is known from the type locality in the Wahiawa Bog region of Kauai. One adult plant and two seedlings were discovered in 1991 by Ken Wood of NTBG on an east-facing slope of Wahiawa Ridge at 853 m (2,800 ft) on privately owned land. Subsequent exploration has resulted in the location of a total of 13 individuals of this species. Although a survey after hurricane Iniki in 1992 did not relocate any individuals, it is hoped that there is a seed bank or that undiscovered individuals remain to be found (Stone *et al*. 1999).

Melicope quadrangularis grows in *Metrosideros polymorpha* diverse lowland wet forest that ranges from mesic to wet conditions at elevations between 608 and 1,593 m (1,995 and 5,228 ft). Associated native plant species include *Antidesma platyphyllum, Broussaisia arguta, Cheirodendron fauriei* (olapa), *Cibotium nealiae* (hapuu), *Cyrtandra pickeringii* (haiwale), *Dicronopteris lineraris, Machaerina angustifolia, Machaerina mariscoides* (uki), other *Melicope* spp., *Metrosideros waialealae* (NCN), *Psychotria hexandra, P. mariniana, P. wawraea* (kipiko), *Sadleria pallida, Scaevola gaudichaudiana* (naupaka kuahiwi), *Syzygium sandwicensis*, or abundant ferns and mosses (K. Wood, pers. comm., 2001).

This species is threatened by over-collecting for scientific purposes, stochastic extinction, and/or reduced reproductive vigor, non-native plants and habitat disturbance by feral pigs (Service 1994).

Munroidendron racemosum (NCN)

Munroidendron racemosum, a member of the ginseng family (Araliaceae), is a small tree with a straight gray trunk crowned with spreading branches. This long-lived perennial species is the only member of a genus endemic to Hawaii. The genus is distinguished from other closely related Hawaiian genera of the family by its distinct flower clusters and corolla (Constance and Affolter 1999).

Reproduction occurs year-round, with flowers and fruits found throughout the year. Self pollination is assumed to occur since viable seeds have been produced by isolated individuals. Pollinators have not been observed, but insect pollination is likely. Dispersal mechanisms are unknown (Service 1995).

Historically, *Munroidendron racemosum* was known from scattered locations throughout the island of Kauai. Populations are now known from Waiahuakua, Pohakuao, the left branch of Kalalau Valley, the right branch of Kalalau Valley, Nakeikionaiwi Valley, Awaawapuhi Valley Spring, Honopu Valley, Nualolo Valley, Poomau Valley, Kawaiiki Valley, Koaie Canyon, Nonou, Haupu, and Keopaweo. There are currently 14 known populations with approximately 101 individuals on State (Hono o Na Pali Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, Nonou Forest Reserve, and Puu Ka Pele Forest Reserve) and privately owned lands (HINHP Database 2000; GDSI 2000).

Munroidendron racemosum is typically found on steep exposed cliffs or on ridge slopes in coastal to lowland mesic forests at elevations between 6 and 979 m (19 and 3,213 ft). Associated plant species include B*obea brevipes, Brighamia insignis* (olulu), *Canavalia napaliensis* (awikiwiki), *Diospyros sandwicensis, Diospyros hillebrandii, Nestegis sandwicensis, Pisonia sandwicensis* (papala kepau), *Pisonia umbellifera* (papala kepau), *Pleomele aurea, Pouteria sandwicensis Psychotria* spp., *Psydrax odoratum, Rauvolfia sandwicensis, Schiedea* spp. (NCN), *Sida fallax*, or *Tetraplasandra* spp. (59 FR 9304; Gagne and Cuddihy 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The threats to *Munroidendron racemosum* are competition with non-native plant species, such as *Aleurites moluccana, Psidium guajava, Lantana camara*, or *Leucaena leucocephala* (koa haole); habitat degradation by feral goats, fire, and fruit predation by rats; introduced insect of the long-horned beetle family (Cerambycidae); extinction from naturally occurring events, such as landslides or hurricanes, and reduced reproductive vigor (59 FR 9304; Service 1995; HINHP Database 2000).

Myrsine linearifolia (kolea)

Myrsine linearifolia, a member of the myrsine family (Myrsinaceae), is a branched shrub. This long-lived perennial species is distinguished from others of the genus by the shape, length, and width of the leaves, length of the petals, and number of flowers per cluster (Wagner *et al*. 1999).

Little is known about the life history of *Myrsine linearifolia*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Historically, *Myrsine linearifolia* was found at scattered locations on Kauai: Olokele Valley, Kalualea, Kalalau Valley, Kahuamaa Flat, Limahuli-Hanakapiai Ridge, Koaie Stream, Pohakuao, Namolokama Summit Plateau, and Haupu. There are currently eight populations with approximately 522 individuals on State (Alakai Wilderness Preserve and Na Pali Coast State Park) and privately owned lands. The populations are found in Limahuli Valley, Alealau, the left branch of Kalalau Valley, Puu O Kila, Koaie Canyon, Na Molokama, and Kapalaoa

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

Myrsine linearifolia typically grows at elevations between 105 and 1,380 m (346 and 4,526 ft), in diverse mesic or wet lowland or montane *Metrosideros polymorpha* forest, with *Cheirodendron* spp., or *Dicranopteris linearis* as co-dominant species. Plants growing in association with this species include *Bobea brevipes, Cryptocarya mannii, Dubautia* spp., *Eurya sandwicensis* (anini), *Freycinetia arborea, Hedyotis terminalis, Lysimachia glutinosa, Machaerina angustifolia, Melicope* spp., *Myrsine* spp., *Nothocestrum* spp. (aiea), *Psychotria* spp., *Sadleria pallida, Syzygium sandwicensis*, or native ferns (61 FR 53070; HINHP Database 2000; K. Wood, pers. comm., 2001).

Competition with non-native plants, such as *Erigeron karvinskianus, Lantana camara, Rubus argutus, Psidium cattleianum, Rubus rosifolius*, and *Kalanchoe pinnata* (air plant), and habitat degradation by feral pigs and goats are the major threats to *Myrsine linearifolia* (61 FR 53070).

Nothocestrum peltatum (aiea)

Nothocestrum peltatum, a member of the nightshade family (Solanaceae), is a small tree with ash-brown bark and woolly stems. The usually peltate leaves and shorter leaf stalks separate this species from others in the genus (Symon 1999).

Although plants of this long-lived perennial species have been observed flowering, they rarely set fruit. This could be the result of a loss of pollinators, reduced genetic variability, or an inability to fertilize itself. Little else is known about the life history of *Nothocestrum peltatum*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (59 FR 9304).

Historically, *Nothocestrum peltatum* was known from Kauai at Kumuwela, Kaholuamanu, and the region of Nualolo. This species is now known from a total of six populations with 19 individuals, located at Kahuamaa Flats, Awaawapuhi Trail, Awaawapuhi Valley, Kawaiula Valley, and Makaha Valley all on State-owned land within the Kokee State Park, Kuia Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and the Puu Ka Pele Forest Reserve (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

This species generally grows in rich soil on steep slopes in mesic or wet forest dominated by *Acacia koa* or a mixture of *Acacia koa* and *Metrosideros polymorpha*, at elevations between 725 and 1,290 m (2,378 and 4,232 ft). Associated native plants include *Alphitonia ponderosa, Antidesma* spp., *Bobea brevipes, Broussaisia arguta, Cheirodendron trigynum, Claoxylon sandwicensis, Coprosma* spp., *Cryptocarya mannii, Dianella sandwicensis, Dicranopteris linearis, Diplazium sandwichianum, Dodonaea viscosa, Elaeocarpus bifidus, Hedyotis terminalis, Ilex anomala, Melicope anisata, M. barbigera, M. haupuensis, Perrottetia sandwicensis, Pleomele aurea, Pouteria sandwicensis, Psychotria mariniana, P. greenwelliae, Tetraplasandra kauaiensis*, or *Xylosma* spp. (HINHP Database 2000; K. Wood, pers. comm., 2001).

Competition with non-native plants (such as *Passiflora mollissima, Lantana camara, Rubus argutus*, or *Erigeron karvinskianus*), and habitat degradation by feral pigs, deer, and red jungle fowl (*Gallus gallus*) constitute the major threats to *Nothocestrum peltatum*. This species is also threatened by fire, risk of extinction from naturally occurring events (*e.g.*, landslides or hurricanes), and reduced reproductive vigor due to the small number of existing individuals (59 FR 9304; HINHP Database 2000).

Panicum niihauense (lau ehu)

Panicum niihauense, a member of the grass family (Poaceae), is a perennial bunchgrass with unbranched culms (aerial stems). This short-lived perennial species is distinguished from others in the genus by the shape of the inflorescence branches, which are erect, and the arrangement of the spikelets, which are densely clustered (Davidse 1999).

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

Panicum niihauense was known historically from Niihau and one location on Kauai. Currently, this species is only known from one population of 23 individuals at the Polihale State Park area on State-owned land (HINHP Database 2000; GDSI 2000).

Panicum niihauense is found scattered in sand dunes in coastal shrubland at elevations between 0 and 103 m (0 and 337 ft) . Associated native plant species include *Cassytha filiformis* (kaunaoa pehu), *Chamaesyce celastroides, Dodonaea viscosa, Nama sandwicensis* (nama), *Ophioglossum pendulum* ssp. *falcatum* (NCN), *Scaevola sericea* (naupaka kahakai), *Sida fallax, Vitex rotundifolia* (kolokolo kahakai), or *Sporobolus virginicus* (akiaki) (HINHP Database 2000; K. Wood, pers. comm., 2001).

Primary threats to *Panicum niihauense* are destruction by off-road vehicles, competition with non-native plant species, and a risk of extinction from naturally occurring events (*e.g.*, landslides or hurricanes) and reduced reproductive vigor due to the small number of individuals in the one remaining population (61 FR 53108; HINHP Database 2000).

Phyllostegia knudsenii (NCN)

Phyllostegia knudsenii, a member of the nonaromatic mint family (Lamiaceae), is an erect herb or vine. This short-lived perennial species is distinguished from others in the genus by its specialized flower stalk; it differs from the closely related *P. floribunda* by often having four flowers per group (Wagner *et al.* 1999).

Little is known about the life history of *Phyllostegia knudsenii*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Until 1993, *Phyllostegia knudsenii* was only known from the site of its original discovery made in the 1800s from the woods of Waimea on Kauai. There is currently one known population with a total of 17 individuals on State-owned land in Koaie Canyon within the Alakai Wilderness Preserve (K. Wood, *in litt.* 1999; Wagner *et al.* 1999; HINHP Database 2000; GDSI 2000).

Phyllostegia knudsenii is found in *Metrosideros polymorpha* lowland mesic or wet forest at elevations between 399 and 1,059 m (1,309 and 3,475 ft). Associated native plant species include *Bobea timonioides* (ahakea), *Claoxylon sandwicensis, Cryptocarya mannii, Cyrtandra kauaiensis, Cyrtandra paludosa* (hai wale), *Diospyros sandwicensis, Elaeocarpus bifidus, Ilex anomala, Myrsine linearifolia, Perrottetia sandwicensis, Pittosporum kauaiense* (hoawa), *Pouteria sandwicensis, Pritchardia minor, Selaginella arbuscula* (lepelepeamoa), *Tetraplasandra oahuensis* (ohe ohe), or *Zanthoxylum dipetalum* (61 FR 53070; K. Wood, pers. comm., 2001).

Major threats to *Phyllostegia knudsenii* include habitat degradation by feral pigs and goats, competition with non-native plants, and a risk of extinction from naturally occurring events (*e.g.*, landslides and hurricanes) and reduced reproductive vigor due to the small number of individuals in the

only known population (61 FR 53070; Service 1998a).

Phyllostegia waimeae (NCN)

Phyllostegia waimeae, a nonaromatic member of the mint family (Lamiaceae), is a climbing perennial plant with hairy four-angled stems that are woody at the base. The oval leaves are 5 to 13 cm (2 to 5 in.) long, 2.5 to 6 cm (1 to 2.4 in.) wide, and have rounded, toothed margins. They are wrinkled and sparsely dotted with oil glands. Flowers grow in groups of six along an unbranched leafy stalk usually 10 to 15 cm (3.9 to 5.9 in.) long. The bracts below each flower stalk are broad and partially overlap the flowers. The calyx resembles an inverted cone with broad lobes. The corolla, 8 to 12 mm (0.3 to 0.5 in.) long, is pinkish or may be white. The fruits, probably nutlets, have not been observed. Characteristics that distinguish this species from others in the genus are the nearly stalkless bracts that partially overlap and cover the flowers, and relatively fewer oil glands on the leaves (Wagner *et al.* 1999).

Little is known about the life history of *Phyllostegia waimeae*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown Service 1995).

Historically, *Phyllostegia waimeae* was known from Kaholuamanu and Kaaha on Kauai. Currently, one population with six individuals persists from State land in Kawaiiki Valley within the Na Pali-Kona Forest Reserve (K. Wood, *in litt.* 2001).

This species typically grows in *Acacia koa-Metrosideros polymorpha* dominated wet or mixed mesic forest with *Cheirodendron* spp. or *Dicranopteris linearis* as co-dominants at elevations between 655 and 1,224 m (2,149 and 4,016 ft). Associated native plant species include *Broussaisia arguta, Claoxylon sandwicense, Diplazium sandwichianum, Dubautia knudsenii, Elaphoglossum* spp., *Gunnera* spp., *Hedyotis* spp., *Myrsine lanaiensis, Pleomele aurea, Psychotria* spp., *Sadleria* spp., *Scaevola procera* (naupaka kuahiwi), *Syzygium sandwicensis*, or *Vaccinium* spp. (K. Wood, pers. comm., 2001).

Habitat destruction by feral goats, erosion, and competition with introduced grasses are the major threats to *Phyllostegia waimeae*. The species is also threatened by over-collecting for scientific purposes, stochastic extinction, and/or reduced reproductive vigor due to the small number of existing individuals (Service 1995).

Phyllostegia wawrana (NCN)

Phyllostegia wawrana, a nonaromatic member of the mint family (Lamiaceae), is a perennial vine that is woody toward the base and has long, crinkly hairs along the stem. This short-lived perennial species can be distinguished from the related *P. floribunda* and *P. knudsenii,* by its less specialized flower stalk (Wagner *et al.* 1999).

Seeds were observed in the wild in August 1993. No additional life history information for this species is currently known (Service 1998a).

Phyllostegia wawrana was reported to be found at Hanalei on Kauai in the 1800s and along Kokee Stream in 1926. Currently, populations are reported from Koaie Canyon, Moaalele, Awaawapuhi Valley, and Makaleha. A total of four populations with approximately 49 individuals are found on State-owned land within the Alakai Wilderness Preserve, Hono o Na Pali Natural Area Reserve, and Kokee State Park (HINHP Database 2000; GDSI 2000).

This species grows at elevations between 398 and 1,284 m (1,306 and 4,212 ft) in *Acacia koa-Metrosideros polymorpha-Cheirodendron* mixed mesic forest. Associated native plant species include *Alectryon* spp., *Asplenium polypodon* (NCN), *Athyrium microphyllum, Carex* spp., *Claoxylon sandwicense, Cyanea fissa* (haha), *Delissea rivularis, Dianella sandwicensis, Diplazium sandwichianum, Dodonaea viscosa, Doodia kunthiana, Dryopteris wallichiana, Dubautia knudsenii, Dubautia laevigata, Hedyotis tryblium, Machaerina angustifolia, Panicum nephelophilum, Peperomia macraeana, Perrottetia sandwicensis, Poa sandvicensis, Pleomele aurea, Pteridium aquilinum* var. *decompositum, Sadleria pallida, Schiedea stellarioides, Scaevola procera, Syzygium sandwicensis, Touchardia latifolia, or Vaccinium dentatum* (61 FR 53070; HINHP Database 2000; K. Wood, pers. comm., 2001).

Major threats to *Phyllostegia wawrana* include habitat degradation by feral pigs and competition with non-native plant species, such as *Rubus rosifolius, Passiflora mollissima, Rubus argutus, Melastoma candidum, Erigeron karvinskianus,* and *Erechtites valerianefolia* (61 FR 53070; Service 1998a).

Poa mannii (Mann's bluegrass)

Poa mannii, a member of the grass family (Poaceae), is a perennial grass with short rhizomes (underground stems) and erect, tufted culms. All three native species of *Poa* in the Hawaiian Islands are endemic to the island of Kauai. *Poa mannii* is distinguished from both *P. siphonoglossa* and *P. sandvicensis* by its fringed ligule (an appendage on the sheath of a blade of grass) and from *P. sandvicensis* by its shorter panicle (a pyramidal loosely-branched flower cluster) branches (O'Connor 1999).

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

Historically, this species was found in Olokele Gulch on Kauai. Currently, there is a total of six populations with approximately 268 individuals on State-owned land in the right and left branches of Kalalau Valley, Awaawapuhi Valley, Kuia Valley, and Kauhao Valley within the Kuia Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Waimea Canyon State Park (K. Wood, *in litt.* 1999; O'Connor 1999; HINHP Database 2000; GDSI 2000).

This species typically grows on cliffs or rock faces in lowland or montane mesic *Metrosideros polymorpha* or *Acacia koa-Metrosideros polymorpha* forest at elevations between 327 and 1,222 m (1,072 and 4,009 ft). Associated native plant species include *Antidesma platyphyllum, Artemisia australis, Bidens cosmoides, Bidens sandvicensis, Carex meyenii, C. wahuensis, Chamaesyce celastroides* var. *hanapepensis, Dodonaea viscosa, Diospyros sandwicensis, Eragrostis variabilis, Hedyotis terminalis, Lobelia niihauensis, Lobelia yuccoides* (NCN), *Luzula hawaiiensis* (woodrush), *Mariscus phloides* (NCN), *Melicope anisata, M. barbigera, M. pallida, Nototrichium* spp., *Panicum lineale, Pleomele aurea, Pouteria sandwicensis, Psychotria mariniana, P. greenwelliae, Schiedea lydgatei* var. *attenuata, Schiedea membranacea,* or *Wilkesia gymnoxiphium* (59 FR 56330; HINHP Database 2000; K. Wood, pers. comm., 2001).

Poa mannii survives only in very steep areas that are inaccessible to goats, suggesting that goat herbivory may have eliminated this species from more accessible locations, as is the case for other rare plants from northwestern Kauai. Threats to *P. mannii* include habitat damage, trampling, and browsing by feral goats, and competition with invasive non-native plants. *Erigeron karvinskianus* has invaded Kalalau, Koaie, and Waialae Valleys, three of the areas where *P. mannii*

occurs. *Lantana camara* threatens all known populations, and *Rubus argutus* threatens the populations in Kalalau and Waialae Valleys. *Poa mannii* is also threatened by fire and reduced reproductive vigor and/or extinction from naturally occurring events, such as landslides or hurricanes, due to the small number of existing populations and individuals (59 FR 56330).

Poa sandvicensis (Hawaiian bluegrass)

Poa sandvicensis is a perennial grass (Poaceae) with densely tufted, mostly erect culms. *Poa sandvicensis* is distinguished from closely related species by its shorter rhizomes (horizontal subterranean plant stem), shorter culms (grass stalk) which do not become rush-like with age, closed and fused sheaths, relatively even-edged ligules, and longer panicle branches (O'Connor 1999).

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

Historically, this species was known from six areas on the island of Kauai: the rim of Kalalau Valley in Na Pali Coast State Park, Halemanu Ridge, Kumuwela Ridgs, and Kauaikanana Drainage in Kokee State Park; Awaawapuhi Trail in Na Pali-Kona Forest Reserve; Kohua Ridge/Mohihi drainage in both the Forest Reserve and Alakai Wilderness Preserve; and Kaholuamanu. Hillebrand's (1888) reference to a Maui locality is most likely an error. Currently, there is a total of nine populations with 1,740 individuals occurring on State-owned land. *Poa sandvicensis* is known to be extant at Alealau, Keanapuka, Awaawapuhi Trail, Kumuwela Ridge, Maile Flat Trail, Mohihi Stream, Mohihi Waialae Trail, Kawaiiki Valley, and Waialae Valley in the Alakai Wilderness Preserve, Hono o Na Pali Natural Area Reserve, Kokee State Park, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve (57 FR 20580; HINHP Database 2000; GDSI 2000; K. Wood, *in litt.* 1999).

Poa sandvicensis grows on wet, shaded, gentle to steep slopes, ridges, and rock ledges of stream banks in semi-open to closed, wet, diverse *Acacia koa -Metrosideros polymorpha* montane forest, at elevations between 498 and 1,290 m (1,635 and 4,232 ft). Associated native plant species include *Alyxia oliviformis, Bidens sandvicensis, Cheirodendron* spp., *Claoxylon sandwicense, Coprosma* spp., *Dianella sandwicensis, Dicranopteris linearis, Dodonaea viscosa, Dubautia* spp., *Hedyotis* spp., *Melicope* spp., *Peperomia* spp., *Psychotria* spp., *Scaevola procera, Schiedea stellarioides,* or *Syzygium sandwicensis* (57 FR 20580; HINHP Database 2000; K. Wood, pers. comm., 2001).

The greatest immediate threats to the survival of *Poa sandvicensis* are competition from non-native plants, such as *Erigeron karvinskianus, Rubus argutus, Passiflora mollissima,* or *Hedychium* spp.; erosion caused by feral pigs and goats; and State forest reserve trail maintenance activities and human recreation. In addition, naturally occurring events could constitute an threat of extinction or reduced reproductive vigor due to the species' small population size (57 FR 20580; Service 1995).

Poa siphonoglossa (NCN)

Poa siphonoglossa is a perennial grass (Poaceae). It differs from *P. sandvicensis* principally by its longer culms, lack of a prominent tooth on the ligule, and shorter panicle branches. *Poa siphonoglossa* has extensive tufted and flattened culms that cascade from banks in masses. Short rhizomes, long culms, closed and fused sheaths, and lack of a tooth on the ligule separate *P. siphonoglossa* from *P. mannii* and other closely related species (O'Connor 1999).

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

Historically, *Poa siphonoglossa* was known from five sites on the island of Kauai: Kohua Ridge in Na Pali-Kona Forest Reserve; near Kaholuamanu; Kaulaula Valley in Puu Ka Pele Forest Reserve; Kuia Valley; and Kalalau. Currently, there are a total of five populations with a total of 50 individuals on State-owned land at Kahuamaa Flats, Mohihi Waialai Trail, Kuia Valley, Makaha Ridge, and Kaulaula Valley in the Alakai Wilderness Preserve, Kuia Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Poa siphonoglossa typically grows on shady banks on steep slopes in mesic *Metrosideros polymorpha-Acacia koa* forests at elevations between about 498 and 1,290 m (1,635 and 4,232 ft). Associated native plant species include *Acacia koa, Alphitonia ponderosa, Alyxia oliviformis, Bobea brevipes, Carex meyenii, Carex wahuensis, Coprosma waimeae, Dianella sandwicensis, Dodonaea viscosa, Dubautia spp, Hedyotis* spp., *Lobelia yuccoides, Melicope* spp., *Microlepia strigosa, Myrsine* spp, *Panicum nephelophilum, Poa sandvicensis, Psychotria* spp., *Scaevola procera, Styphelia tameiameiae, Tetraplasandra kauaiensis, Vaccinium* spp., *Wilkesia gymnoxiphium, Xylosma* spp, *Zanthoxylum dipetalum* (57 FR 20580, K. Wood, pers. comm., 2001).

The primary threat to the survival of *Poa siphonoglossa* is habitat degradation and/or herbivory by feral pigs and deer. The non-native plant *Rubus argutus* invading Kohua Ridge constitutes a probable threat to that population. Small population size and potential for one disturbance event to destroy the majority of known individuals are also serious threats to this species (57 FR 20580; Service 1995; HINHP Database 2000).

Pritchardia aylmer-robinsonii (wahane)

Pritchardia aylmer-robinsonii, a member of the palm family (Arecaceae) is a fan-leaved tree about 7 to 15 m (23 to 50 ft) tall. This species is distinguished from others of the genus by the thin leaf texture and drooping leaf segments, tan woolly hairs on the underside of the petiole and the leaf blade base, stout hairless flower clusters that do not extend beyond the fan-shaped leaves, and the smaller spherical fruit (Read and Hodel 1999).

Little is known about the life history of *Pritchardia aylmer-robinsonii*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (61 FR 41020).

Historically, *Pritchardia aylmer-robinsonii* was found at three sites in the eastern and central portions of the island of Niihau. Trees were found on Kaali Cliff and in Mokouia and Haao Valleys at elevations between 70 and 270 m (230 and 885 ft) on privately owned land. The most recent observations indicate that two plants still remain on Kaali Cliff (Read and Hodel 1999; HINHP Database 2000; GDSI 2000).

Pritchardia aylmer-robinsonii typically grows on rocky talus in seepage areas within coastal dry forest at elevations between 91 to 259 m (300 to 850 ft). Associated native plant species include *Brighamia insignis, Cyperus trachysanthos, Lobelia niihauensis* or *Lipochaeta lobata* var. *lobata* (nehe). Originally a component of the coastal dry forest, this species now occurs only in a rugged and steep area where it receives some protection from

grazing ungulates (61 FR 41020; HINHP Database 2000).

The species is threatened by habitat degradation and/or herbivory by cattle, feral pigs, and feral goats and seed predation by rats. Small population size, limited distribution, and reduced reproductive vigor makes this species particularly vulnerable to extinction (61 FR 41020).

Pritchardia napaliensis (loulu)

Pritchardia napaliensis, a member of the palm family (Arecaceae), is a small tree with about 20 leaves and an open crown. This species is distinguished from others of the genus that grow on Kauai by having about 20 flat leaves with pale scales on the lower surface that fall off with age, inflorescences with hairless main axes, and globose (having or consisting of globules) fruits less than 3 cm (1.2 in.) long (Read and Hodel 1999).

Little is known about the life history of *Pritchardia napaliensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

Pritchardia napaliensis has only been known from three populations with 155 individuals on State-owned land in Pohakuao, Alealau, Waiahuakua; and Hoolulu Valley within the Hono o Na Pali Natural Area Reserve and Na Pali Coast State Park (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Pritchardia napaliensis typically grows in areas between elevations of 152 and 1,158 m (500 and 3,800 ft) in a wide variety of habitats ranging from lowland dry to diverse mesic forests dominated by *Diospyros* spp. or montane wet forests dominated by *Metrosideros polymorpha* and *Dicranopteris linearis*. Several associated native plant species besides those mentioned above include *Alsinidendron lychnoides, Alyxia oliviformis, Boehmeria grandis, Cheirodendron trigynum, Cibotium* spp., *Dubautia knudsenii, Elaeocarpus bifidus, Hibiscus kokio* ssp. *saintjohnianus (kokio), Lipochaeta connata* var. *acris* (nehe), *Melicope peduncularis* (alani), *Nesoluma polynesicum* (keahi), *Ochrosia kauaiensis* (holei), *Rauvolfia sandwicensis, Stenogyne purpurea* (NCN), *Syzygium sandwicensis, Phyllostegia electra* (NCN), *Pleomele* spp., *Poa sandvicensis, Pouteria sandwicensis, Psychotria* spp., *Psydrax odoratum, Pteralyxia kauaiensis, Santalum freycinetianum* var. *pyrularium, Vaccinium dentatum, Xylosma hawaiiense,* or *Wilkesia gymnoxiphium* (Service 1998a; 61 FR 53070; HINHP Database 2000).

Major threats to *Pritchardia napaliensis* include habitat degradation and grazing by feral goats and pigs; seed predation by rats; and competition with the non-native plants, such as *Kalanchoe pinnata, Erigeron karvinskianus, Lantana camara, Psidium guajava*, or possibly *Cordyline fruticosa*. The species is also threatened by vandalism and over-collection. In 1993, near the Wailua River, the Hawaii Department of Forestry and Wildlife (DOFAW) constructed a fenced enclosure around 39 recently planted *P. napaliensis* individuals. Shortly after being planted, the fence was vandalized and the 39 plants were removed. Also, because of the small number of remaining populations and individuals, this species is susceptible to a risk of extinction from naturally occurring events, such as landslides or hurricanes, and from reduced reproductive vigor (61 FR 53070; Craig Koga, DOFAW, *in litt.* 1999; A. Kyono, pers. comm., 2000).

Pritchardia viscosa (loulu)

Pritchardia viscosa, a member of the palm family (Arecaceae), is a small tree 3 to 8 m (10 to 26 ft) tall. This species differs from others of the genus that grow on Kauai by the degree of hairiness of the lower surface of the leaves and main axis of the flower cluster, and length of the flower cluster (Read and Hodel 1999).

Historically, *Pritchardia viscosa* was known only from a 1920 collection from Kalihiwai Valley. It was not seen again until 1987, when Robert Read observed it in the same general area as the type locality, off the Powerline Road at 512 m (1,680 ft) elevation (HINHP Database 2000). Currently, there is one population with three individuals on State-owned land within the Halelea Forest Reserve (61 FR 53070; HINHP Database 2000; GDSI 2000).

This species is found in *Metrosideros polymorpha -Dicranopteris linearis* lowland wet forest at elevations between 488 to 518 m (1,600 to 1,700 ft). Associated native species include *Antidesma* spp., *Bobea* spp., *Cibotium* spp., *Cyanea fissa, Cyrtandra kauaiensis, Cyrtandra longiflora, Dubautia knudsenii, Nothocestrum* spp., *Perrottetia sandwicensis, Psychotria* spp., *Sadleria pallida,* or *Syzygium sandwicensis* (Service 1998a; 61 FR 53070).

Pritchardia viscosa is threatened by *Psidium cattleianum* and non-native grasses, such as *Paspalum conjugatum;* and seed predation by rats. At least one of the remaining mature trees has been damaged by spiked boots used either by a botanist or seed collector to scale the tree. In mid-1996, a young plant and seeds from mature *Pritchardia viscosa* plants were removed from the only known location of this species. Because of this past activity, it is reasonable to assume that these plants are threatened by over-collection and vandalism. Also, because of the small numbers of individuals in the only known population, this species is susceptible to extinction since a single naturally occurring event (*e.g.*, a hurricane) could destroy all remaining plants (61 FR 53070; C. Koga, *in litt.* 1999; A. Kyono, pers. comm., 2000).

Pteralyxia kauaiensis (kaulu)

Pteralyxia kauaiensis, a member of the dogbane family (Apocynaceae), is a long-lived perennial tree 3 to 8 m (10 to 26 ft) tall. The leaves are dark green and shiny on the upper surfaces, but pale and dull on the lower surfaces. This species differs from the only other species of this endemic Hawaiian genus in having reduced lateral wings on the seed (Wagner *et al.* 1999).

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

Historically, *Pteralyxia kauaiensis* was known from the Wahiawa Mountains in the southern portion of Kauai. This species is now known from 15 populations, with a total of 807 individuals in the following scattered locations on State land: Limahuli Valley, the left branch of Kalalau Valley, Pohakuao, the right branch of Kalalau Valley, Makaha Valley, Kuia Valley, Haeleele Valley, Koaie Canyon, Kawaiiki Valley, Hipalau, Haupu, Blue Hole, Poomau Valley, and Kapalikea within the Lihue-Koloa Forest Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve. There is also an undocumented sighting of one individual at Makaleha, above the town of Kapaa (59 FR 9304; K. Wood, *in litt.* 1999; Wagner *et al.* 1999; HINHP Database 2000).

This taxon is typically found in diverse mesic or *Diospyros sandwicensis* mixed mesic forests with *Pisonia* spp. between elevations of 915 and 1,007 m (3,002 and 3,305 ft). Associated native plant species include *Acacia koa, Alectryon macrococcus, Alphitonia ponderosa, Antidesma platyphyllum* var. *hillebrandii, Bobea brevipes, Carex* spp., *Charpentiera elliptica, Claoxylon sandwicense, Cyanea* spp., *Dianella sandwicensis, Diospyros* spp. (lama), *Dodonaea*

viscosa, Diplazium sandwichianum, Euphorbia haeleeleana, Freycinetia arborea, Gahnia spp., *Gardenia remyi* (nanu), *Hedyotis terminalis, Hibiscus kokio, Kokia kauaiensis, Metrosideros polymorpha, Myrsine lanaiensis, Neraudia* spp. (NCN), *Nesoluma polynesicum, Nestegis sandwicensis, Peperomia* spp., *Pleomele aurea, Pipturus* spp., *Pisonia sandwicensis, Poa sandvicensis, Pouteria sandwicensis, Psychotria* spp., *Psydrax odoratum, Pritchardia* spp., *Rauvolfia sandwicensis, Santalum freycinetianum* var. *pyrularium, Schiedea* spp., *Styphelia tameiameiae, Syzygium sandwicensis, Tetraplasandra* spp., *Xylosma hawaiiense,* or *Zanthoxylum dipetalum* (59 FR 9304; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Pteralyxia kauaiensis* are habitat destruction by feral animals and competition with introduced plants. Animals affecting the survival of this species include feral goats and pigs, and, possibly, rats, which may eat the fruit. Fire could threaten some populations. Introduced plants competing with this species include *Psidium guajava, Erigeron karvinskianus, Aleurites moluccana, Lantana camara, Psidium cattleianum,* or *Cordyline fruticosa* (59 FR 9304; Service 1995; HINHP Database 2000).

Remya kauaiensis (NCN)

Remya kauaiensis, one of three species of a genus endemic to the Hawaiian Islands, is in the aster family (Asteraceae). *Remya kauaiensis* is a small short-lived perennial shrub, about 1 m (3 ft) tall, with many slender, sprawling branches which are covered with a fine tan fuzz near their tips. The leaves, coarsely toothed along the edges, are green on the upper surface while the lower surface is covered with a dense mat of fine white hairs (Wagner *et al.* 1999).

Seedlings of this taxon have not been observed. Flowers have been observed in April, May, June, and August, and are probably insect-pollinated. Seeds are probably wind or water-dispersed. *Remya kauaiensis* may be self-incompatible (56 FR 1450; Herbst 1988; Service 1995).

Historically, this species was found in the Na Pali Kona Forest Reserve at Koaie, Mohihi, Kalalau, Makaha, Nualolo, Kawaiula, Kuia, Honopu, Awaawapuhi, Kopakaka, and Kauhao, on Kauai. There are currently 12 known populations with a total of 124 individuals on State-owned land. They occur in Hipalau Valley, Awini Valley, Koaie Canyon, Mohihi Stream, the left branch of Kalalau Valley, Awaawapuhi and Nualolo Valleys, Kuia and Kawaiula Valleys, Makaha Valley, Kauhao Valley, and Kaulaula Valley within the Alakai Wilderness Preserve, Kuia Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, Puu Ka Pele Forest Reserve, and Waimea Canyon State Park (K. Wood, *in litt.* 1999; GDSI 2000; HINHP Database 2000).

Remya kauaiensis grows chiefly on steep, north or northeast-facing slopes at elevations between 560 and 1,247 m (1,836 and 4,090 ft). It is found primarily in *Acacia koa-Metrosideros polymorpha* lowland mesic forest with *Chamaesyce* spp. (akoko), *Claoxylon sandwicense, Dianella sandwicensis, Diospyros* spp., *Dodonaea viscosa, Hedyotis terminalis, Melicope* spp., *Nestegis sandwicensis, Pouteria sandwicensis, Psychotria* spp., *Schiedea* spp., or *Tetraplasandra* spp. (56 FR 1450; Herbst 1988; HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Remya kauaiensis* include herbivory and habitat degradation by feral goats, pigs, cattle, and deer, and competition from non-native plant species. Other threats include erosion, fire, and risk of extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of remaining populations and individuals (56 FR 1450; Service 1995).

Remya montgomeryi (NCN)

The genus *Remya*, in the aster family (Asteraceae), is endemic to the Hawaiian Islands. *Remya montgomeryi* was discovered in 1985 by Steven Montgomery on the sheer, virtually inaccessible cliffs below the upper rim of Kalalau Valley, Kauai. It is a small short-lived perennial shrub, about 1 m (3 ft) tall, with many slender, sprawling to weakly erect, smooth branches. The leaves are coarsely toothed along the edges, and are green on the upper as well as lower surfaces (Wagner *et al.* 1999).

Seedlings of this taxon have not been observed. Flowers have been observed in April, May, June, and August, and are probably insect-pollinated. Seeds are probably wind or water-dispersed. *Remya montgomeryi* may be self-incompatible (Herbst 1988; 56 FR 1450).

Remya montgomeryi is known only from Kauai. Three populations with 113 individuals are reported on State-owned land in the left and right branches of Kalalau Valley, Koaie Canyon, and Kuia Valley within the Alakai Wilderness Preserve and Na Pali Coast State Park (Herbst 1988; K. Wood, *in litt.* 1999; GDSI 2000; HINHP Database 2000).

Remya montgomeryi grows at elevations between 336 and 1,344 m (1,102 and 4,411 ft), primarily on steep, north or northeast-facing slopes or cliffs in transitional wet or *Metrosideros polymorpha* dominated mixed mesic forest. Associated native plant species include *Artemisia australis, Bobea* spp., *Boehmeria grandis, Cheirodendron* spp., *Claoxylon sandwicensis, Cyrtandra* spp., *Dubautia* spp., *Ilex anomala, Lepidium serra, Lysimachia* spp. (kolokolo kuahiwi), *Myrsine linearifolia, Nototrichium* spp., *Pleomele aurea, Poa mannii, Sadleria* spp., *Scaevola* spp., *Stenogyne campanulata, Tetraplasandra* spp., or *Zanthoxylum dipetalum* (HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Remya montgomeryi* are herbivory and habitat degradation by feral goats, pigs, cattle, and deer, and competition from non-native plant species. Other threats include erosion, fire, and an increased risk of extinction from naturally occurring events (*e.g.,* landslides or hurricanes) because of the small size of the populations and their limited distribution (56 FR 1450; Service 1995).

Schiedea apokremnos (maolioli)

Schiedea apokremnos, a member of the pink family (Caryophyllaceae), is a low, branching short-lived perennial shrub 20 to 51 cm (8 to 20 in.) tall. The leaves are oppositely arranged, oblong, and somewhat fleshy and glabrous (having a surface without hairs). *Schiedea apokremnos* is distinguished from related species by shorter sepals, nectaries, and capsules (Wagner *et al.* 1999).

Some *S. apokremnos* individuals are functionally female and must be cross-pollinated to set seed. This reproductive strategy may be ineffective in populations with few individuals. Little is known about the life history of *Schiedea apokremnos*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Schiedea apokremnos has been collected from Nualolo Kai, Kaaweiki Ridge, and along a 10.5 km (6.5 mi) long section of the Na Pali coast including Milolii Valley, Kalalau Beach, Kaalahina and Manono Ridges, Haeleele Ridge, and, as far north as, Pohakuao Valley, all on the island of Kauai. There is currently a total of five populations containing 751 individuals on State-owned lands. The species is extant at Nakeikionaiwi, Pohakuao, Nualolo Valley, Haeleele Valley, and Kawaiiki Valley within the Na Pali Coast State Park and Puu Ka Pele Forest Reserve (56

FR 49639; HINHP Database 2000; GDSI 2000).

Schiedea apokremnos grows in the crevices of near-vertical basalt coastal cliff faces, at elevations between 12 and 391 m (40 and 1,283 ft). The species grows in sparse dry coastal cliff shrub vegetation along with *Artemisia australis, Bidens* spp., *Carex meyenii, Chamaesyce celastroides, Eragrostis variabilis, Lepidium serra, Lipochaeta connata, Lobelia niihauensis, Myoporum sandwicense, Peperomia* spp., *Pleomele aurea, Psydrax odoratum,* or *Wilkesia* spp. (56 FR 49639; HINHP Database 2000; K. Wood, pers. comm., 2001).

The restriction of this species to inaccessible cliffs suggests that goat herbivory may have eliminated them from more accessible locations. The greatest current threat to the survival of *Schiedea apokremnos* is still herbivory and habitat degradation by feral goats, as well as competition from the non-native plants *Leucaena leucocephala* and *Hyptis pectinata* (comb hyptis), and trampling by humans. Given the small size of most populations and restricted distribution, depressed reproductive vigor may be a serious threats to the species. In addition, a single environmental disturbance (such as a landslide or fire) could destroy a significant percentage of the extant individuals (56 FR 49639; Service 1995).

Schiedea helleri (NCN)

Schiedea helleri, a member of the pink family (Caryophyllaceae), is a short-lived perennial vine. The stems, smooth below and minutely hairy above, are usually prostrate and at least 15 cm (6 in.) long with internodes at least 4 to 15 cm (1.6 to 6 in.) long. The opposite leaves are somewhat thick, triangular, egg-shaped to heart-shaped, conspicuously three-veined, and nearly hairless to sparsely covered with short, fine hairs, especially along the margins. This species is the only member of the genus on Kauai that grows as a vine (Wagner *et al.* 1999).

Three plants were observed flowering in February. No additional life history information for this species is currently known (Service 1998a).

Schiedea helleri was originally found only at a single location above Waimea, at Kaholuamano on the island of Kauai, over 100 years ago. There is currently a total of three populations with 63 individuals on State-owned land at Mohihi Stream, Nawaimaka Valley, and Mohihi Waialae Trail within the Alakai Wilderness Preserve and Na Pali-Kona Forest Reserve (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Schiedea helleri is found on ridges and steep cliffs in closed *Metrosideros polymorpha-Dicranopteris linearis* montane wet forest, *M. polymorpha-Cheirodendron* spp. montane wet forest, or *Acacia koa-M. polymorpha* montane mesic forest at elevations between 941 and 1,223 m (3,088 and 4,011 ft). Other native plants growing in association with this species include *Broussaisia arguta, Cheirodendron* spp., *Cibotium* spp., *Cyanea* spp., *Dianella sandwicensis, Dubautia* spp., *Elaeocarpus bifidus, Hedyotis terminalis, Melicope* spp., *Myrsine* spp., *Poa sandvicensis Scaevola procera, Syzygium sandwicensis,* or *Viola wailenalenae* (pamakani) (K. Wood, pers. comm., 2001; HINHP Database 2000).

Competition with the non-native plant *Rubus argutus,* a risk of extinction from naturally occurring events (e.g., landslides or hurricanes), and reduced reproductive vigor due to the small number of extant individuals are serious threats to *Schiedea helleri* (61 FR 53070).

Schiedea kauaiensis (NCN)

Schiedea kauaiensis, a member of the pink family (Caryophyllaceae), is a generally hairless, erect subshrub. The green, sometimes purple-tinged leaves are opposite, narrowly egg-shaped or lance-shaped to narrowly or broadly elliptic. Lacking petals, the perfect flowers are borne in open branched inflorescences, and are moderately covered with fine, short, curly, white hairs. This short-lived perennial species is distinguished from others in this endemic Hawaiian genus by its habit, larger leaves, the hairiness of the inflorescence, the number of flowers in each inflorescence, larger flowers, and larger seeds (Wagner *et al.* 1999).

Little is known about the life history of this taxon. Fruit and flowers have been observed in July and August, and flowering material has been collected in September. There is no evidence of regeneration from seed under field conditions. Reproductive cycles, longevity, specific environmental requirements and limiting factors are unknown (Service 1998a).

Historically, *Schiedea kauaiensis* was known from the northwestern side of Kauai, from Papaa to Mahanaloa. It was thought to be extinct until the two currently known populations in Mahanaloa and Kalalau Valleys, with a total of 22 individuals, were found. Both populations occur on State land within the Kuia Natural Area Reserve and Na Pali Coast State Park (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 1999).

Schiedea kauaiensis typically grows in diverse mesic to wet *Acacia koa-Metrosideros polymorpha* forest on steep slopes at elevations between 192 and 1,290 m (631 and 4,232 ft). Associated native plant species include *Alphitonia ponderosa, Cryptocarya mannii, Diospyros* spp., *Dodonaea viscosa, Euphorbia haeleeleana, Exocarpos luteolus, Microlepia strigosa, Nestegis sandwicensis, Pisonia* spp., *Peucedanum sandwicense, Psychotria* spp., *Psydrax odoratum,* or *Styphelia tameiameiae* (61 FR 53108; HINHP Database 2000; K. Wood, pers. comm., 2001).

Threats to *Schiedea kauaiensis* include habitat degradation and/or destruction by feral goats, pigs, and cattle; competition from several non-native plant species; predation by introduced slugs and snails; and a risk of extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the low number of individuals in only two known populations. *Schiedea kauaiensis* is also potentially threatened by fire (61 FR 53108; Service 1998a; HINHP Database 2000).

Schiedea membranacea (NCN)

Schiedea membranacea, a member of the pink family (Caryophyllaceae), is a perennial herb. The unbranched, fleshy stems rise upwards from near the base and are somewhat sprawling. During dry seasons, the plant dies back to a woody, short stem at or beneath the ground surface. The oppositely arranged leaves are broadly elliptic to egg-shaped, generally thin, have five to seven longitudinal veins, and are sparsely covered with short, fine hairs. The perfect flowers have no petals, are numerous, and occur in large branched clusters. This short-lived perennial species differs from others of the genus that grow on Kauai by having five-to seven-nerved leaves and a herbaceous habit (Wagner *et al.* 1999).

Research suggests that this species largely requires outcrossing for successful germination and survival to adulthood. Pollinators for *Schiedea membranacea* are unknown, since none have been seen during the daytime, and none were observed during one set of night observations. Little else is known about the life history of *Schiedea membranacea.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown. (Service 1998a).

Schiedea membranacea is currently known from the western side of the island of Kauai, on State and privately

owned lands at Poopooiki Valley, Milolii Ridge, Kuia Valley, Awaawapuhi Valley, Nualolo Valley, Kahuamaa Flats, Waialae Falls, Koaie Canyon, and the right branch of Wainiha Valley. On State lands it occurs within the Alakai Wilderness Preserve, Halelea Forest Reserve, Kuia Natural Area Reserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve. There are currently seven populations containing 195 individuals (Wood and Perlman 1993; 61 FR 53070; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

This species is typically found on cliffs and cliff bases in mesic or wet habitats, in lowland, or montane shrubland, or forest communities dominated by *Acacia koa, Pipturus* spp. and *Metrosideros polymorpha* or Urticaceae shrubland on talus slopes at elevations between 422 and 1,205 m (1,386 and 3,953 ft). Associated native plant species include *Alphitonia ponderosa, Alyxia oliviformis, Asplenium* spp., *Athyrium sandwicensis* (akolea), *Bobea brevipes, Boehmeria grandis, Cyrtandra* spp., *Diplazium sandwichianum, Dodonaea viscosa, Eragrostis variabilis, Hedyotis terminalis, Hibiscus waimeae, Joinvillea ascendens* ssp. *ascendens* (ohe), *Labordia helleri* (kamakahala), *Lepidium serra, Lysimachia kalalauensis* (NCN), *Machaerina angustifolia, Mariscus pennatiformis, Melicope* spp., *Myrsine* spp., *Perrottetia sandwicensis, Pisonia* spp., *Pleomele aurea, Poa mannii, Poa sandvicensis, Pouteria sandwicensis, Psychotria* spp., *Psydrax odoratum, Remya kauaiensis, Sadleria cyatheoides* (amau), *Scaevola procera, Thelypteris cyatheoides* (kikawaio), *Thelypteris sandwicensis* (palapalaia), or *Touchardia latifolia* (61 FR 53070; HINHP Database 2000; K. Wood, pers. comm., 2001).

Habitat degradation by feral goats, and pigs, and deer; competition with the non-native plant species *Erigeron karvinskianus, Lantana camara, Rubus argutus, R. rosifolius, Psidium cattleianum, Ageratina riparia* (Hamakua pamakani), or *Passiflora mollissima;* loss of pollinators; and landslides are the primary threats to *Schiedea membranacea.* Based on observations indicating that snails and slugs may consume seeds and seedlings, it is likely that introduced molluscs also represent a major threat to this species (61 FR 53070; Wood and Perlman 1993; Service 1998a).

Schiedea spergulina var. *leiopoda* and *Schiedea spergulina* var. *spergulina* (NCN)

Schiedea spergulina, a member of the pink family (Caryophyllaceae), is a short-lived perennial subshrub. The opposite leaves are very narrow, one-veined, and attached directly to the stem. The flowers are unisexual, with male and female flowers on different plants. Flowers occur in compact clusters of three. The capsular fruits contain nearly smooth, kidney-shaped seeds. Of the 22 species in this endemic genus, only two other species have smooth seeds. *Schiedea spergulina* differs from those two in having very compact flower clusters. The two weakly defined varieties differ primarily in the degree of hairiness of the inflorescences, with *S. s.* var. *leiopoda* being the less hairy of the two (Wagner *et al.* 1999).

Little is known about the life histories of either *Schiedea spergulina* var. *leiopoda* or *Schiedea spergulina* var. *spergulina.* Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Schiedea spergulina* var. *leiopoda* was found on a ridge on the east side of Hanapepe on Kauai. One population with approximately 50 individuals is now known to grow in Lawai Valley on Kauai on privately owned land (HINHP Database 2000; GDSI 2000).

Schiedea spergulina var. *spergulina* was historically found in Olokele Canyon, but is now known only from the right branch of Kalalau Valley, Koaie Canyon, and Waimea Canyon. A total of three populations numbering approximately 206 individuals is reported on State-owned land within the Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and the Puu Ka Pele Forest Reserve. However, it has been estimated that this species may number in the thousands on Kauai (Service 1995; HINHP Database 2000; GDSI 2000).

Both varieties of *Schiedea spergulina* are usually found on bare rock outcrops or sparsely vegetated portions of rocky cliff faces or cliff bases in diverse lowland dry to mesic forests at elevations between 21 and 87 m (69 and 284 ft) for *Schiedea spergulina* var. *leiopoda* and elevations between 144 and 828 m (474 and 2,718 ft) for *Schiedea spergulina* var. *spergulina.* Associated native plant species include *Acacia koa, Artemisia australis, Bidens sandvicensis, Carex meyenii, Chamaesyce celastroides, Dianella sandwicensis, Doryopteris* spp. (kumuniu), *Eragrostis variabilis, Erythrina sandwicensis* (wiliwili), *Gahnia* spp, *Heliotropium* spp. (ahinahina), *Lepidium serra, Lipochaeta connata, Microlepia strigosa, Nestegis sandwicensis, Nototrichium sandwicense, Panicum lineale, Peucedanum sandwicense,* or *Wilkesia gymnoxiphium* (59 FR 9304; Lorence and Flynn 1991; Service 1995; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Schiedea spergulina* var. *leiopoda* are habitat destruction by feral goats and competition with non-native plants such as *Leucaena leucocephala, Lantana camara,* or *Furcraea foetida* (Mauritius hemp). Individuals have also been damaged and destroyed by rock slides. This variety is potentially threatened by pesticide use in nearby sugarcane fields, as well as a risk of extinction from naturally occurring events (*e.g.,* hurricanes) and/or reduced reproductive vigor due to the small number of existing individuals (59 FR 9304; Lorence and Flynn 1991; Service 1995).

Schiedea spergulina var. *spergulina* is threatened by competition with non-native plant species, including *Erigeron karvinskianus, Lantana camara, Melia azedarach,* or *Triumfetta semitriloba* (Sacramento bur). The area in which this variety grows is used heavily by feral goats, and there is evidence that plants are being browsed and trampled (59 FR 9304; Lorence and Flynn 1991; HINHP Database 2000).

Schiedea stellarioides (laulihilihi)

Schiedea stellarioides, a member of the pink family (Caryophyllaceae), is a slightly erect to prostrate subshrub with branched stems. The opposite leaves are very slender to oblong-elliptic, and one-veined. This short-lived perennial species is distinguished from others of the genus that grow on Kauai by the number of veins in the leaves, shape of the leaves, presence of a leaf stalk, length of the flower cluster, and shape of the seeds (Wagner *et al.* 1999).

Plants were observed flowering in the field in February. Little else is known about the life history of *Schiedea stellarioides.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Schiedea stellarioides* was found at the sea cliffs of Hanakapiai Beach, Kaholuamano-Opaewela region, the ridge between Waialae and Nawaimaka Valleys, and Haupu Range on the island of Kauai. Currently it is found in Kawaiiki Valley and Waialae Falls within the Na Pali-Kona Forest Reserve. There is a total of two populations with 400 individuals on

State-owned land (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Schiedea stellarioides is found on steep slopes in closed *Acacia koa-Metrosideros polymorpha* lowland to montane mesic forest or shrubland at elevations between 476 and 1,216 m (1,561 and 3,990 ft). Associated native plant species include *Alsinidendron viscosum, Artemisia australis, Bidens cosmoides, Chenopodium* spp. (ahe ahea), *Dianella sandwicensis, Dodonaea viscosa, Mariscus* spp., *Melicope* spp., *Nototrichium sandwicense, Pipturus* spp., *Styphelia tameiameiae, Syzygium sandwicensis,* or *Zanthoxylum dipetalum* (61 FR 53070; HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to this species include habitat degradation and herbivory by feral pigs and goats, competition with the non-native plants *Melinis minutiflora* and *Rubus argutus,* and a risk of extinction of the two remaining populations from naturally occurring events, such as landslides or hurricanes (61 FR 53070).

Stenogyne campanulata (NCN)

Stenogyne campanulata, a member of the mint family (Lamiaceae), is a vine with four-angled, hairy stems. A short-lived perennial species, *Stenogyne campanulata* is distinguished from closely related species by its large and very broadly bell-shaped calyces that nearly enclose the relatively small, straight corollas, and by small calyx teeth that are half as long as wide (Weller and Sakai 1999).

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

Stenogyne campanulata is known from two populations with 66 individuals which were originally discovered in the left branch of Kalalau Valley on State-owned land in the Na Pali Coast State Park (GDSI 2000; HINHP Database 2000).

Stenogyne campanulata grows on the rock face of a nearly vertical, north-facing cliff in diverse lowland or montane mesic forest at elevations between 335 and 1,290 m (1,100 and 4,232 ft). The associated native plant species include *Lepidium serra, Lobelia niihauensis, Lysimachia* spp., *Metrosideros polymorpha, Melicope pallida, Neraudia kauaiensis, Nototrichium divaricatum* (kului), *Poa mannii, Remya montgomeryi,* or *Wilkesia gymnoxiphium* (57 FR 20580; Weller and Sakai 1999; K. Wood, pers. comm., 2001).

The restriction of this species to virtually inaccessible cliffs suggests that herbivory by feral goats may have eliminated it from more accessible locations. Goat herbivory and habitat degradation remain the primary threat. Feral pigs have disturbed vegetation in the vicinity of these plants. Erosion caused by feral goats or pigs exacerbates the potential threat of landslides. *Erigeron karvinskianus* and *Rubus argutus* are the primary non-native plants threatening *Stenogyne campanulata.* The small number of individuals and its restricted distribution are serious potential threats to the species. The limited population size may depress reproductive vigor, or a single environmental disturbance, such as a landslide, could destroy all known extant individuals (57 FR 20580).

Viola helenae (NCN)

Viola helenae is a small, unbranched perennial subshrub with an erect stem in the violet family (Violaceae). The hairless leaves are clustered on the upper part of the plant and are lance-shaped with a pair of narrow, membranous stipules below each leaf. The small, pale lavender or white flowers are produced on stems either singly or in pairs in the leaf axils. The fruit is a capsule that splits open at maturity, releasing the pale olive brown seeds (Wagner *et al.* 1999).

Little is known about the life history and ecology of *Viola helenae.* Wagner *et al.* (1999) stated that the flowers are all chasmogamous (open at maturity for access by pollinators) and not cleistogamous (remain closed and self-fertilize in the bud) as in certain other violets. Therefore, it is likely that its flowers require pollination by insects for seed set. Mature flowering plants do produce seed; however, seed viability may be low and microhabitat requirements for germination and growth may be very specific. Seeds planted at NTBG on Kauai failed to germinate, although they may not have been sufficiently mature when collected and violet seeds are often very slow to germinate. The seeds are jettisoned when the capsule splits open, as in most species of the genus (Service 1994).

Historically, *Viola helenae* was known from four populations, two along either branch of the Wahiawa Stream on Kauai. Currently, there is one known population, with a total of 137 individual plants, on privately owned land within the Wahiawa Drainage (56 FR 47695; Service 1994; GDSI 2000; HINHP Database 2000).

This species is found in *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest or *Metrosideros polymorpha-Cheirodendron* wet forest growing on stream drainage banks or adjacent Valley bottoms in light to moderate shade at elevations between 522 and 1,006 m (1,712 and 3,301 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii, Broussaisia arguta, Dicranopteris linearis, Diplazium sandwichianum, Dubautia* spp., *Freycinetia arborea, Hesperomannia lydgatei, Melicope* spp, or *Pritchardia* spp. (Service 1994; HINHP Database 2000; K. Wood, pers. comm., 2001).

Threats include competition from non-native plant species, including *Psidium cattleianum, Melastoma candidum,* potentially *Melaleuca quinquenervia, Stachytarpheta dichotoma, Rubus rosifolius, Elephantopus mollis, Erechtites valerianifolia,* or various non-native grasses; trampling and browsing damage by feral pigs; landslides and erosion; and hurricanes (56 FR 47695; Service 1994).

Viola kauaiensis var. *wahiawaensis* (nani waialeale)

Viola kauaiensis, a member of the violet family (Violaceae), is a short-lived perennial herb with upward curving or weakly rising, hairless, lateral stems. The species is distinguished from others of the genus by its nonwoody habit, widely spaced kidney-shaped leaves, and by having two types of flowers: conspicuous, open flowers and smaller, unopened flowers. Two varieties of the species are recognized, both occurring on Kauai: var. *kauaiensis* and var. *wahiawaensis. Viola kauaiensis* var. *wahiawaensis* is distinguished by having broadly wedge-shaped leaf bases (Service 1998a; Wagner *et al.* 1999).

Five *Viola kauaiensis* var. *wahiawaensis* plants were observed in flower in December. Little else is known about the life history of *Viola kauaiensis* var. *wahiawaensis.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown. (Service 1998a).

Viola kauaiensis var. *wahiawaensis* is known only from two populations in the Wahiawa Mountains of Kauai with a total of 13 individual plants, on privately owned land. This taxon is not known to have occurred beyond its current range (HINHP Database 2000; GDSI 2000).

Viola kauaiensis var. *wahiawaensis* is found in *Machaerina angustifolia-Rhynchospora rugosa* (kuolohia)

lowland bog or mixed wet shrubland and adjacent *Metrosideros polymorpha* wet forest at elevations between 393 and 1,006 (1,291 and 3,301 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii, Bidens forbesii* (kookoolau), *Chamaesyce remyi* (akoko), *Chamaesyce sparsiflora* (akoko), *Coprosma grayana* (pilo), *Cyanea fissa, Dicranopteris linearis, Diplopterygium pinnatum* (NCN), *Dubautia imbricata* (naenae), *Dubautia raillardioides, Gahnia vitiensis* (NCN), *Lobelia kauaensis* (NCN), *Machaerina angustifolia, Machaerina mariscoides, Melicope* spp., *Psychotria wawrae, Sadleria pallida, Scaevola gaudichaudii, Sphenomeris chinensis, Styphelia tameiameiae, Syzygium sandwicensis, Tetraplasandra oahuensis,* or *Vaccinium dentatum* (Lorence and Flynn 1991; 61 FR 53070; Service 1998a; HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Viola kauaiensis* var. *wahiawaensis* are a risk of extinction from naturally occurring events, such as landslides or hurricanes, and reduced reproductive vigor due to the small number of existing populations and individuals; habitat degradation through the rooting activities of feral pigs; and competition with non-native plants, such as *Juncus planifolius* (NCN) or *Pterolepis glomerata* (NCN) (61 FR 53070; Lorence and Flynn 1991; Service 1994; HINHP Database 2000).

Wilkesia hobdyi (dwarf iliau)

Wilkesia hobdyi, a member of the sunflower family (Asteraceae), is a short-lived perennial shrub which branches from the base. The tip of each branch bears a tuft of narrow leaves growing in whorls joined together into a short sheathing section at their bases. The cream-colored flower heads grow in clusters (Carr 1982a, 1999b).

This species is probably pollinated through outcrossing and is probably self-incompatible. Insects are the most likely pollinators. In 1982, Carr reported that reproduction and seedling establishment were occurring and appeared sufficient to sustain the populations. Flowering was observed most often in the winter months, but also during June. Fruits may be dispersed when they stick to the feathers of birds. Densities reach one plant per square meter (approximately one square yard) in localized areas, and hybridization with *Wilkesia gymnoxiphium* may be occurring (Carr 1982a).

First collected in 1968 on Polihale Ridge, Kauai, this species was not formally described until 1971 (St. John 1971). Currently, there are six populations with a total of 491 individuals. This species occurs on State-owned lands within the Hono o Na Pali Natural Area Reserve, Na Pali Coast State Park, and Puu Ka Pele Forest Reserve and on land under Federal jurisdiction within the Pacific Missile Range Facility (PMRF) at Makaha Ridge. The plants occur in Milolii Valley, Makaha Ridge, Haeleele Ridge, Kaaweiki Ridge, Polihale Spring, Pohakumano, and Pohakuao (HINHP Database 2000; GDSI 2000).

Wilkesia hobdyi grows on coastal dry cliffs or very dry ridges at elevations between 12 and 685 m (40 and 2,246 ft). The associated native plant species include *Artemisia australis, Dodonaea viscosa, Eragrostis variabilis, Hibiscus kokio* ssp. *saint johnianus, Lipochaeta connata, Lobelia niihauensis, Myoporum sandwicense, Peperomia blanda* (ala ala wai nui), *Peperomia leptostachya* (ala ala wai nui), *Peperomia tetraphylla* (ala ala wai nui), *Peucedanum sandwicense, Psydrax odoratum, Sida fallax, Waltheria indica* (uhaloa), or *Wilkesia gymnoxiphium* (57 FR 27859; Service 1995; Wagner *et al.* 1999; K. Wood, pers. comm., 2001).

The greatest immediate threats to the survival of this species are habitat disturbance and browsing by feral goats. Although the low number of individuals and their restricted habitat could be considered a potential threat to the survival to the species, the plant appears to have vigorous reproduction and may survive indefinitely if goats were eliminated from its habitat. Fire and extinction through naturally occurring events, such as landslides or hurricanes, could also be threats to the survival of the species (57 FR 27859; Service 1995).

Xylosma crenatum (NCN)

Xylosma crenatum is a dioecious (plant bears only male or female flowers, and must cross-pollinate with another plant to produce viable seed) long-lived perennial tree in the flacourtia family (Flacourtiaceae). The tree grows up to 14 m (45 ft) tall and has dark gray bark. The somewhat leathery leaves are oval to elliptic-oval, with coarsely toothed edges and moderately hairy undersides. More coarsely toothed leaf edges and hairy undersides of the leaves distinguish *X. crenatum* from the other Hawaiian member of this genus (Wagner *et al.* 1999).

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

Historically, *Xylosma crenatum* was known from two sites on Kauai: along upper Nualolo Trail in Kuia Natural Area Reserve and along Mohihi Road between Waiakoali and Mohihi drainages in Na Pali-Kona Forest Reserve. Currently, this species is extant on State-owned land in Kainamanu, Nualolo Trail, and Mohihi Valley within the Kokee State Park, Kuia Natural Area Reserve, and Na Pali-Kona Forest Reserve. There are three populations with a total of eight individual plants (57 FR 20580; Service 1995; HINHP Database 2000; GDSI 2000).

Xylosma crenatum is known from diverse *Acacia koa-Metrosideros polymorpha* montane mesic forest, *Metrosideros polymorpha-Dicranopteris linearis* montane wet forest, or *Acacia koa-Metrosideros polymorpha* montane wet forest at elevations between 936 and 1,284 m (3,070 and 4,212 ft). Associated native plant species include *Athyrium sandwicensis, Cheirodendron* spp., *Claoxylon sandwicense, Coprosma* spp., *Cyanea hirta* (haha), *Diplazium sandwichianum, Dubautia knudsenii, Hedyotis* spp., *Ilex anomala, Lobelia yuccoides, Myrsine* spp., *Nestegis sandwicensis, Perrottetia sandwicensis, Pleomele aurea, Poa sandvicensis, Pouteria sandwicensis, Psychotria* spp., *Scaevola procera, Streblus pendulinus, Tetraplasandra* spp., *Touchardia latifolia,* or *Zanthoxylum dipetalum* (57 FR 20580; Service 1995; HINHP Database 2000; K. Wood, pers. comm., 2001).

The small number of individuals and scattered distribution makes this species vulnerable to human or natural environmental disturbance. *Xylosma crenatum* is also threatened by competition from non-native plants, particularly *Psidium guajava.* In addition, feral pigs may threaten this species (57 FR 20580; Service 1995; HINHP Database 2000).

Multi-Island Species

Acaena exigua (liliwai)

Acaena exigua is a small perennial rosette herb in the rose family (Rosaceae) with narrow, fern-like, divided leaves and slender flowering stalks 5–15 cm (2–5.9 in.) long. It is easily hidden among the other low, tufted bog plants with which it grows. The narrow, oblong leaves are usually 10–25 mm (0.4–1.0 in.) long with 6–17 leaflets 1–4 mm (0.04–0.16 in.) long and 1–2 mm (0.04–0.08 in.) wide. The leaflet on the end is wider (to 3 mm (0.12 in.)). The upper surface of the leaves is glossy with conspicuous veins; the lower

surface is whitish. The flowers lack petals and are arranged in short, dense spikes 5–10 mm (0.2–0.4 in.) long held on slender, sparsely leafy stalks 5–15 cm (2–6 in). tall. The base of the flower is urn-shaped, sometimes with very short spines or bristles, and encloses a single cone-shaped dry fruit (achene) 1 mm (0.04 in.) long (Wagner et al. 1999).

Little is known about the life history of *Acaena exigua.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1997).

Historically, *Acaena exigua* was known from Puu-kukui on West Maui and from Mount Waialeale on Kauai. On Kauai, *Acaena exigua* was last collected by Wawra between 1869 and 1870, and it has not been seen in the wild since (Wagner *et al.* 1999).

Acaena exigua is known only from sites with extensive cloud cover and moderate to strong winds in wet montane shrub bog or bog margins characterized by a thick peat substrate overlying an impervious clay substrate, with hummocks of sedges and grasses, stunted trees, and shrubs and elevations between 666 and 1,598 m (2,185 and 5,244 ft). Associated native plant species include *Deschampsia nubigena* (hair grass), *Dichanthelium cynodon* (NCN), *Dichanthelium hillebrandianum* (NCN), *Dichanthelium isachnoides* (NCN), *Dubautia* spp., *Melicope* spp., *Metrosideros polymorpha, Oreobolus furcatus* (NCN), or *Vaccinium* spp. (K. Wood, pers. comm., 2001).

The reason for the disappearance of this species is not known. Though impact from herbivory and rooting by pigs is assumed and often cited, feral pigs have become established at Waialeale (Kauai) only within the past two decades. The main current threats to *Acaena exigua,* if it exists, are believed to include small population size; human impacts (collecting and site degradation); potentially consumption of vegetative or floral parts of this species by non-native slugs and/or rats; predation and habitat disturbance by feral pigs; and non-native plant species especially, *Juncus planifolius* (57 FR 20772).

Achyranthes mutica (NCN)

Achyranthes mutica, a member of the amaranth family (Amaranthaceae) and a short-lived perennial, is a many-branched shrub with egg-shaped leaves and stalkless flowers. This species is distinguished from others in the genus by the shape and size of the sepals and by characteristics of the spike, which is short and congested (Wagner *et al.* 1999).

Historically, *Achyranthes mutica* was known from three collections from opposite ends of the main archipelago: Kauai and Hawaii. Currently, this species is known only from Hawaii island, from the Kilohana Gulch on private land. It was last observed on Kauai in the 1850s (61 FR 53108; HINHP Database 2000; GDSI 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Achyranthes mutica* on the island of Kauai.

Nothing is known of the threats to *Achyranthes mutica* on the island of Kauai.

Adenophorus periens (pendent kihi fern)

Adenophorus periens, a 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 (a leaflet) margins, by the pinnae being at right angles to the midrib axis, by the placement of the sori on the pinnae, and the degree of dissection of each pinna (Linney 1989).

Little is known about the life history of *Adenophorus periens,* which seems to grow only in closed canopy dense forest with high humidity. Its breeding system is unknown, but outbreeding is very likely to be the predominant mode of reproduction. Spores 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 their longevity is brief, probably measured in days at most. Due to the weak differences between the 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).

Historically, *Adenophorus periens* was reported from Kauai, Oahu, Lanai, Maui, and the island of Hawaii. Currently, it is known from several locations on Kauai, Molokai, and Hawaii (HINHP Database 2000). On Kauai, there is a total of seven populations on private and State-owned lands (Halelea Forest Reserve, Hono o Na Pali Natural Area Reserve, and Kealia Forest Reserve), with approximately 80 individuals, that occur at Pihea, Pali Eleele, Waioli Valley, Mount Namahana, Lumahai Valley, Wainiha Valley, and Kapalaoa (59 FR 56333; GDSI 2000; HINHP Database 2000).

This species, an epiphyte (a plant that derives moisture and nutrients from the air and rain) usually growing on *Metrosideros polymorpha* trunks, is found in riparian banks of stream systems in well-developed, closed canopy that provides deep shade or high humidity in *Metrosideros polymorpha-Cibotium glaucum* lowland wet forests, open *Metrosideros polymorpha* montane wet forest, or *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest at elevations between 107 and 1,593 m (351 and 5,228 ft). Associated native plant species include *Antidesma platyphyllum, Athyrium sandwichianum, Broussaisia* spp., *Cheirodendron trigynum, Cyanea* spp., *Cyrtandra* spp., *Dicranopteris linearis Freycinetia arborea*, *Hedyotis terminalis*, *Labordia hirtella, Machaerina angustifolia, Psychotria* spp., *Psychotria hexandra*, *Syzygium sandwicensis,* or *Tetraplasandra oahuensis* (59 FR 56333; Linney 1989; K. Wood, pers. comm., 2001).

The threats to this species on Kauai include habitat degradation by feral pigs and goats and competition with the non-native plant *Psidium cattleianum* (59 FR 56333; HINHP Database 2000).

Alectryon macrococcus var. *macrococcus* (mahoe)

Alectryon macrococcus, a member of the soapberry family (Sapindaceae), consists of two varieties, *macrococcus* and *auwahiensis,* both trees with reddish-brown branches and net-veined paper- or leather-like leaves with one to five pairs of sometimes asymmetrical egg-shaped leaflets. The underside of the leaf has dense brown hairs, persistent in *A. macrococcus* var. *auwahiensis,* but only on leaves of young *A. macrococcus* var. *macrococcus* plants. 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 to mesic sites and is adapted to periodic drought. Little else is known about the life history of *Alectryon macrococcus.* Flowering cycles, pollination vectors, seed dispersal agents, longevity, and specific environmental requirements are unknown (Service 1997).

Alectryon macrococcus var. *macrococcus* historically and currently occurs on Kauai, Oahu, Molokai and Maui. On Kauai, *Alectryon macrococcus* var. *macrococcus* occurs on State-owned land in the Alakai Wilderness

Preserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve on Kauai. A total of six populations of 204 individuals is known from Kalalau Valley, Kipalau Valley, Haeleele Valley, Waimea Canyon, Hipalau Valley, and Kawaiiki Falls (K. Wood, *in litt.* 1999; GDSI 2000). This variety is also found on Oahu, Molokai, and West Maui (57 FR 20772). *Alectryon macrococcus* var. *auwahiensis* is found only on leeward east Maui and will be reviewed further in a subsequent rule (Medeiros *et al.* 1986; HINHP Database 2000).

The habitat of *Alectryon macrococcus* var. *macrococcus* on Kauai is *Diospyros* spp.-*Metrosideros polymorpha* lowland mesic forest, *Metrosideros polymorpha* mixed mesic forest, or *Diospyros* spp. mixed mesic forest on dry slopes or in gulches, at elevations between 341 and 954 m (1,120 and 3,129 ft). Associated native plant species include *Acacia koa, Alyxia oliviformis, Antidesma* spp., *Bobea timonioides, Caesalpinia kauaiense* (uhiuhi), *Canavalia* spp. (awikiwiki), *Carex meyenii, Carex wahuensis, Doodia kunthiana, Hibiscus waimeae, Kokia kauaiensis, Melicope knudsenii, Microlepia strigosa, Munroidendron racemosum, Myrsine lanaiensis, Nesoluma polynesicum, Nestegis sandwicensis, Pisonia* spp., *Pleomele* spp., *Pouteria sandwicensis, Psychotria* spp., *Psydrax odoratum, Pteralyxia spp., Rauvolfia sandwicensis, Streblus pendulinus, Tetraplasandra* spp., *Xylosma* spp., or *Zanthoxylum* spp. (57 FR 20772; HINHP Database 2000; K. Wood, pers. comm., 2001).

Alectryon macrococcus var. *macrococcus* on Kauai is threatened by feral goats and pigs; the non-native plant species *Melinis minutiflora, Schinus terebinthifolius* (Christmasberry), or *Psidium cattleianum;* damage from the black twig borer; seed predation by rats and mice (*Mus musculus*); fire; depressed reproductive vigor; seed predation by insects (probably the endemic micro-lepidopteran *Prays* cf. *fulvocanella*); loss of pollinators; and, due to the very small remaining number of individuals and their limited distribution, natural or human-caused environmental disturbances which could easily be catastrophic (57 FR 20772).

Bonamia menziesii (NCN)

Bonamia menziesii, a member of the morning-glory family (Convolvulaceae), is a vine with twining branches that are fuzzy when young. This species is the only member of the genus that is endemic to the Hawaiian Islands and differs from other genera in the family by its two styles, 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 1999).

Historically, *Bonamia menziesii* was known from the following general areas: scattered locations on Kauai, the Waianae Mountains of Oahu, scattered locations on Molokai, one location on West Maui, and eastern Hawaii. Currently, it is known from Kauai, Oahu, Lanai, Maui, and Hawaii. On Kauai, there are eight total populations with 62 individuals on State (Alakai Wilderness Preserve, Hono o Na Pali Natural Area Reserve, Lihue-Koloa Forest Reserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve) and privately owned lands in Waiahuakua, Kalalau Valley, Awaawapuhi Valley, Paaiki Valley, Kipalau Valley, Hulua, Wahiawa Falls, and Laauhihaihai (Service 1999; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Bonamia menziesii is found in dry, mesic, or wet *Metrosideros polymorpha-Cheirodendron-Dicranopteris* forest at elevations between 351 and 1,415 m (1,151 and 4,644 ft). Associated native plant species include *Antidesma platyphyllum*, *Alphitonia ponderosa*, *Acacia koa, Cyanea* spp., *Cyrtandra pickeringii, Cyrtandra limahuliensis, Dianella sandwicensis, Diospyros sandwicensis, Dodonaea viscosa, Dubautia knudsenii, Hedyotis terminalis, Isodendrion longifolium, Labordia hirta, Melicope anisata, Melicope barbigera, Myoporum sandwicense, Nestegis sandwicensis, Pisonia* spp., *Pittosporum* spp., *Pouteria sandwicensis, Psychotria mariniana, Psychotria hexandra, Psydrax odoratum, Sapindus oahuensis, Scaevola procera,* or *Syzygium sandwicensis* (HINHP Database 2000; Service 1999; K. Wood, pers. comm., 2001).

The primary threats to this species on Kauai include habitat degradation and possible predation by feral pigs and goats, deer, and cattle; competition with a variety of non-native plants; and fire (59 FR 56333).

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 *C. 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. It is possible that heavy rainfall induces flowering. Populations are found in dry areas, and plants are more likely to be found following heavy rains. Little else is known about the life history of *Centaurium sebaeoides.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically and currently, *Centaurium sebaeoides* is known from scattered localities on the islands of Kauai, Oahu, Molokai, Lanai, and Maui. Currently on Kauai, there are a total of three populations with approximately 52 individuals on State-owned land. This species is found at Puanaiea Point, the caves at Nakeikionaiwi, and Pohakuao within the Na Pali Coast State Park (HINHP Database 2000; GDSI 2000).

Centaurium sebaeoides typically grows in volcanic or clay soils or on cliffs in arid coastal areas at elevations between 0 and 147 m (0 and 483 ft). Associated native plant species include *Artemisia* spp. (hinahina), *Bidens* spp., *Chamaesyce celastroides*, *Dodonaea viscosa, Fimbristylis cymosa* (mauu akiaki), *Heteropogon contortus, Jacquemontia ovalifolia* (pauohiiaka), *Lipochaeta succulenta, Lipochaeta heterophylla* (nehe), *Lipochaeta integrifolia* (nehe), *Lycium sandwicense, Lysimachia mauritiana* (kolokolo kuahiwi), *Mariscus phleoides, Panicum fauriei* (NCN), *P. torridum* (kakonakona), *Scaevola sericea, Sida fallax,* or *Wikstroemia uva-ursi* (akia) (56 FR 55770; K. Wood, pers. comm., 2001).

The major threats to this species on Kauai include habitat degradation by feral goats and cattle; competition from the non-native plant species *Casuarina equisetfolia* (ironwood), *Casuarina glauca* (saltmarsh), *Leucaena leucocephala, Prosopis pallida* (kiawe), *Schinus terebinthifolius, Syzygium cumini* (Java plum), and *Tournefortia argentea* (tree heliotrope); trampling by humans on or near trails; and fire (56 FR 55770; *Medeiros et al.* 1999; Service 1999).

Ctenitis squamigera (pauoa)

Ctenitis squamigera is a short-lived perennial of 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. The leaf stalks are densely clothed with tan-colored scales up to 1.8 cm (0.7 in.) long and 1 mm (0.04 in.) wide. The sori are tan-colored when mature and are in a single row one-third of the distance from the margin to the midrib of the ultimate segments. The indusium (an outgrowth of a fern frond that invests the sori) is whitish before wrinkling, thin and suborbicular (less than completely, perfectly round), with a narrow sinus extending about half way, glabrous except for a circular margin which is ciliolate (fringed with minute hairs) with simple several-celled glandular and nonglandular hairs arising directly from the margin or from the deltoid base. *Ctenitis squamigera* can be readily distinguished from other Hawaiian species of *Ctenitis* by the dense covering of tan-colored scales on its frond (Degener and Degener 1957; Wagner and Wagner 1992).

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

Historically, *Ctenitis squamigera* was recorded from the islands of Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii. It is currently found on Oahu, Lanai, Molokai, and Maui. It was last seen on Kauai in 1896 (HINHP Database 2000).

This species is found on rock faces in gulches in the forest understory at elevations between 568 and 1,069 m (1,863 and 3,507 ft), in *Metrosideros polymorpha-Diospyros* spp. mesic forest and diverse mesic forest. Associated native plant species include *Myrsine* spp., *Psychotria* spp., and *Xylosma* spp. (Service 1998a; HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Ctenitis squamigera* are habitat degradation by feral pigs and goats, competition with non-native plant species, especially *Psidium cattleianum* or *Schinus terebinthifolius;* fire; and extinction from naturally occurring events due to the small number of existing populations and individuals (Service 1998a).

Cyperus trachysanthos (puukaa)

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

Historically, *Cyperus trachysanthos* was known on Niihau, Kauai, scattered locations on Oahu, Molokai, and Lanai. It was last observed on Molokai in 1912 and on Lanai in 1919. Currently, this species is reported from the Nualolo Valley on Kauai on State-owned land and west of Mokouia Valley on the privately owned island of Niihau. There is one known population with about 300 individuals on the island of Kauai and an unknown number of individuals on Niihau (HINHP Database 2000; GDSI 2000).

Cyperus trachysanthos is usually found in wet sites (mud flats, wet clay soil, or wet cliff seeps) on seepy flats or talus slopes at elevations between 0 and 234 m (0 and 767 ft). *Hibiscus tiliaceus* (hau) is often found in association with this species (61 FR 53108; Koyama 1999; K. Wood, pers. comm., 2001).

On Kauai, the threats to this species are the loss of wetlands and a risk of extinction from naturally occurring events, such as landslides or hurricanes, due to the small number of populations. The threats on Niihau are unknown (61 FR 53108; Service 1999).

Delissea undulata (NCN)

Delissea undulata, a member of the bell flower family (Campanulaceae), is an unbranched, palm-like, woody-stemmed perennial tree, with a dense cluster of leaves at the tip of the stem. One or two knob-like structures often occur on the back of the flower tube. The three recognized subspecies are distinguishable on the basis of leaf shape and margin characters: *D. undulata* ssp. *kauaiensis,* leaf blades are oval and have a flat-margin with sharp teeth; *D. undulata* ssp. *niihauensis,* leaf blades are heart shaped and have a flat-margin with shallow, rounded teeth; and *D. undulata* ssp. *undulata,* leaf blades are elliptic to lance-shaped and wavy-margin with small, sharply pointed teeth. This species is separated from the other closely related members of the genus by its large flowers and berries and broad leaf bases (Lammers 1990).

On the island of Hawaii, *Delissea undulata* ssp. *undulata* was observed in flower and fruit (immature) in August and outplanted individuals were observed in flower in July. Little else is known about the life history of *Delissea undulata.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1996; 61 FR 53124).

Historically and currently, *Delissea undulata* ssp. *kauaiensis* is known only from Kauai. Currently, there is one known population of three individuals on State-owned land in Kuia Valley within the Kuia Natural Area Reserve. *Delissea undulata* ssp. *niihauensis* was known only from Niihau, but has not been seen since 1865. *Delissea undulata* ssp. *undulata* was known from southwestern Maui and western Hawaii. Currently, this variety occurs only on the island of Hawaii (K. Wood, *in litt.* 1999; Lammers 1999; GDSI 2000; 61 FR 53124; HINHP Database 2000).

Delissea undulata ssp. *kauaiensis* occurs in dry or open *Acacia koa-Metrosideros polymorpha* mesic forests or *Alphitonia ponderosa* montane forest at elevations between 139 and 1,006 m (456 and 3,299 ft). Associated native species include *Diospyros sandwicensis, Dodonaea viscosa, Doodia kunthiana, Eragrostis variabilis, Euphorbia haeleeleana, Kokia kauaiensis, Microlepia strigosa, Panicum* spp., *Pleomele aurea, Psychotria mariniana, P. greenwelliae, Santalum ellipticum* (K. Wood, pers. comm., 2001).

The threats to this subspecies on Kauai are feral goats, pigs, and cattle; small population size; competition with the non-native plants *Passiflora mollissima* and *Delairea odorata* (cape ivy); fire; introduced slugs; seed predation by rats and introduced game birds; and a risk of extinction due to random naturally occurring events, such as landslides or hurricanes (Service 1996).

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 large brown or dark gray scales, fused or separate sori along both margins, shiny black midribs that have a hardened surface, and veins that do not usually encircle the sori (Degener and Greenwell 1950; Wagner 1952).

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

Historically, *Diellia erecta* was known on Kauai, Oahu, Molokai, Lanai, scattered locations on Maui, and various locations on the Island of Hawaii. Currently, it is only known from Moloka'i, Maui, and Hawaii and recently rediscovered on Kauai. On Kauai there is one known population with 30 individuals in Kawaiiki Valley on State-owned land within the Na Pali-Kona Forest Reserve (Service 1999; HINHP Database 2000).

This species is found in brown granular soil with leaf litter and occasional terrestrial moss on north facing slopes in deep shade on steep slopes or gulch bottoms in *Metrosideros polymorpha-Dicranopteris linearis* wet forest or *Metrosideros polymorpha* mixed mesic with *Acacia koa* and *Acacia koaia* as codominants, at elevations between 655 and 1,224 m (2,149 and 4,016 ft). Associated native plant species include *Asplenium aethiopicum* (NCN), *Asplenium contiguum* (NCN), *Asplenium macraei* (NCN), *Coprosma* spp., *Dodonaea viscosa, Dryopteris fusco-atra* (NCN), *Dryopteris unidentata, Hedyotis terminalis, Melicope* spp., *Microlepia strigosa, Myrsine* spp., *Nestegis sandwicensis, Psychotria* spp., *Styphelia tameiameiae, Syzygium sandwicensis,* or *Wikstroemia* spp. (Service 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Diellia erecta* on Kauai are habitat degradation by pigs and goats; competition with non-native plant species, including *Blechnum occidentale, Grevillea robusta* (silk oak), *Lantana camara, Mariscus meyenianus* (NCN), *Myrica faya, Passiflora mollissima, Rubus argutus,* or *Setaria palmifolia* (palm grass); and random naturally occurring events that could cause extinction and/or reduced reproductive vigor due to the small number of existing individuals (59 FR 56333; Service 1996).

Diplazium molokaiense (NCN)

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

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

Historically, *Diplazium molokaiense* was found on Kauai, Oahu, Molokai, Lanai, and Maui. Currently, this species is only known from Maui. It was last seen on Kauai in 1909 (HINHP Database 2000).

This species occurs in brown soil with basalt outcrops near water falls in lowland or montane mesic *Metrosideros polymorpha-Acacia koa* forest at elevations between 476 and 1,284 m (1,562 and 4,212 ft) (Service 1998a; HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats on Kauai are habitat degradation by feral goats, and pigs and competition with non-native plant species (59 FR 49025; Service 1998a; HINHP Database 2000).

Euphorbia haeleeleana (akoko)

Euphorbia haeleeleana, a member of the spurge family (Euphorbiaceae), is a dioecious tree with alternate papery leaves. This short-lived perennial species is distinguished from others in the genus in that it is a tree, whereas most of the other species are herbs or shrubs, as well as by the large leaves with prominent veins (Wagner *et al.* 1999).

Individual trees of *Euphorbia haeleeleana* bear only male or female flowers, and must be cross-pollinated from a different tree to produce viable seed. *Euphorbia haeleeleana* sets fruit between August and October. Little else is known about the life history of this species. Reproductive cycles, longevity, specific environmental requirements, and limiting factors are unknown (Wagner *et al.* 1999; Service 1999).

Euphorbia haeleeleana is known historically and currently from northwestern Kauai and the Waianae Mountains of Oahu. On Kauai, there is a total of seven populations with 597 individuals occurring on State-owned land. It is found at Pohakuao, Kalalau Valley, Hipalau Valley, Koaie Canyon, Mahanaloa Valley, Kuia Valley, Poopooiki Valley, Nualolo Trail, Makaha Valley, and Haeleele Valley within the Kuia Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve (61 FR 53108; Service 1999; K. Wood, *in litt.* 1999; HINHP Database 2000).

Euphorbia haeleeleana is usually found in lowland mixed mesic or dry *Diospyros* forest that is often co-dominated by *Metrosideros polymorpha* and *Alphitonia ponderosa.* This plant is typically found at elevations between 284 and 1,178 m (931 and 3,866 ft). Associated native plant species include *Acacia koaia* (koaia), *Antidesma platyphyllum, Claoxylon sandwicense, Carex meyenii, Carex wahuensis, Diplazium sandwichianum, Dodonaea viscosa, Erythrina sandwicensis, Kokia kauaiensis, Pleomele aurea, Psychotria mariniana, P. greenwelliae, Pteralyxia sandwicensis, Rauvolfia sandwicensis, Reynoldsia sandwicensis* (ohe), *Sapindus oahuensis, Tetraplasandra kauaiensis, Pouteria sandwicensis, Pisonia sandwicensis,* or *Xylosma* spp. (61 FR 53108; K. Wood, pers. comm., 2001).

Threats to this species on Kauai include habitat degradation and destruction by deer, feral goats, and pigs; seed predation by rats; fire; and competition with non-native plants (61 FR 53108; Service 1999).

Flueggea neowawraea (mehamehame)

Flueggea neowawraea, a member of the spurge family (Euphorbiaceae), is a large dioecious tree with white oblong pores covering its scaly, pale brown bark. This long-lived perennial species is the only member of the genus found in Hawaii and can be distinguished from other species in the genus by its large size, scaly bark, the shape, size, and color of the leaves, flowers clustered along the branches, and the size and shape of the fruits (Neal 1965; Linney 1982; 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. Reproductive cycles, longevity, specific environmental requirements, and limiting factors are unknown (Hayden 1999).

Historically, *Flueggea neowawraea* was known from Kauai, Oahu, Maui, Molokai, and the island of Hawaii. Currently, it is known from Kauai, Oahu, east Maui, and Hawaii. On Kauai, this species is reported from Limahuli Valley, Pohakuao, the left branch of Kalalau Valley, Kuia and Paaiki Valleys, Kipalau Valley, Koaie Falls, Kawaiiki Valley, and Waimea Canyon. There are eight populations with 85 known individuals occurring on State (Alakai Wilderness Preserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve) and privately owned lands. However, it has been estimated that the total number of individuals may be slightly over 100 (Hayden 1999; Service 1999; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Flueggea neowawraea occurs in dry or mesic forests at elevations between 210

and 1,178 m (689 and 3,865 ft). Associated native plant species include *Alectryon macrococcus, Antidesma pulvinatum* (hame), *A. platyphyllum, Bidens sandvicensis, Bobea timonioides, Caesalpinia kavaiensis, Charpentiera* spp., *Diospyros* spp., *Diplazium sandwichianum, Freycinetia arborea, Hibiscus* spp., *Isodendrion laurifolium, Kokia kauaiensis, Melicope* spp., *Metrosideros polymorpha, Munroidendron racemosum, Myrsine lanaiensis, Nesoluma polynesicum, Nestegis sandwicensis, Tetraplasandra* spp., *Pittosporum* spp., *Pouteria sandwicensis, Pritchardia minor, Psychotria* spp., *Psydrax odoratum, Pteralyxia kauaiensis, Rauvolfia sandwicensis, Streblus pendulinus, Tetraplasandra* spp., *Xylosma hawaiiense,* or *Xylosma crenatum* (59 FR 56333; HINHP Database 2000; Service 1999; K. Wood, pers. comm., 2001).

The threats to this species on Kauai include the black twig borer; habitat degradation by feral pigs, goats, deer, and cattle; competition with non-native plant species; fire; small population size; depressed reproductive vigor; and a potential threat of predation on the fruit by rats (59 FR 56333; HINHP Database 2000; Service 1999).

Gouania meyenii (NCN)

Gouania meyenii, a member of the buckthorn family (Rhamnaceae), is a shrub with entire, papery leaves. This short-lived perennial species is distinguished from the two other Hawaiian species of *Gouania* by its lack of tendrils on the flowering branches, the absence of teeth on the leaves, and the lack or small amount of hair on the fruit (Wagner *et al.* 1999).

Gouania meyenii flowers from March to May. Seed capsules develop in about 6 to 8 weeks. Plants appear to live about 10 to 18 years in the wild. Little else is known about the life history of *Gouania meyenii.* Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998b).

Historically, *Gouania meyenii* was known only from Oahu. It was discovered on Kauai in 1993 (Lorence et al.) and published in the supplement to the Manual of Flowering Plants of Hawaii (Wagner *et al.* 1999). Currently, this species is found on Oahu and on Kauai on State-owned land within the Na Pali Coast State Park and the Na Pali-Kona Forest Reserve. There is a total of three populations on Kauai with nine individuals found in the Kalalau and Hipalau Valleys (56 FR 55770; Wagner *et al.* 1999; GDSI 2000; HINHP Database 2000).

This species typically grows on rocky ledges, cliff faces, and ridge-tops in dry shrubland or *Metrosideros polymorpha* lowland diverse mesic forest at elevations between 375 and 1,179 m (1,231 and 3,867 ft). Associated native plant species include *Bidens* spp., *Carex meyenii, Chamaesyce* spp., *Dodonaea viscosa, Diospyros* spp., *Eragrostis variabilis, Euphorbia haeleeleana, Hedyotis* spp., *Hibiscadelphus* spp., *Lysimachia* spp., *Melicope pallida, Neraudia kauaiensis, Nestegis sandwicensis, Nototrichium divaricatum, Panicum lineale, Poa mannii, Psychotria* spp., *Senna gaudichaudii* (kolomona), or *Wilkesia gymnoxiphium* (56 FR 55770; HINHP Database 2000; K. Wood, pers. comm., 2001).

Threats to *Gouania meyenii* on Kauai include competition from the non-native plants *Schinus terebinthifolius, Melinis minutiflora,* or *Psidium cattleianum;* fire; habitat degradation by feral pigs and goats; and the small number of extant populations and individuals (56 FR 55770; Service 1998b).

Hedyotis cookiana (awiwi)

Hedyotis cookiana, a member of the coffee family (Rubiaceae), is a small shrub with many branches and papery-textured leaves which are fused at the base to form a sheath around the stem. This short-lived perennial species is distinguished from other species in the genus that grow on Kauai by being entirely hairless (Wagner *et al.* 1999).

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

Historically, *Hedyotis cookiana* was known from the islands of Hawaii, Kauai, Molokai, and Oahu. Currently, it is only known from one population of 80 individuals on State-owned land within Hono O Na Pali Natural Area Reserve in Waiahuakua Valley on Kauai (GDSI 2000; HINHP Database 2000).

This species generally grows in streambeds or on steep cliffs close to water sources in relict *Metrosideros polymorpha* low mesic and low wet forest communities at elevations between 119 and 553 m (392 and 1,814 ft). Associated native plant species include *Boehmeria grandis, Chamaesyce celastroides* var. *hanapepensis, Hibiscus kokio ssp. saintjohnianus, Machaerina angustifolia, Nototrichium sandwicense, Pleomele aurea, Pipturus kauaiensis* (mamaki), *Pouteria sandwicensis, Psydrax odoratum,* or *Rauvolfia sandwicensis. Hedyotis cookiana* is believed to have formerly been much more widespread on several of the main Hawaiian Islands (Wagner *et al.* 1999; K. Wood, pers. comm., 2001).

The threats to this species on Kauai are risk of extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of individuals in the only known population; flooding; competition with non-native plants; and habitat modification by feral pigs and goats (59 FR 9304; Service 1995; HINHP Database 2000).

Hibiscus brackenridgei (mao hau hele)

Hibiscus brackenridgei, a short-lived perennial and a member of the mallow family (Malvaceae). The species 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 that fall off, leaving an elliptic scar. Two subspecies are currently recognized, *Hibiscus brackenridgei* ssp. *brackenridgei* and *H. brackenridgei* ssp. *mokuleianus* (Bates 1990).

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 biology, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Hibiscus brackenridgei* was known from the islands of Kauai, Oahu, Lanai, Maui, Molokai, and the island of Hawaii. *Hibiscus brackenridgei* was collected from an undocumented site on Kahoolawe, though the subspecies has never been determined. Currently, *Hibiscus brackenridgei* ssp. *mokuleianus* is only known from Oahu. *Hibiscus brackenridgei* ssp. *brackenridgei* is currently known from Lanai, Maui, and the island of Hawaii (Bates 1990; Service 1999; HINHP Database 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Hibiscus brackenridgei* on the island of Kauai.

Nothing is known of the threats to *Hibiscus brackenridgei* on the island of Kauai.

Ischaemum byrone (Hilo ischaemum)

Ischaemum byrone, a short-lived perennial member of the grass family (Poaceae), is a 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 di- or trichotomously-branching (two-or three-tiered) inflorescence (O'Connor 1999).

Additional information on the life history of this plant, reproductive cycles, longevity, specific environmental requirements, and limiting factors is generally unknown (Service 1996).

Historically, *Ischaemum byrone* was reported from Oahu, Molokai, East Maui, Kauai and the island of Hawaii. Currently, this species is found on Molokai, Hawaii, Maui, and recently rediscovered on the north shore of Kauai. On Kauai, there are two populations with at least two individuals at Kaweonui Point and Kauapea Beach on privately owned land (59 FR 10305; HINHP Database 2000).

The habitat of *Ischaemum byrone* is coastal shrubland, occurring near the ocean among rocks and seepy cliffs at elevations between 0 and 297 m (0 and 975 ft). Associated native plant species include *Bidens* spp., *Chamaesyce celastroides, Fimbristylis cymosa, Lipochaeta succulenta, Lysimachia mauritiana,* or *Scaevola sericea* (HINHP Database 2000; K. Wood, pers. comm., 2001).

Threats to *Ischaemum byrone* include the invasion of non-native plants, fire, grazing and browsing by goats and pigs. Disturbance incurred from these ungulates further promotes the introduction and establishment of non-native weeds. Some populations are also threatened from residential development (59 FR 10305; Service 1996; HINHP Database 2000).

Isodendrion laurifolium (aupaka)

Isodendrion laurifolium, a member of the violet family (Violaceae), is a slender, straight shrub with few branches. The short-lived perennial species is distinguished from others in the genus by its leathery, oblong-elliptic or narrowly elliptic lance-shaped leaves (Wagner *et al.* 1999).

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

Historically, *Isodendrion laurifolium* is known from scattered locations on Kauai and Oahu. Currently, on Kauai, this species is found on State-owned land within the Alakai Wilderness Preserve, Kuia Natural Area Reserve, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve in the following locations: Paaiki, Poopooiki, Kawaiula Valley, Mehanaloa Valley, Makaha Valley, Haeleele Valley, Kipalau Valley, Kawaiiki Valley and Kaluahaulu Ridge. There are a total of five populations with 151 individuals (HINHP Database 2000; GDSI 2000; Service 1999).

Isodendrion laurifolium is usually found at elevations between 376 and 1,163 m (1,233 and 3,817 ft) in diverse mesic forest, dominated by *Metrosideros polymorpha, Acacia koa* or *Diospyros* spp. Associated native species include *Alphitonia ponderosa, Antidesma* spp., *Claoxylon sandwicense, Dodonaea viscosa, Dubautia* spp., *Elaeocarpus bifidus, Euphorbia haeleeleana, Hedyotis terminalis, Kokia kauaiensis, Melicope anisata, Melicope barbigera, Melicope ovata, Melicope peduncularis, Myrsine lanaiensis, Nestegis sandwicensis, Pisonia* spp., *Pittosporum glabrum* (hoawa), *Pleomele aurea, Pouteria sandwicensis, Psydrax odoratum, Streblus pendulinus,* or *Xylosma hawaiiense* (HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Isodendrion laurifolium* on Kauai are habitat degradation by feral goats, pigs and deer and competition with non-native plants (61 FR 53108; HINHP Database 2000; Service 1999).

Isodendrion longifolium (aupaka)

Isodendrion longifolium, a member of the violet family (Violaceae), is a slender, straight shrub. Hairless, leathery, lance-shaped leaves distinguish this species from others in the genus (Wagner *et al.* 1999).

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

Historically and currently, *Isodendrion longifolium* is known from scattered locations on Kauai and Oahu. On Kauai, this species is reported from Limahuli Valley, Manoa Stream, Hanakapiai, Pohakea, Waioli Valley, the left branch of Kalalau Valley, Honopu Valley, Kawaiula Valley, Wahiawa, and Haupu. There is a total of nine populations containing approximately 521 individual plants on State (Halelea Forest Reserve, Hono o Na Pali Natural Area Reserve, Kokee State Park, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve) and privately owned lands (Lorence and Flynn 1991, 1993; 61 FR 53108; Service 1999; HINHP Database 2000; GDSI 2000).

Isodendrion longifolium is found on steep slopes and some flats in certain undisturbed areas, gulches, or stream banks in mesic or wet *Metrosideros polymorpha-Acacia koa* forests, usually at elevations between 38 and 1,541 m (125 and 5,057 ft). Associated native plant species include *Antidesma* spp., *Bidens* spp., *Bobea brevipes, Cheirodendron* spp., *Cibotium* spp., *Cyanea hardyi, Cyrtandra* spp., *Dicranopteris linearis, Diospyros* spp., *Eugenia* spp., *Hedyotis* spp., *Ilex anomala, Melicope* spp., *Nestegis sandwicensis, Peperomia* spp., *Perrottetia sandwicensis, Pipturus* spp., *Pittosporum* spp., *Pritchardia* spp., *Psychotria* spp., *Psydrax odoratum,* or *Syzygium* spp. (61 FR 53108; Service 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Isodendrion longifolium* on Kauai are habitat degradation or destruction by feral goats and pigs, and competition with various non-native plants (Lorence and Flynn 1993; 61 FR 53108; Service 1999; HINHP Database 2000).

Isodendrion pyrifolium (wahine noho kula)

Isodendrion pyrifolium, a short-live perennial of the violet family (Violaceae), is a small, branched shrub with elliptic to lance-shaped leaf blades. The papery-textured blade is moderately hairy beneath (at least on the veins) and stalked. The petiole is subtended by oval, hairy stipules. Fragrant, bilaterally symmetrical flowers are solitary. The pedicel (flower stalk) is white-hairy, and subtended by two bracts. Bracts arise at the tip of the peduncle. The five sepals are lance-shaped, membranous-edged and fringed with white hairs. Five green-yellow petals are somewhat unequal, and lobed, the upper being the shortest and the lower the longest. The fruit is a three-lobed, oval capsule, which splits to release olive-colored seeds. *Isodendrion pyrifolium* is distinguished from other species in the genus by its smaller, green-yellow flowers, and hairy stipules and leaf veins (Wagner *et al.* 1999).

During periods of drought, this species will drop all but the newest leaves. After sufficient rains, the plants produce flowers with seeds ripening one to two months later. No other life history information is currently known for this species (Service 1996).

Isodendrion pyrifolium is known historically from six of the Hawaiian Islands. Locations of the populations on Niihau, Molokai, and Lanai were

unspecified. Specific populations were found in Oahu's central Waianae Mountains, Maui's southwestern Mountains, and on the western slope of Hualalai mountain on the island of Hawaii. It is currently found only on the island of Hawaii. It was last seen on Niihau in the 1850s (59 FR 10305; Service 1996; GDSI 2000; HINHP Database 2000; Marie Bruegmann, pers. comm., 2000).

Information on the physical and biological features that are essential to the conservation of *Isodendrion pyrifolium* on the island of Niihau is not known.

Information on the threats of *Isodendrion pyrifolium* on the island of Niihau is not known.

Lobelia niihauensis (NCN)

Lobelia niihauensis, a member of the bellflower family (Campanulaceae), is a small, branched shrub. This short-lived perennial species is distinguished from others in the genus by lacking or nearly lacking leaf stalks, the magenta-colored flowers, the width of the leaf, and length of the flowers (Lammers 1999).

Lobelia niihauensis flowers in late summer and early fall. Fruits mature a month to six weeks later. Plants are known to live as long as 20 years. Little else is known about the life history of *Lobelia niihauensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998b).

Historically, *Lobelia niihauensis* was known from Oahu, Niihau, and Kauai. It is now known to be extant only on Kauai and Oahu. On Kauai, 11 populations containing 1,106 individuals can be found on State (Hono o Na Pali Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve) and privately owned lands in Limahuli Valley, Hoolulu Valley, Hanakoa Valley, Pohakuao, the left and right branches of Kalalau Valley, Koaie Canyon, Kipalau Valley, Polihale Spring Kaaweiki Valley, and Keopaweo (Service 1998b; HINHP Database 2000; GDSI 2000).

Lobelia niihauensis typically grows on exposed, mesic mixed shrubland or coastal dry cliffs at elevations between 11 and 887 m (37 and 2,911 ft). Associated native plant species include *Artemisia australis, Bidens sandvicensis, Chamaesyce celastroides, Charpentiera* spp., *Eragrostis variabilis, Hibiscus kokio* ssp. *saint-johnianus, Lipochaeta connata* var. *acris, Lythrum* spp. (pukamole), *Nototrichium* spp., *Plectranthus parviflorus, Schiedea apokremnos*, or *Wilkesia hobdyi* (Service 1998b; Lammers 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

On Kauai, the major threats to this species are habitat degradation and browsing by feral goats and competition from non-native plants (56 FR 55770).

Lysimachia filifolia (NCN)

Lysimachia filifolia, a member of the primrose family (Primulaceae), is a small shrub. This short-lived perennial species is distinguished from other species of the genus by its leaf shape and width, calyx lobe shape, and corolla length (Wagner *et al.* 1999).

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

Historically, *Lysimachia filifolia* was known only from the upper portion of Olokele Valley on Kauai. This species is now also known from Oahu, and the ''Blue Hole'' area of Waialeale, Kauai. There is currently one population containing a total of 75 individuals on State-owned land on Kauai within the Lihue-Koloa Forest Reserve (Service 1995; HINHP Database 2000; GDSI 2000).

This species typically grows on mossy banks at the base of cliff faces within the spray zone of waterfalls or along streams in lowland wet forests at elevations between 177 and 1,088 m (581 and 3,568 ft). Associated native plant species include mosses, mosses, ferns, liverworts, *Antidesma platyphyllum, Bidens valida* (kookoolau), *Bobea elatior* (ahakea lau nui), *Cyanea asarifolia, Chamaesyce remyi* var *kauaiensis* (akoko), *Dubautia plantaginea* ssp. *magnifolia* (naenae), *Eragrostis variabilis, Metrosideros polymorpha, Machaerina angustifolia, Melicope* spp., or *Panicum lineale* (59 FR 9304; Service 1995; Wagner *et al.* 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Lysimachia filifolia* on Kauai include competition with non-native plant species; feral pigs; and the risk of extinction on Kauai from naturally occurring events (*e.g.,* landslides and hurricanes), due to the small number of individuals in the only known population (59 FR 9304; HINHP Database 2000).

Mariscus pennatiformis (NCN)

Mariscus pennatiformis, a short-lived member of the sedge family (Cyperaceae), is a perennial plant with a woody root system covered with brown scales. *Mariscus pennatiformis* is a subdivided into two subspecies, ssp. *bryanii* and ssp. *pennatiformis*, which are distinguished by the length and width of the spikelets; color, length, and width of the glume; and by the shape and length of the achenes. This species differs from other members of the genus by its three-sided, slightly concave, smooth stems; the length and number of spikelets; the leaf width; and the length and diameter of stems (Koyama 1990).

Mariscus pennatiformis is known to flower from November to December after heavy rainfall. Additional information on the life history of this plant, reproductive cycles, longevity, specific environmental requirements, and limiting factors is generally unknown (Service 1999).

Historically, *Mariscus pennatiformis* was known from Kauai, Oahu, East Maui, the Island of Hawaii, and from Laysan in the Northwestern Hawaiian Islands). *Mariscus pennatiformis* ssp. *bryanii* is only known from Laysan Island in the Northwestern Hawaiian Islands National Wildlife Refuge. *Mariscus pennatiformis* ssp. *pennatiformis* is currently found only on East Maui. It was last seen on Kauai in 1927 (K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Mariscus pennatiformis is found at elevations between 544 and 1,104 m (1,785 and 3,621 ft) in open sites in *Metrosideros polymorpha-Acacia koa* mixed mesic forest. Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii, Alsinidendron viscosum, Carex alligata* (NCN), *Cyperus laevigatus* (makaloa), *Dianella sandwicensis, Diospyros hillebrandii, Diospyros sandwicensis, Dodonaea viscosa, Myrsine linearifolia, Nestegis sandwicensis, Panicum nephelophilum, Poa sandvicensis, Psydrax odoratum, Schiedea stellarioides, Styphelia tameiameiae*, or endemic ferns (Koyama 1990; HINHP Database 2000; K. Wood, pers. comm., 2001).

Threats to *Mariscus pennatiformis* on Kauai include grazing and habitat destruction caused by ungulates; competition from non-native plant species; and extinction from random naturally occurring events (59 FR 56333; Service 1999).

Melicope knudsenii (alani)

Melicope knudsenii, a member of the rue family (Rutaceae), is a tree with smooth gray bark and yellowish brown to olive-brown hairs on the tips of the branches. The long-lived perennial species is distinguished from *M. haupuensis* and other members of the genus by the distinct carpels present in

the fruit, a hairless endocarp, a larger number of flowers per cluster, and the distribution of hairs on the underside of the leaves (Stone *et al.* 1999).

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

Historically and currently, *Melicope knudsenii* is known from Maui and Kauai. On Kauai, this species is known from seven populations on State-owned land, with a total of 10 individuals, in Poopooiki Valley, Kuia Valley, Mahanaloa Valley, Makaha Ridge, Koaie Canyon, Koaie Falls, and Kawaiiki Valley within the Kuia Natural Area Reserve and Na Pali-Kona Forest Reserve (59 FR 9304; Service 1995; GDSI 2000; HINHP Database 2000; K. Wood, pers. comm., 2001).

Melicope knudsenii grows on forested flats with brown granular soil in lowland dry to montane mesic forests at elevations between 111 and 1,141 m (364 and 3,745 ft) with *Alectryon macrococcus, Antidesma platyphylla, Bobea brevipes, Carex meyenii, Cryptocarya mannii, Diospyros sandwicensis, Diplazium sandwichianum, Dodonaea viscosa, Euphorbia haeleeleana, Gahnia beecheyi* (NCN), *Hedyotis* spp., *Hibiscus waimeae, Isodendrion laurifolium, Metrosideros polymorpha, Melicope* spp., *Myrsine lanaiensis, Nestegis sandwicensis, Panicum nephelophilum, Peucedanum sandwicense, Pisonia sandwicensis, Pittosporum kauaiensis, Pleomele aurea, Pouteria sandwicensis, Pritchardia minor, Psychotria hobdyi, Psydrax odoratum, Rauvolfia sandwicensis, Remya kauaiensis, Scaevola procera, Styphelia tameiameiae*, or *Xylosma hawaiiense* (Service 1995; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Melicope knudsenii* on Kauai include competition with the non-native plant *Lantana camara*; habitat degradation by feral goats and pigs; fire; black twig borer; and the risk of extinction on Kauai from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of existing individuals and populations (59 FR 9304; Service 1995).

Melicope pallida (alani)

Melicope pallida, a member of the rue family (Rutaceae), is a tree with grayish white hairs and black, resinous new growth. The long-lived perennial species differs from *M. haupuensis*, *M. knudsenii*, and other members of the genus by presence of resinous new growth, leaves folded in clusters of three, and fruits with separate carpels (Stone *et al.* 1999).

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

Historically and currently, *Melicope pallida* is known from Oahu and Kauai. On Kauai, the species is currently known in the following locations: Pohakuao, the left branch of Kalalau Valley, Honopu Trail, Awaawapuhi Valley, and Koaie Canyon. There is a total of five populations with 181 individuals on State-owned land within the Alakai Wilderness Preserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve (K. Wood, in litt. 1999; D.W. Mathias, U.S. Navy (Navy), *in litt.* 1999; HINHP Database 2000; GDSI 2000).

Melicope pallida usually grows on steep rock faces in lowland to montane mesic to wet forests or shrubland at elevations between 359 and 1,081 m (1,179 and 3,546 ft). Associated native plant species include *Abutilon sandwicense, Alyxia oliviformis, Artemisia australis, Boehmeria grandis, Carex meyenii, Chamaesyce celastroides* var *hanapepensis, Coprosma waimeae, Coprosma kauensis* (koi), *Dodonaea viscosa, Dryopteris* spp., *Hedyotis terminalis, Lepidium serra, Melicope* spp., *Metrosideros polymorpha, Nototrichium* spp., *Pipturus albidus* (mamaki), *Pleomele aurea, Poa mannii, Psychotria mariniana, Pritchardia minor, Sapindus oahuensis, Schiedea membranacea, Tetraplasandra waialealae*, or *Xylosma hawaiiense* (HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Melicope pallida* are habitat destruction by feral goats and pigs; the black twig borer; fire; susceptibility to extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of existing populations; and competition with non-native plant species (59 FR 9304; Hara and Beardsley 1979; Medeiros *et al.* 1986; Service 1995; HINHP Database 2000).

Peucedanum sandwicense (makou)

Peucedanum sandwicense, a 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 short-lived perennial species is the only member of the genus in the Hawaiian Islands, one of three genera of the family with species endemic to the island of Kauai. This species differs from the other Kauai members of the parsley family in having larger fruit and pinnately compound leaves with broad leaflets (Constance and Affolter 1999).

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

Historically and currently, *Peucedanum sandwicense* is known from Molokai, Maui, and Kauai. Discoveries in 1990 extended the known distribution of this species to the Waianae Mountains on the island of Oahu. Additionally, a population is known from State-owned Keopuka Rock, an islet off the coast of Maui. On Kauai, there are 14 populations on State (Haena State Park, Hono o Na Pali Natural Area Reserve, Kuia Natural Area Reserve, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve) and privately owned lands, containing approximately 340 individuals, in Maunahou Valley, Limahuli Valley, Hoolulu, Hanakoa, Pohakuao, Kanakou, the left branch of Kalalau Valley, Nualolo Valley, Kuia Valley, Mahanaloa Valley, Koaie Canyon, and Haupu (59 FR 9304; Service 1995; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000).

This species grows on cliff habitats in mixed shrub coastal dry cliff communities or diverse mesic forest between 0 and 1,232 m (0 and 4,041 ft). Associated native plant species include *Acacia koa, Artemisia australis, Brighamia insignis, Bidens* spp., *Carex meyenii, Chamaesyce celastroides, Diospyros* spp., *Dodonaea viscosa, Eragrostis variabilis, Hibiscus kokio, Lobelia niihauensis, Metrosideros polymorpha, Panicum lineale, Psydrax odoratum, Psychotria* spp., or *Wilkesia* spp. (59 FR 9304; Constance and Affolter 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to *Peucedanum sandwicense* on Kauai include competition with introduced plants; habitat degradation and browsing by feral goats and deer; and trampling and trail clearing (Hanakapiai population) (59 FR 9304; Service 1995; HINHP Database 2000).

Phlegmariurus mannii (wawaeiole)

Phlegmariurus mannii, a member of the clubmoss family (Lycopodiaceae) and a short-lived perennial, is a pendant (hanging) epiphyte with clustered,

delicate red stems and forked reproductive spikes. These traits distinguish it from others in the genus in Hawaii (Holub 1991).

Little is known about the life history of *Phlegmariurus mannii*. Reproductive cycles, dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1997).

Historically, *Phlegmariurus mannii* was known from Kauai, West Maui, and Hawaii island. Currently, this species is extant on Maui and Hawaii island. It was last observed on Kauai in 1900 (HINHP Database 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Phlegmariurus mannii* on the island of Kauai.

Nothing is known of the threats to *Phlegmariurus mannii* on the island of Kauai.

Phlegmariurus nutans (waewaeiole)

Phlegmariurus nutans is an erect of pendulous herbaceous epiphyte (plant not rooted in the ground) of the clubmoss family (Lycopodiaceae). Its stiff, light green branches, 25 to 40 cm (10 to 16 in.) long and about 6 mm (0.2 in.) thick, are covered with stiff, flat, leathery leaves, 12 to 16 mm (0.5 to 0.6 in.) long and about 2.5 mm (0.1 in.) wide that overlap in acute angles. The leaves are arranged in six rows and arise directly from the branches. The branches end in thick, 7 to 13 cm (2.8 to 5.1 in.) long fruiting spikes that are unbranched or branch once or twice, and taper toward a downward-curving tip. Bracts on the fruiting spikes, between 3 to 6 mm (0.6 and 0.2 in.) long, are densely layered and conceal the spore capsules. This species can be distinguished from others of the genus in Hawaii by its epiphytic habit, simple or forking fruiting spikes, and larger and stiffer leaves (Wagner and Wagner 1987).

Phlegmariurus nutans has been observed fertile, with spores, in May and December. Little else is known about the life history of *Phlegmariurus nutans*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998b).

Historically, *Phlegmariurus nutans* was known from the island of Kauai and from scattered locations in the Koolau Mountains of Oahu. It is currently only known from Oahu. It was last observed on Kauai in 1900 (Service 1998b; HINHP Database 2000).

Phlegmariurus nutans grows on tree trunks, usually on open ridges and slopes in *Metrosideros polymorpha-Dicranopteris linearis* wet forests and occasionally mesic forests at elevations between 601 and 1,594 m (1,971 and 5,228 ft). The vegetation in those areas typically include *Antidesma platyphyllum, Broussaisia arguta, Cibotium chamissoi* (hapuu), *Cheirodendron fauriei*, *Diploterygiun pinnatum*, *Hedyotis terminalis*, *Hibiscus kokio* ssp. *kokio*, *Melicope waialealae* (alani wai), *Scaevola gaudichaudii*, *Syzygium sandwicensis*, *Perrottetia sandwicensis*, *Psychotria hexandra*, *P. mariniana*, or *P. wawrae* (K. Wood, pers. comm., 2001).

The primary threat to *Phlegmariurus nutans* is extinction due to naturally-occurring events and/or reduced reproductive vigor because of the small number of remaining individuals and limited distribution. Additional threats to *Phlegmariurus nutans* are feral pigs and the noxious non-native plants *Clidemia hirta* or *Psidium cattleianum* (Service 1998b).

Plantago princeps (laukahi kuahiwi)

Plantago princeps, a member of the plantain family (Plantaginaceae), is a small shrub or robust perennial herb. This short-lived perennial 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, *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. Reproductive cycles, longevity, specific environmental requirements, and limiting factors are generally unknown. However, individuals have been observed in fruit from April through September (Service 1999).

Historically, *Plantago princeps* was found on the islands of Hawaii, Kauai, Maui, Molokai, and Oahu. It no longer occurs on the island of Hawaii. Two varieties of the species, totaling six populations, with 471 individuals, are extant on the island of Kauai, on both State (Halelea Forest Reserve, Lihue-Koloa Forest Reserve, and Na Pali Coast State Park) and privately owned lands. Historically on Kauai, *Plantago princeps* var. *anomala* was reported from a ridge west of Hanapepe River. Currently, this variety is found in the left branch of Kalalau Valley and Puu Ki. *Plantago princeps* var. *longibracteata* was historically known from Hanalei, the Wahiawa Mountains, and Hanapepe Falls. Currently, populations are known from Waioli Valley, Alakai Swamp, the left branch of Wainiha Valley, and Blue Hole (59 FR 56333; Service 1999; GDSI 2000; HINHP Database 2000).

Plantago princeps var. *longibracteata* is found in windswept areas near waterfalls in *Metrosideros polymorpha-Cheirodendron montane* wet forest with riparian vegetation at elevations between 347 and 1,598 m (1,139 and 5,244 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii*, *Bidens forbesii*, *Bobea elatior*, *Boehmeria grandis*, *Cyrtandra* spp., *Diplazium sandwichianum*, *Freycinetia arborea*, *Gunnera* spp., *Hedyotis elatior*, *Huperzia* spp. *Hedyotis centranthoides*, *Isachne pallens* (NCN), *Machaerina angustifolia*, *Perrottetia sandwicensis*, *Pilea peploides* (NCN), *Pipturus* spp., *Sadleria cyatheoides* (amau), or *Tetraplasandra* spp. (K. Wood, pers. comm., 2001).

Plantago princeps var. *anomala* is found in *Metrosideros polymorpha* lowland to montane transitional wet forest on cliffs and ridges, growing on basalt rocky outcrops. Associated native plant species include *Bidens sandvicensis*, *Carex meyenii*, *Carex wahuensis*, *Charpentiera elliptica*, *Hedyotis* spp., *Lipochaeta connata*, *Lysimachia glutinosa*, *Lysimachia kalalauensis*, *Melicope* spp., *Myrsine linearifolia*, *Poa mannii*, or *Wilkesia gymnoxiphium* (K. Wood, pers. comm., 2001).

The primary threats to both species of *Plantago princeps* on Kauai are herbivory and habitat degradation by feral pigs and goats and competition with various non-native plant species. Ungulate herbivory is especially severe, with numerous observations of *P. princeps* individuals exhibiting browse damage (61 FR 53108; Service 1999).

Platanthera holochila (NCN)

Platanthera holochila, a 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. This short-lived perennial 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 *Platanthera holochila*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Platanthera holochila* was known from the Alakai Swamp, Kaholuamano area, and the Wahiawa Mountains on Kauai, and scattered locations on Oahu, Molokai, and Maui. Currently, *P. holochila* is extant on Kauai, Molokai, and Maui. On Kauai, there are two populations with 28 individuals reported on State (Alakai Wilderness Preserve) owned lands at Kilohana and the Alakai Swamp (HINHP Database 2000; GDSI 2000).

Platanthera holochila is found in montane *Metrosideros polymorpha -Dicranopteris linearis* wet forest or *M. polymorpha* mixed bog at elevations between 803 and 1,563 m (2,635 and 5,128 ft). Associated native plant species include mosses, grammitid ferns, *Carex montis-eeka* (NCN), *Cibotium* spp., *Clermontia fauriei* (oha wai), *Coprosma elliptica* (pilo), *Dichanthelium* spp, *Lobelia kauaensis, Machaerina angustifolia, Myrsine denticulata* (kolea), *Oreobolus furcatus, Rhynchospora laxa* (kuolohia), *Styphelia tameiameiae,* or *Vaccinium* spp., or *Viola kauaensis* (61 FR 53108; Service 1999; K. Wood, pers. comm., 2001).

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

Schiedea nuttallii (NCN)

Schiedea nuttallii, a member of the pink family (Caryophyllaceae), is a generally hairless, erect subshrub. This long-lived perennial 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).

Little is known about the life history of *Schiedea nuttallii.* Based on field and greenhouse observations, it is hermaphroditic (a flower containing both male and female sexual 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 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 (Service 1999).

Historically, *Schiedea nuttallii* was known from Kauai and Oahu and was reported from Maui. Currently, it is found on Kauai, Oahu, and Molokai. On Kauai, one population with 50 individuals is found on Haupu Peak on privately owned land. The status of individuals previously found in the Limahuli Valley is currently unknown (61 FR 53108; HINHP Database 2000; GDSI 2000; Service 1999).

Schiedea nuttallii typically grows on cliffs in lowland diverse mesic forest dominated by *Metrosideros polymorpha* at elevations between 37 and 702 m (120 and 2,303 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii, Bidens valida, Chamaesyce celastroides, Eragrostis variabilis, Hedyotis acuminata, Hedyotis fluviatilis, Heteropogon contortus, Lepidium* spp. (anaunau), *Lobelia niihauensis, Psychotria* spp., *Perrottetia sandwicensis,* or *Pisonia* spp. (Service 1999; K. Wood, pers. comm., 2001).

Schiedea nuttallii is threatened on Kauai by habitat degradation and/or destruction by feral pigs, goats, and possibly deer; competition with several non-native plants; landslides; predation by the black twig borer; and a risk of extinction from naturally occurring events (*e.g.,* landslides or hurricanes) and/or reduced reproductive vigor, due to the small number of individuals in the only known population. Based on observations that indicate that introduced snails and slugs may consume seeds and seedlings, it is likely that introduced molluscs also represent a major threat to this species (61 FR 53108; Service 1999).

Sesbania tomentosa (ohai)

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

The pollination biology of *Sesbania tomentosa* is being studied by David Hopper, a graduate student in the Department of Zoology at the University of Hawaii at Manoa. His preliminary 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 populations 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 year (Service 1999).

Currently, *Sesbania tomentosa* occurs on six of the eight main Hawaiian Islands (Kauai, Oahu, Molokai, Kahoolawe, Maui, and Hawaii) and in the Northwestern Hawaiian Islands (Nihoa and Necker). Although once found on Niihau and Lanai, it is no longer extant on these islands. On Kauai, *S. tomentosa* is known from one population, with 18 individuals, on State-owned land from the Polihale State Park (59 FR 56333; HINHP Database 2000; GDSI 2000).

Sesbania tomentosa is found on sandy beaches, dunes, or pond margins at elevations between 0 and 212 m (0 and 694 ft). It commonly occurs in coastal dry shrublands or mixed coastal dry cliffs with the associated native plant species *Chamaesyce celastroides, Cluscuta sandwichiana* (kaunaoa), *Dodonaea viscosa, Heteropogon contortus, Myoporum sandwicense, Nama sandwicensis, Scaevola sericea, Sida fallax, Sporobolus virginicus, Vitex rotundifolia or Waltheria indica* (Service 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Sesbania tomentosa* on Kauai are habitat degradation caused by competition with various non-native plant species; lack of adequate pollination; seed predation by rats, mice and, potentially, non-native insects; fire; and destruction by off-road vehicles and other human disturbances (59 FR 56333; Service 1999).

Silene lanceolata (NCN)

Silene lanceolata, a member of the pink family (Caryophyllaceae), is an upright, short-lived perennial plant with stems 15 to 51 cm (6 to 20 in.) long, which are woody at the base. The narrow leaves are smooth except for a fringe of hairs near the base. Flowers are arranged in open clusters. The flowers are white with deeply-lobed, clawed petals. The capsule opens at the top to release reddish-brown seeds. This species is distinguished from *S. alexandri* by its smaller flowers and capsules and its stamens, which are shorter than the sepals (Wagner *et al.* 1999).

Little is known about the life history of *Silene lanceolata.* Its flowering cycles, pollination vectors, seed

dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (57 FR 46325; Service 1996).

The historical range of *Silene lanceolata* includes five Hawaiian Islands: Kauai, Oahu, Molokai, Lanai, and the island of Hawaii. *Silene lanceolata* is presently extant on the islands of Molokai, Oahu, and the island of Hawaii. It was last observed on Kauai in the 1850s (57 FR 46325; GDSI 2000; Service 1996).

Nothing is known of the preferred habitat of or native plant species associated with *Silene lanceolata* on the island of Kauai.

Nothing is known of the threats to *Silene lanceolata* on the island of Kauai.

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. The oval to elliptic leaves have prominent veins on the lower surface and lobed leaf margins. Numerous flowers grow in loose branching clusters with each flower on a stalk. 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 Lanai, Maui, and the island of Hawaii. According to David Symon (1999), the known distribution of *Solanum incompletum* also extended to the islands of Kauai and Molokai. Currently, *Solanum incompletum* is only known from the island of Hawaii. The reported presence on Kauai may be erroneous (HINHP Database 2000; Christopher Puttock, Bernice P. Bishop Museum, pers comm., 2001).

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

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

Solanum sandwicense (aiakeakua, popolo)

Solanum sandwicense, a member of the nightshade family (Solanaceae), is a large sprawling shrub. The younger branches are more densely hairy than older branches and the oval leaves usually have up to 4 lobes along the margins. This short-lived perennial species differs from others of the genus in having dense hairs on young plant parts, a greater height, and its lack of prickles (Symon 1999).

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

Historically, *Solanum sandwicense* was known from both Oahu and Kauai. Currently, this species is only known from Kauai. On Kauai, this species was historically reported from locations in the Kokee region bounded by Kalalau Valley, Milolii Ridge, and extending to the Hanapepe River. Currently, *Solanum sandwicense* is only known from six populations of 14 individual plants on private and State lands (Kokee State Park, Kuia Natural Area Reserve, and Na Pali-Kona Forest Reserve) at Kahuamaa Flats, Awaawapuhi Valley, Kumuwela Ridge, Waialae Valley, and Mokuone Stream (59 FR 9304; Service 1995; K. Wood, *in litt.* 1999; HINHP Database 2000; GDSI 2000; Joan Yoshioka, The Nature Conservancy of Hawaii (TNCH), pers. comm., 2000).

This species is typically found under forest canopies at elevations between 445 and 1,290 m (1,460 and 4,232 ft) in diverse lowland or montane *Acacia koa* or *Acacia koa-Metrosideros polymorpha* mesic forests or occasionally in wet forests. Associated native plant species include *Alphitonia ponderosa, Athyrium sandwicensis, Bidens* spp., *Carex meyenii, Coprosma* spp., *Cryptocarya mannii, Dianella sandwicensis, Dicranopteris linearis, Dubautia* spp., *Hedyotis* spp., *Ilex anomala, Melicope* spp., *Poa* spp., *Pouteria sandwicensis, Psychotria* spp., *Syzygium sandwicensis,* or *Xylosma hawaiiense* (59 FR 9304; Service 1995; HINHP Database 2000; K. Wood, pers. comm., 2001).

The major threats to populations of *Solanum sandwicense* on Kauai are habitat degradation by feral pigs, and competition with non-native plant species (*Passiflora mollissima, Rubus argutus, Psidium cattleianum, Hedychium gardnerianum* (kahili ginger), or *Lonicera japonica*); fire; human disturbance and development; and a risk of extinction from naturally occurring events (e.g., landslides or hurricanes) and/or reduced reproductive vigor due to the small number of existing individuals (59 FR 9304; Service 1995; HINHP Database 2000).

Spermolepis hawaiiensis (NCN)

Spermolepis hawaiiensis, a member of the parsley family (Apiaceae), is a slender annual herb with few branches. Its leaves, dissected into narrow, lance-shaped divisions, are oblong to somewhat oval in outline and grow on stalks. Flowers are arranged in a loose, compound umbrella-shaped inflorescence arising from the stem, opposite the leaves. *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 1999).

Historically, *Spermolepis hawaiiensis* was known from the islands of Kauai, Oahu, Lanai, and the island of Hawaii. Currently, it is found on Kauai, Oahu, Molokai, Lanai, West Maui, and Hawaii. On Kauai, this species is known from State-owned land at Koaie Canyon, the rim of Waimea Canyon, and Kapahili Gulch within the Na Pali-Kona Forest Reserve. There are three known populations with five individuals total on Kauai (59 FR 56333; Service 1999; HINHP Database 2000; GDSI 2000).

Spermolepis hawaiiensis is known from *Metrosideros polymorpha* forest and *Dodonaea viscosa* lowland dry shrubland, at elevations between 56 and 725 m (184 and 2,377 ft). Associated native plant species include *Bidens sandvicensis, Doryopteris* spp., *Eragrostis variabilis, Erythrina sandwicensis, Lipochaeta* spp., *Schiedea spergulina,* or *Sida fallax* (Service 1999; HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Spermolepis hawaiiensis* on Kauai are habitat degradation by feral goats; competition with various non-native plants; and erosion, landslides, and rock slides due to natural weathering which result in the death of individual plants as well as habitat destruction (59 FR 56333; Service 1999).

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, and are sparsely or moderately covered with coarse hairs. Flowers, in clusters of one to four, have thin, translucent, pale yellow or greenish-yellow petals. The two lowermost petals are fused and appear distinctly beaked. The sparsely hairy calyx has asymmetrical lobes. The fruits are long slender pods that may or may not be slightly inflated and contain seven to 15 gray to black seeds. This species differs from others in the genus by its thin yellowish petals, sparsely hairy calyx, and thin pods which may or may not be slightly inflated (Geesink *et al.* 1999).

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

Historically, *Vigna o-wahuensis* was known from Niihau, Oahu, Maui, Molokai, Lanai, Kahoolawe, and the island of Hawaii. Currently, *Vigna o-wahuensis* is known from the islands of Molokai, Lanai, Kahoolawe, Maui, and the island of Hawaii. It was last observed on Niihau in the 1912 (59 FR 56333; HINHP Database 2000; GDSI 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Vigna o-wahuensis* on the island of Niihau.

Nothing is known of the threats to *Vigna o-wahuensis* on the island of Niihau.

Zanthoxylum hawaiiense (ae)

Zanthoxylum hawaiiense is a medium-size tree with pale to dark gray bark, and lemon-scented leaves in the rue family (Rutaceae). Alternate leaves are composed of three small triangular-oval to lance-shaped, toothed leaves (leaflets) with surfaces usually without hairs. A long-lived perennial tree, *Zanthoxylum hawaiiense* is distinguished from other Hawaiian members of the genus by several characteristics: three leaflets all of similar size, one joint on lateral leaf stalk, and sickle-shape fruits with a rounded tip (Stone *et al.* 1999).

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

Historically, *Zanthoxylum hawaiiense* was known from five islands: Kauai, Molokai, Lanai, Maui, and the island of Hawaii. Currently, *Zanthoxylum hawaiiense* is found on Kauai, Molokai, Maui, and the island of Hawaii. On Kauai, this species is only known from two populations with three individuals on State-owned land in Kawaiiki and Kipalau Valleys within the Alakai Wilderness Preserve and Na Pali-Kona Forest Reserve (HINHP Database 2000; GDSI 2000).

Zanthoxylum hawaiiense is reported from lowland dry or mesic forests, at elevations between 464 and 887 m (1,522 and 2,911 ft). This species is typically found in forests dominated by *Metrosideros polymorpha* or *Diospyros sandwicensis* with associated native plant species including *Antidesma platyphyllum, Alectryon macrococcus, Charpentiera elliptica, Dodonaea viscosa, Melicope* spp., *Myrsine lanaiensis, Pisonia* spp., *Pleomele aurea, Streblus pendulinus, Zanthoxylum dipetalum* (HINHP Database 2000; K. Wood, pers. comm., 2001).

The threats to *Zanthoxylum hawaiiense* on Kauai include competition with the non-native plant species *Melia azedarach* and *Lantana camara;* fire; human disturbance; and risk of extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the small number of individuals in the only known population (59 FR 10305; Service 1996).

A summary of populations and landownership for the 95 plant species reported from the islands of Kauai and Niihau is given in Table 3.

TABLE 3.—SUMMARY OF POPULATIONS OCCURRING ON KAUAI AND NIIHAU, AND LANDOWNERSHIP FOR 95 SPECIES REPORTED FROM KAUAI AND NIIHAU

Species	Number of current populations	Landownership		
		Federal	State	Private
Acaena exigua	0			
Achyranthes mutica	0			
Adenophorus periens	7		X	X
Alectryon macrococcus	6		X	
Alsinidendron lychnoides	2		X	
Alsinidendron viscosum	5		X	
Bonamia menziesii	8		X	X
Brighamia insignis	4		X	X
Centaurium sebaeoides	3		X	
Chamaesyce halemanui	6		X	
Ctenitis squamigera	0			
Cyanea asarifolia	1		X	
Cyanea recta	7		X	X
Cyanea remyi	7		X	X
Cyanea undulata	1			X
Cyperus trachysanthos	2		X	X
Cyrtandra cyaneoides	5		X	X
Cyrtandra limahuliensis	11		X	X
Delissea rhytidosperma	3		X	X
Delissea rivularis	2		X	
Delissea undulata	1		X	
Diellia erecta	1		X	
Diellia pallida	4		X	
Diplazium molokaiense	0			
Dubautia latifolia	9		X	

TABLE 3.—SUMMARY OF POPULATIONS OCCURRING ON KAUAI AND NIIHAU, AND LANDOWNERSHIP FOR 95 SPECIES REPORTED FROM KAUAI AND NIIHAU—Continued

Species	Number of current populations	Landownership		
		Federal	State	Private
Dubautia pauciflorula	2		X	X
Euphorbia haeleeleana	7		X	
Exocarpos luteolus	8		X	X
Flueggea neowawraea	8		X	X
Gouania meyenii	3		X	
Hedyotis cookiana	1		X	
Hedyotis st.-johnii	4		X	
Hesperomannia lydgatei	3		X	X
Hibiscadelphus woodii	1		X	
Hibiscus brackenridgei	0			
Hibiscus clayi	1		X	
Hibiscus waimeae ssp. *hannerae*	3		X	X
Ischaemum byrone	2			X
Isodendrion laurifolium	5		X	
Isodendrion longifolium	9		X	X
Isodendrion pyrifolium	0			
Kokia kauaiensis	5		X	
Labordia lydgatei	6		X	X
Labordia tinifolia var. *wahiawaensis*	1			X
Lipochaeta fauriei	4		X	
Lipochaeta micrantha	5		X	X
Lipochaeta waimeaensis	1		X	
Lobelia niihauensis	11		X	X
Lysimachia filifolia	1		X	
Mariscus pennatiformis	0			
Melicope haupuensis	4		X	
Melicope knudsenii	7		X	
Melicope pallida	5		X	
Melicope quadrangularis	0			
Munroidendron racemosum	14		X	X
Myrsine linearifolia	8		X	X
Nothocestrum peltatum	6		X	
Panicum niihauense	1		X	
Peucedanum sandwicense	14		X	X
Phlegmariurus mannii	0			
Phlegmariurus nutans	0			
Phyllostegia knudsenii	1		X	
Phyllostegia waimeae	1		X	
Phyllostegia wawrana	4		X	X
Plantago princeps	6		X	X
Platanthera holochila	2		X	
Poa mannii	6		X	
Poa sandvicensis	9		X	
Poa siphonoglossa	5		X	
Pritchardia aylmer-robinsonii	1			X
Pritchardia napaliensis	3		X	
Pritchardia viscosa	1		X	
Pteralyxia kauaiensis	15		X	
Remya kauaiensis	12		X	
Remya montgomeryi	3		X	
Schiedea apokremnos	5		X	
Schiedea helleri	3		X	
Schiedea kauaiensis	2		X	
Schiedea membranacea	7		X	X
Schiedea nuttallii	1			X
Schiedea spergulina var. *leiopoda*	1			X
Schiedea spergulina var. *spergulina*	3		X	
Schiedea stellarioides	2		X	
Sesbania tomentosa	1		X	
Silene lanceolata	0			
Solanum incompletum	0			
Solanum sandwicense	6		X	X
Spermolepis hawaiiensis	3		X	
Stenogyne campanulata	2		X	
Vigna o-wahuensis	0			
Viola helenae	1			X
Viola kauaiensis var. *wahiawaensis*	2			X
Wilkesia hobdyi	6	X*	X	
Xylosma crenatum	3		X	

TABLE 3.—SUMMARY OF POPULATIONS OCCURRING ON KAUAI AND NIIHAU, AND LANDOWNERSHIP FOR 95 SPECIES REPORTED FROM KAUAI AND NIIHAU—Continued

Species	Number of current populations	Landownership		
		Federal	State	Private
Zanthoylum hawaiiense	2		X	

*Pacific Missile Range Facility at Makaha Ridge.

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, Argyroxiphium kauense, Bonamia menziesii, Clermontia drepanomorpha, Clermontia lindseyana, Colubrina oppositifolia, Cyanea hamatiflora* ssp. *carlsonii* (as *Cyanea carlsonii*), *Cyanea platyphylla* (as *Cyanea bryanii*), *Cyanea shipmanii, Flueggea neowawraea* (as *Drypetes phyllanthoides*), *Hibiscadelphus giffardianus, Hibiscadelphus hualalaiensis, Hibiscus brackenridgei* (as *Hibiscus brackenridgei* var. *brackenridgei,* var. *mokuleianus,* and var. ''from Hawaii''), *Ischaemum byrone, Melicope zahlbruckneri* (as *Pelea zahlbruckneri*), *Neraudia ovata, Nothocestrum breviflorum* (as *Nothocestrum breviflorum* var. *breviflorum*), *Portulaca sclerocarpa, Sesbania tomentosa* (as *Sesbania hobdyi* and *Sesbania tomentosa* var. *tomentosa*), *Silene lanceolata, Solanum incompletum* (as *Solanum haleakalense* and *Solanum incompletum* var. *glabratum,* var. *incompletum,* and var. *mauiensis*), *Vigna o-wahuensis* (as *Vigna sandwicensis* var. *heterophylla* and var. *sandwicensis*), and *Zanthoxylum hawaiiense* (as *Zanthoxylum hawaiiense* var. *citriodora*) were considered endangered; *Cyrtandra giffardii, Diellia erecta, Silene hawaiiensis* (as *Silene hawaiiensis* var. *hawaiiensis*), *Zanthoxylum dipetalum* ssp. *tomentosum,* and *Zanthoxylum hawaiiense* (as *Zanthoxylum hawaiiense* var. *hawaiiense* and var. *velutinosum*) were considered threatened; and, *Asplenium fragile* var. *insulare* (as *Asplenium fragile*), *Clermontia pyrularia, Delissea undulata* (as *Delissea undulata* var. *argutidentata* and var. *undulata*), *Gouania vitifolia, Hedyotis coriacea, Isodendrion hosakae, Isodendrion pyrifolium, Nothocestrum breviflorum* (as *Nothocestrum breviflorum* var. *longipes*), and *Tetramolopium arenarium* (as *Tetramolopium arenarium* var. *arenarium,* var. *confertum,* and var. *dentatum*) were considered to be extinct. On July 1, 1975, we published a notice in the **Federal Register** (40 FR 27823) of our acceptance of the Smithsonian report as a petition within the context of section 4(c)(2) (now section 4(b)(3)) of the Act, and gave notice of our intention to review the status of the plant taxa named therein. As a result of that review, on June 16, 1976, we published a proposed rule in the **Federal Register** (41 FR 24523) to determine endangered status pursuant to section 4 of the Act for approximately 1,700 vascular plant taxa, including all of the above taxa except for *Cyrtandra giffardii* and *Silene hawaiiensis.* 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.

General comments received in response to the 1976 proposal are 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). A summary of the status categories for these 95 plant species in the 1980–1996 notices of review can be found in Table 4(a). We listed the 95 species as endangered or threatened between 1991 and 1996. A summary of the listing actions can be found in Table 4(b).

TABLE 4(A).—SUMMARY OF CANDIDACY STATUS FOR 95 PLANT SPECIES FROM KAUAI AND NIIHAU

Species	**Federal Register** notice of review			
	1980	1985	1990	1993
Acaena exigua	C1	C1	C1	
Achyranthes mutica				
Adenophorus periens	C1	C1	C1	
Alectryon macrococcus	C1	3C	C1	
Alsinidendron lychnoides		C1*		C2
Alsinidendron viscosum		C1*	3A	
Bonamia menziesii	C1	C1	C1	
Brighamia insignis	C1	C1	C1	
Centaurium sebaeoides			C1	
Chamaesyce halemanui	C1	C1	C1	
Ctenitis squamigera	C1*	C1*	C1*	
Cyanea asarifolia			C1	
Cyanea recta			3A	
Cyanea remyi				
Cyanea undulata			3A	

TABLE 4(A).—SUMMARY OF CANDIDACY STATUS FOR 95 PLANT SPECIES FROM KAUAI AND NIIHAU—Continued

Species	**Federal Register** notice of review			
	1980	1985	1990	1993
Cyperus trachysanthos				C2
Cyrtandra cyaneoides				C2
Cyrtandra limahuliensis			C1	
Delissea rhytidosperma	C1	C1	C1	
Delissea rivularis	C2	C2	3A	
Delissea undulata	C1	C1*	C1*	
Diellia erecta	C1	C1	C1	
Diellia pallida			C1*	
Diplazium molokaiense	C1*	C1*	C1	
Dubautia latifolia	C1	C1	C1	
Dubautia pauciflorula			C1	
Euphorbia haeleeleana	C1	C1	C1	
Exocarpos luteolus		C1	C1	
Flueggea neowawraea	C1	C1	C1	
Gouania meyenii	3A	3A	C1	
Hedyotis cookiana	3A	3A	C1	
Hedyotis st.-johnii	C1	C1	C1	
Hesperomannia lydgatei	C1	C1	C1	
Hibiscadelphus woodi				
Hibiscus brackenridgei	C1	C1	C1	
Hibiscus clayi	C1	C1	C1	
Hibiscus waimeae ssp. *hannerae*				
Ischaemum byrone	3C	3C	C2	C2
Isodendrion laurifolium	C1	C1	C1	C2
Isodendrion longifolium	C1	C1	C1	C2
Isodendrion pyrifolium				
Kokia kauaiensis	C2	C2	C2	
Labordia lydgatei	C2	C2	C2	
Labordia tinifolia var. *wahiawaensis*.				
Lipochaeta fauriei	C1*	C1*	C1	
Lipochaeta micrantha	C1	C1	C1	
Lipochaeta waimeaensis	C1	C1	C1	
Lobelia niihauensis	C1	C1	C1	
Lysimachia filifolia	C2	C2	C1	
Mariscus pennatiformis		C1	C1	
Melicope haupuensis	C1	C1	C1	
Melicope knudsenii	C1*	C1*	C1	
Melicope pallida			C1*	
Melicope quadrangularis	C1	C1	C1*	
Munroidendron racemosum	C1	C1	C1	
Myrsine linearifolia	C1	C1	C2	C2
Nothocestrum peltatum	C1	C1	C1	
Panicum niihauense				C2
Peucedanum sandwicense	C2	C2	C2	
Phlegmariurus mannii	C1	C1	C1	
Phlegmariurus nutans	C1	C1	C1	
Phyllostegia knudsenii	C1	C1	3A	
Phyllostegia waimeae			C1	
Phyllostegia wawrana			3A	
Plantago princeps	C2	C2	C1	
Platanthera holochila	C1	C1	C1	C2
Poa mannii	C1	C1	C1*	
Poa sandvicensis	C1	C1	C1	
Poa siphonoglossa	C1	C1	C1	
Pritchardia aylmer-robinsonii	C1	C1	C1	
Pritchardia napaliensis			C2	C2
Pritchardia viscosa			C2	C2
Pteralyxia kauaiensis	C1	C1	C1	
Remya kauaiensis	C1*	C1*		
Remya montgomeryi				
Schiedea apokremnos		C1	C1	
Schiedea helleri		C1*	3A	
Schiedea kauaiensis				
Schiedea membranacea	C2	C2	C2	C2
Schiedea nuttallii				C2
Schiedea spergulina var. *leiopoda*		C1	C1 *	
Schiedea spergulina var. *spergulina*		C1	C1	
Schiedea stellarioides		C1*	3A	
Sesbania tomentosa	C1*	C1*	C1	
Silene lanceolata	C1	C1	C1	

TABLE 4(A).—SUMMARY OF CANDIDACY STATUS FOR 95 PLANT SPECIES FROM KAUAI AND NIIHAU—Continued

Species	Federal Register notice of review			
	1980	1985	1990	1993
Solanum incompletum	C1*	C1*	C1	
Solanum sandwicense	C1*	C1*	C1	
Spermolepis hawaiiensis	.....	.....	C1	
Stenogyne campanulata	.....	.....	C1	
Vigna o-wahuensis	C1	C1	C1	
Viola helenae	C1	C1	C1	
Viola kauaiensis var. *wahiawaensis*	C1	C1	C2	C2
Wilkesia hobdyi	C1	C1		
Xylosma crenatum	C2	C2	C1	
Zanthoxylum hawaiiense	C1	C1	C1	

Key:
C1: Taxa for which the Service has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.
C1*: Taxa of known vulnerable status in the recent past that may already have become extinct.
C2: Taxa for which there is some evidence of vulnerability, but for which there are not enough data to support listing proposals at this time.
3A: Taxa for which the Service has persuasive evidence of extinction. If rediscovered, such taxa might acquire high priority for listing.
3C: Taxa that have proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat.

Federal Register Notice of Review:
1980: 45 FR 82479
1985: 50 FR 39525
1990: 55 FR 6183
1993: 58 FR 51144

TABLE 4(B).—SUMMARY OF LISTING ACTIONS FOR 95 PLANT SPECIES FROM KAUAI AND NIIHAU.

Species	Federal status	Proposed Rule		Final Rule		Prudency determinations and proposed critical habitat	
		Date	Federal Register	Date	Federal Register	Date(s)	Federal Register
Acaena exigua	E	05/24/1991	56 FR 23842	05/15/1992	57 FR 20787	12/18/2000	65 FR 79192
Achyranthes mutica	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	NA	NA
Adenophorus periens	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	11/07/2000, 12/29/2000	65 FR 66808, 66 FR 83157
Alectryon macrococcus	E	05/24/1991	56 FR 23842	05/15/1992	57 FR 20772	11/07/2000, 12/18/2000, 12/29/2000	65 FR 66808, 65 FR 79192, 66 FR 83157
Alsinidendron lychnoides	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Alsinidendron viscosum	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Bonamia menziesii	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	11/07/2000, 12/18/2000, 12/27/2000	65 FR 66808, 65 FR 79192, 65 FR 82086
Brighamia insignis	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Centaurium sebaeoides	E	09/28/1990	55 FR 39664	10/29/1991	56 FR 55770	11/07/2000, 12/18/2000, 12/27/2000, 12/29/2000	65 FR 66808, 65 FR 79192, 65 FR 82086, 66 FR 83157
Chamaesyce halemanui	E	09/21/1990	50 FR 39301	05/13/1992	57 FR 20580	11/07/2000	65 FR 66808
Ctenitis squamigera	E	06/24/1993	58 FR 34231	09/09/1994	59 FR 49025	12/18/2000, 12/27/2000, 12/29/2000	65 FR 79192, 65 FR 79192, 66 FR 83157
Cyanea asarifolia	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Cyanea recta	T	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Cyanea remyi	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Cyanea undulata	E	09/17/1990	55 FR 38242	09/20/1991	56 FR 47695	11/07/2000	65 FR 66808
Cyperus trachysanthos	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000	65 FR 66808
Cyrtandra cyaneoides	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Cyrtandra limahuliensis	T	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Delissea rhytidosperma	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Delissea rivularis	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Delissea undulata	E	06/27/1994	59 FR 32946	10/10/1996	61 FR 53124	11/07/2000	65 FR 66808
Diellia erecta	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	12/18/2000, 12/29/2000	65 FR 79192, 65 FR 83157
Diellia pallida	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Diplazium molokaiense	E	06/24/1993	58 FR 34231	09/09/1994	59 FR 49025	12/18/2000	65 FR 79192
Dubautia latifolia	E	09/21/1990	50 FR 39301	05/13/1992	57 FR 20580	11/07/2000	65 FR 66808
Dubautia pauciflorula	E	09/17/1990	55 FR 38242	09/20/1991	56 FR 47695	11/07/2000	65 FR 66808
Euphorbia haeleeleana	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000	65 FR 66808
Exocarpos luteolus	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808

TABLE 4(B).—SUMMARY OF LISTING ACTIONS FOR 95 PLANT SPECIES FROM KAUAI AND NIIHAU.—Continued

Species	Federal status	Proposed Rule		Final Rule		Prudency determinations and proposed critical habitat	
		Date	Federal Register	Date	Federal Register	Date(s)	Federal Register
Flueggea neowawraea	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	11/07/2000, 12/18/2000	65 FR 66808, 65 FR 79192
Gouania meyenii	E	09/28/1990	55 FR 39664	10/29/1991	56 FR 55770	11/07/2000	65 FR 66808
Hedyotis cookiana	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Hedyotis st.-johnii	E	08/03/1990	55 FR 31612	09/30/1991	56 FR 49639	11/07/2000	65 FR 66808
Hesperomannia lydgatei	E	09/17/1990	55 FR 38242	09/20/1991	56 FR 47695	11/07/2000	65 FR 66808
Hibiscadelphus woodii	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Hibiscus brackenridgei	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	12/18/2000, 12/27/2000	65 FR 79192, 65 FR 82086
Hibiscus clayi	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Hibiscus waimeae ssp. *hannerae*.	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Ischaemum byrone	E	12/17/1992	57 FR 59951	03/04/1994	59 FR 10305	12/18/2000, 12/29/2000	65 FR 79192, 65 FR 83157
Isodendrion laurifolium	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000	65 FR 66808
Isodendrion longifolium	T	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000	65 FR 66808
Isodendrion pyrifolium	E	12/17/1992	57 FR 59951	03/04/1994	59 FR 10305	NA	NA
Kokia kauaiensis	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Labordia lydgatei	E	09/17/1990	55 FR 38242	09/20/1991	56 FR 47695	11/07/2000	65 FR 66808
Labordia tinifolia var. *wahiawaensis*.	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Lipochaeta fauriei	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Lipochaeta micrantha	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Lipochaeta waimeaensis	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Lobelia niihauensis	E	09/28/1990	55 FR 39664	10/29/1991	56 FR 55770	11/07/2000	65 FR 66808
Lysimachia filifolia	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Mariscus pennatiformis	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	12/18/2000	65 FR 79192
Melicope haupuensis	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Melicope knudsenii	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000, 12/18/2000	65 FR 66808, 65 FR 79192
Melicope pallida	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Melicope quadrangularis	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Munroidendron racemosum	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Myrsine linearifolia	T	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Nothocestrum peltatum	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Panicum niihauense	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000	65 FR 66808
Peucedanum sandwicense	T	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000, 12/18/2000, 12/29/2000	65 FR 66808, 65 FR 79192, 66 FR 83157
Phlegmariurus mannii	E	05/24/1991	56 FR 23842	05/15/1992	57 FR 20772	12/18/2000	65 FR 79192
Phlegmariurus nutans	E	09/28/1990	55 FR 39664	10/29/1991	56 FR 55770	NA	NA
Phyllostegia knudsenii	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Phyllostegia waimeae	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Phyllostegia wawrana	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Plantago princeps	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	11/07/2000, 12/18/2000, 12/29/2000	65 FR 66808, 65 FR 79192, 65 FR 83157
Platanthera holochila	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000, 12/18/2000, 12/29/2000	65 FR 66808, 65 FR 79192, 65 FR 83157
Poa mannii	E	04/07/1993	58 FR 18073	11/10/1994	59 FR 56330	11/07/2000	65 FR 66808
Poa sandvicensis	E	09/21/1990	50 FR 39301	05/13/1992	57 FR 20580	11/07/2000	65 FR 66808
Poa siphonoglossa	E	09/21/1990	50 FR 39301	05/13/1992	57 FR 20580	11/07/2000	65 FR 66808
Pritchardia aylmer-robinsonii	E	12/17/1992	57 FR 59970	08/07/1996	61 FR 41020	11/07/2000	65 FR 66808
Pritchardia napaliensis	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Pritchardia viscosa	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Pteralyxia kauaiensis	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Remya kauaiensis	E	10/02/1989	54 FR 40447	01/14/1991	56 FR 1450	11/07/2000	65 FR 66808
Remya montgomeryi	E	10/02/1989	54 FR 40447	01/14/1991	56 FR 1450	11/07/2000	65 FR 66808
Schiedea apokremnos	E	08/03/1990	55 FR 31612	09/30/1991	56 FR 49639	11/07/2000	65 FR 66808
Schiedea helleri	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Schiedea kauaiensis	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000	65 FR 66808
Schiedea membranacea	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Schiedea nuttallii	E	10/02/1995	60 FR 51417	10/10/1996	61 FR 53108	11/07/2000, 12/29/2000	65 FR 66808, 65 FR 83157
Schiedea spergulina var. *leiopoda*.	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808
Schiedea spergulina var. *spergulina*.	T	10/30/1991	56 FR 5562	02/25/1994	59 FR 9304	11/07/2000	65 FR 66808

TABLE 4(B).—SUMMARY OF LISTING ACTIONS FOR 95 PLANT SPECIES FROM KAUAI AND NIIHAU.—Continued

Species	Federal status	Proposed Rule		Final Rule		Prudency determinations and proposed critical habitat	
		Date	Federal Register	Date	Federal Register	Date(s)	Federal Register
Schiedea stellarioides	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Sesbania tomentosa	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	11/07/2000, 12/18/2000, 12/29/2000	65 FR 66808, 65 FR 79192, 65 FR 83157
Silene lanceolata	E	09/20/1991	56 FR 47718	10/08/1992	57 FR 46325	12/29/2000	65 FR 83157
Solanum incompletum	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	NA	NA
Solanum sandwicense	E	10/30/1991	56 FR 5562	02/25/1994	59 FR 09304	11/07/2000	65 FR 66808
Spermolepis hawaiiensis	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	11/07/2000, 12/29/2000	65 FR 66808, 65 FR 83157
Stenogyne campanulata	E	09/21/1990	50 FR 39301	05/13/1992	57 FR 20580	11/07/2000	65 FR 66808
Vigna o-wahuensis	E	09/14/1993	58 FR 48012	11/10/1994	59 FR 56333	12/18/2000, 12/27/2000, 12/29/2000,	65 FR 79192, 65 FR 82086, 65 FR 83157
Viola helenae	E	09/17/1990	55 FR 38242	09/20/1991	56 FR 47695	11/07/2000	65 FR 66808
Viola kauaiensis var. *wahiawaensis*.	E	09/25/1995	60 FR 49359	10/10/1996	61 FR 53070	11/07/2000	65 FR 66808
Wilkesia hobdyi	E	10/02/1989	54 FR 40444	06/22/1992	57 FR 27859	11/07/2000	65 FR 66808
Xylosma crenatum	E	09/21/1990	50 FR 39301	05/13/1992	57 FR 20580	11/07/2000	65 FR 66808
Zanthoxylum hawaiiense	E	12/17/1992	57 FR 59951	03/04/1994	59 FR 10305	11/07/2000, 12/18/2000, 12/29/2000	65 FR 66808, 65 FR 79192, 65 FR 83157

Key:
E = Endangered.
T = Threatened.

Critical Habitat

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

The not prudent determinations 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 determinations for 245 listed plant species in Hawaii. Among other things, the court held that, in most cases, we did not sufficiently demonstrate that the species are threatened by human activity or that such threats would increase with the designation of critical habitat. The court also held that we failed to balance any risks of designating critical habitat against any benefits (*id.* at 1283–85).

Regarding our determination that designating critical habitat would have no additional benefits to the species above and beyond those already provided through the section 7 consultation requirement of the Act, the court ruled that we failed to consider the specific effect of the consultation requirement on each species (*id.* at 1286–88). In addition, the court stated that we did not consider benefits outside of the consultation requirements. In the court's view, these potential benefits include substantive and procedural protections. The court held that, substantively, designation establishes a ''uniform protection plan'' prior to consultation and indicates where compliance with section 7 of the Act is required. Procedurally, the court stated that the designation of critical habitat educates the public, State, and local governments and affords them an opportunity to participate in the designation (*id.* at 1288). The court also stated that private lands may not be excluded from critical habitat designation even though section 7 requirements apply only to Federal agencies. In addition to the potential benefit of informing the public, State, and local governments of the listing and of the areas that are essential to the species' conservation, the court found that there may be Federal activity on private property in the future, even though no such activity may be occurring there at the present (*id.* at 1285–88).

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

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 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 October 5, 1999, we mailed letters to more than 160 landowners on the islands of Kauai and Niihau requesting any information considered germane to the management of any of the 95 plants on his/her property, and containing 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 received 25 written responses to our landowner mailing with varying types of information on their current land management activities. These responses included information on the following: the presence of fences or locked gates to restrict public access; access to the respondent's property by hunters or whether hunting is allowed on the property; ongoing weeding and rat control programs; and the propagation and/or planting of native plants. Some respondents stated that the plants of concern were not on her/his property. Only a few respondents expressed support for the designation of critical habitat. We held three open houses on the island of Kauai, at the Waimea Community Center, the Kauai War Memorial Convention Hall in Lihue, and the Kilauea Neighborhood Center, on October 19 to 21, 1999, respectively, to meet one-on-one with local landowners and other interested members of the public. A total of 48 people attended the three open houses. In addition, we met with Kauai County Division of Forestry and Wildlife staff and Kauai State Parks staff to discuss their management activities on the island.

On November 7, 2000, we published the first of the court-ordered prudency determinations and proposed critical habitat designations or non-designations for 76 Kauai and Niihau plants (65 FR 66808). The prudency determinations and proposed critical habitat designations for Maui and Kahoolawe plants were published on December 18, 2000 (65 FR 79192), for Lanai plants on December 27, 2000 (65 FR 82086), and for Molokai plants on December 29, 2000 (65 FR 83157). All of these proposed rules had been sent to the **Federal Register** by or on November 30, 2000, as required by the court's order. In those proposals we determined that critical habitat was prudent for 85 species (*Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Ctenitis squamigera, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia erecta, Diellia pallida, Diplazium molokaiense, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus brackenridgei, Hibiscus clayi, Hibiscus waimeae* ssp. *hannerae, Ischaemum byrone, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Mariscus pennatiformis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phlegmariurus mannii, Phyllostegia knudsenii, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Silene lanceolata, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Vigna o-wahuensis, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hobdyi, Xylosma crenatum*, and *Zanthoxylum hawaiiense*) that are reported from Kauai and/or Niihau as well as on Maui, Kahoolawe, Lanai, and Molokai.

In the November 7, 2000, proposal we determined that it was prudent to designate approximately 24,348 ha (60,165 ac) of lands on the island of Kauai and approximately 191 ha (471 ac) of lands on the island of Niihau as critical habitat. The publication of the proposed rule opened a 60-day public comment period, which closed on January 7, 2001. On January 18, 2001, we published a notice (66 FR 4782) announcing the reopening of the comment period until February 19, 2001, on the proposal to designate critical habitat for 76 plants from Kauai and Niihau and a notice of a public hearing. On February 6, 2001, we held a public hearing at the Radisson Kauai Beach Resort in Lihue, Kauai.

On March 7, 2001, we published a notice announcing the reopening of the comment period, and announced the availability of the draft economic analysis on the proposal to designate critical habitat for 76 plants from Kauai and Niihau (66 FR 13691). This third public comment period was open until April 6, 2001.

On October 3, 2001, we submitted a joint stipulation with Earth Justice Legal Defense Fund 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. Publication of this revised proposal for plants from Kauai and Niihau is consistent with the court-ordered stipulation.

Summary of Comments and Recommendations

In the November 7, 2000, proposed rule (65 FR 66808), we requested all interested parties to submit comments on the specifics of the proposal, including information, policy, and proposed critical habitat boundaries as provided in the proposed rule. The first comment period closed on December 7, 2000. We reopened the comment period from January 18, 2001, to February 19, 2001 (66 FR 4782), to accept comments on the proposed designations and to hold a public hearing on February 6, 2001, in Lihue, Kauai. The comment period was reopened from March 7, 2001, to April 6, 2001 (66 FR 13691), to allow for additional comments on the proposed rule and comments on the

draft economic analysis of the proposed critical habitat.

We contacted all appropriate State and Federal agencies, county governments, elected officials, and other interested parties and invited them to comment. In addition, we invited public comment through the publication of notices in the following newspapers: the *Honolulu Advertiser* on November 13, 2000, and the *Garden Island* on November 15, 2000. We received two requests for a public hearing. We announced the date and time of the public hearing in letters mailed to all interested parties, appropriate State and Federal agencies, county governments, and elected officials, and in notices published in the *Honolulu Advertiser* and in the *Garden Island* newspaper on January 19, 2001. A transcript of the hearing held in Lihue, Kauai on February 6, 2001, is available for inspection (see **ADDRESSES** section).

We requested three botanists who have familiarity with Kauai and Niihau plants to peer review the proposed critical habitat designations. All three peer reviewers submitted comments on the proposed critical habitat designations, providing updated biological information, critical review, and editorial comments.

We received a total of 37 oral and 202 written comments during the three comment periods. These included responses from one Federal agency, seven State offices, one local agency, one elected official, and 207 private organizations or individuals. We reviewed all comments received for substantive issues and new information regarding critical habitat and the Kauai and Niihau plants. Of the 239 comments we received, 157 supported designation, 25 were opposed to it, and eight provided information or declined to oppose or support the designation. Similar comments were grouped into eight general issues relating specifically to the proposed critical habitat determinations and draft economic analysis on the proposed determinations. These are addressed in the following summary.

Issue 1: Biological Justification and Methodology

(1) *Comment:* The designation of critical habitat in unoccupied habitat is particularly important, since this may be the only mechanism available to ensure that Federal actions do not eliminate the habitat needed for the survival and recovery of extremely endangered species.

Our Response: We agree. Our recovery plans for these species (Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999) identify the need to expand existing populations and reestablish wild populations within historic range. We have revised the November 7, 2000, proposal to designate critical habitat for 76 plants from Kauai and Niihau to incorporate new information and/or address comments and new information received during the comment periods, including information on areas of potentially suitable unoccupied habitat for some of these species.

(2) *Comment:* The data cited in the critical habitat proposal documenting the habitat losses and threats is questionable. We do not agree with the threats to the species as described in the proposed rule.

Our Response: In the November 7, 2000, proposal to designate critical habitat for 76 plants from Kauai and Niihau, we provided information on the status of and threats to, the Kauai and Niihau plants. The threats to these species, and the species status, were documented in the listing rules for the Kauai and Niihau plants (56 FR 1450, 56 FR 47695, 56 FR 49639, 56 FR 55770, 57 FR 20580, 57 FR 20772, 57 FR 20787, 57 FR 27859, 57 FR 46325, 59 FR 9304, 59 FR 10305, 59 FR 49025, 59 FR 56330, 59 FR 56333, 61 FR 53070, 61 FR 53108, 61 FR 53124, and 61 FR 41020), and in the recovery plans for these species (Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, and 1999), and in the supporting documentation in the files at the Pacific Islands Office (See **ADDRESSES** section).

(3) *Comment:* The proposal provides very limited information on the criteria and data used to determine the areas proposed as critical habitat. For example, some of the data used by the Service was 30 years old or older.

Our Response: When developing the November 7, 2000, proposal to designate critical habitat for 76 plants from Kauai and Niihau, we used the best scientific and commercial data available at the time, including but not limited to, information from the known locations, site-specific species information from the HINHP database and our own rare plant database; species information from the Center for Plant Conservation's (CPC) rare plant monitoring database housed at the University of Hawaii's Lyon Arboretum; the final listing rules for these species; information received at the three informational open houses held on Kauai at the Waimea Community Center, the Kauai War Memorial Convention Hall in Lihue, and the Kilauea Neighborhood Center, on October 19 to 21, 1999, respectively; recent biological surveys and reports; our recovery plans for these species; information received in response to outreach materials and requests for species and management information we sent to all landowners, land managers, and interested parties on the islands of Kauai and Niihau; discussions with botanical experts; and recommendations from the Hawaii Pacific Plant Recovery Coordinating Committee (HPPRCC) (Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999; HPPRCC 1998; HINHP Database 2000; CPC *in litt.* 1999).

We have revised the proposed designations to incorporate new information, and/or address comments and new information received during the comment periods. This additional information comes from the Geographic Information System (GIS) coverages (*e.g.* vegetation, soils, annual rainfall, elevation contours, land ownership); new information; completed recovery plans, and information received during the public comment periods and public hearings.

(4) *Comment:* We received comments that the proposed critical habitat designations were not specific enough, and were over broad and therefore, failed to comply with Congressional intent to restrict critical habitat to those areas ''essential to the conservation of the species.'' On the other hand, we also received comments that the designation was not inclusive enough and failed to include areas where Kauai and Niihau plants have occurred and which are necessary for recovery of the species.

Our Response: We used the best scientific information available to develop the November 7, 2000, proposal to designate critical habitat for 76 Kauai and Niihau plants. This information is detailed above in our response to Comment (3). Based on the information described above, we believe we have identified those areas essential to the conservation of the Kauai and Niihau plant species at issue in this proposed rule.

(5) *Comment:* We are concerned that our property infrastructure (*i.e.*, roads, buildings, etc.) is within proposed critical habitat boundaries, even though it does not contain any habitat for listed plants. Areas seaward of the vegetation line were included in the maps. Also, Units J, G, and H (on Navy lands) appear to include missile launch pads, buildings, towers, and paved roads. Modify specific units in order to avoid areas where existing projects (*i.e.,* agricultural lands with irrigation infrastructure) are planned or may occur.

Our Response: When delineating critical habitat units, we made an effort to avoid developed areas such as towns, agricultural lands, and other lands

unlikely to contribute to the conservation of these species. Existing features and structures within proposed areas, such as buildings, roads, aqueducts, telecommunications equipment, telemetry antennas, radars, missile launch sites, arboreta and gardens, heiau (indigenous places of worship or shrines), and other man-made features do not contain, and are not likely to develop, constituent elements, and would be specifically excluded from designation under this proposed rule. Therefore, unless a Federal action related to such features or structures indirectly affected nearby habitat containing the primary constituent elements, operation and maintenance of such features or structures generally would not be impacted by the designation of critical habitat.

(6) *Comment:* The presence of non-native plants makes habitat unsuitable and inappropriate for designation as critical habitat.

Our Response: The presence of non-native plant competitors does not preclude designation of an area as critical habitat, if the area contains physical and biological features that are essential to the conservation of the species, and that may require special management considerations or protection. We defined the primary constituent elements on the basis of the habitat features of the areas in which the plants are reported from, such as the type of plant community, associated native plant species, locale information (*e.g.*, steep rocky cliffs, talus slopes, stream banks), and elevation.

(7) *Comment:* The Service avoided a statutory obligation to determine whether the benefits of excluding particular areas (*e.g.*, areas with conservation agreements, etc.) from critical habitat designation outweigh the benefits of including each area.

Our Response: Section 4(b)(2) of the Act requires that we consider the economic and other impacts of critical habitat designation and allows us to exclude potentially suitable areas when the benefits of exclusion outweigh the benefits of designation, provided the exclusion will not result in the extinction of the species. We base our decision to exclude an area from critical habitat designation on the best scientific data available, taking into consideration the economic and other impacts of specifying any particular area as critical habitat. We completed an economic analysis of the November 7, 2000, proposal. However, we will revise that analysis to reflect this new proposal and provide another opportunity for public comment. We will use that final economic analysis in determining whether exclusions under section 4(b)(2) are appropriate (see 50 CFR 424.19).

We will provide technical assistance and work closely with applicants throughout the development of any future Habitat Conservation Plans (HCPs) or other conservation plans to identify lands essential for the long-term conservation of the Kauai and Niihau plants and appropriate management for those lands. If an HCP or other conservation management plan is approved by us, we will reassess the critical habitat boundaries in light of the conservation plan. We will seek to undertake this review when an HCP or conservation management plan is approved, but funding constraints may influence the timing of such a review.

Issue 2: Site-Specific Biological Comments

(8) *Comment:* Critical habitat should be designated for *Phyllostegia waimeae* and *Melicope quadrangularis* because habitats have not been adequately surveyed and these species may still be extant in the wild.

Our Response: We have revised the November 7, 2000, proposal to designate critical habitat for 76 plants from Kauai and Niihau to incorporate new information and/or address comments and new information received during the comment periods including information on the recent rediscovery in August 2000 of *Phvllostegia waimeae* on Kauai. In light of this new information we have reconsidered an earlier not prudent finding and determine that the designation of critical habitat is prudent for *Phvllostegia waimeae*. We determined on November 7, 2000, that critical habitat designation is not prudent for *Melicope quadrangularis* because it has not been seen recently in the wild on Kauai and no viable genetic material of this species is known to exist. Therefore, critical habitat designation would be of no benefit to this species and no change is made to that determination here. If this species is rediscovered we may revise this proposal to incorporate or address new information as new data becomes available.

(9a) *Comment:* Critical habitat should be designated for *Pritchardia* or loulu palm species if the units are of adequate ecological size and because the habitat is too inaccessible and remote for vandals. (9b) *Comment:* Critical habitat for *Pritchardia* should not be designated because of previous acts of vandalism to listed plant species.

Our Response: We have revised the November 7, 2000, proposal to designate critical habitat for 76 plants from Kauai and Niihau to incorporate new information, and/or address comments and new information received during the comment periods. However, no additional information was provided during the comment periods that would ensure the protection of *Pritchardia* from vandalism or collection if critical habitat was designated for the three Kauai and Niihau species. We believe that the benefits of designating critical habitat do not outweigh the potential increased threats from vandalism or collection of these three species of *Pritchardia*.

(10) *Comment:* Include *Sesbania tomentosa* on the border of the Navy's PMRF at Barking Sands and *Munroidendron racemosum* on the border of unit E.

Our Response: We have revised the November 7, 2000, proposal to designate critical habitat for 76 plants from Kauai and Niihau to incorporate new information, and/or address comments and new information received during the comment periods, including information on *Sesbania tomentosa* and *Munroidendron racemosum.* We have proposed critical habitat for *Sesbania tomentosa* in units Kauai D, H, and I; and for *Munroidendron racemosum* in units Kauai B, E, I, J and O in this revised rule.

(11) *Comment:* U.S. Navy lands should be excluded from the critical habitat designation because protections and management afforded the Kauai and Niihau plants under the Integrated Natural Resource Management Plans (INRMP), pursuant to the Sikes Act and amendments, and under existing programmatic biological opinions were sufficient, thereby resulting in these lands not requiring special management or protection and not meeting the definition of critical habitat. In addition, the PMRF should be excluded from critical habitat because its existing programmatic, habitat-based management efforts reflected in the *Cooperative Agreement for the Conservation and Management of Fish and Wildlife Resources at Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii,* and signed between the Service and the Navy in 1986, ensures long-term conservation of Federal trust species. Furthermore, designation of critical habitat would detrimentally restrain and limit the installation's flexibility, adversely affecting its ability to perform its national defense mission.

Our Response: We agree that an INRMP can provide special management for lands such that they no longer meet the definition of critical habitat when the plan meets the following criteria: (1)

The plan must be complete and provide a conservation benefit to the species, (2) the plan must provide assurances that the conservation management strategies will be implemented, and (3) the plan must provide assurances that the conservation management strategies will be effective, *i.e.,* provide for periodic monitoring and revisions as necessary. If all of these criteria are met, the lands covered under the plan would no longer meet the definition of critical habitat.

We believe that occupied and unoccupied areas that contain the primary constituent elements for plants occurring on the Barking Sands and Makaha Ridge Facility lands are needed for recovery of these species. Management at the Barking Sands and Makaha Ridge Facility lands currently consists of restricting human access and mowing landscaped areas. These actions alone are not sufficient to address the factors inhibiting the long-term conservation of *Panicum niihauense* and *Wilkesia hobdyi* and address the primary threats to these species. Also, we believe that the INRMP may not ensure that appropriate conservation management strategies will be adequately funded or effectively implemented. Therefore, we cannot at this time find that management on these lands under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. If the Navy completes and implements an INRMP or other endangered species management plans that addresses the maintenance and improvement of the essential elements for these two plant species, and provides for their long-term conservation and assurances that it will be implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude these military lands under section 4(b)(2) of the Act if the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

(12) *Comment:* The State of Hawaii identified specific areas that they thought should not be designated as critical habitat.

Our Response: During the public comment periods for the November 7, 2000, proposal for plants from Kauai and Niihau, we received written comments and a map showing the DOFAW's vegetation classes and recommended critical habitat units. We have revised the November 7, 2000, proposed designations to incorporate new information, and/or address comments and new information received during the comment periods, including information received from DOFAW.

We evaluated DOFAW's comments on a species by species basis and incorporated information that was consistent with our methodology. DOFAW recommended deletion of some of the proposed critical habitat units as they do not believe these areas are suitable for the recovery of some species because they (DOFAW) would not be able to manage these areas with their limited staff and funding. Because the basis for identifying areas by DOFAW was made on the manageability of the area, their mapping of habitat is distinct from the regulatory designation of critical habitat as defined by the Act.

Issue 3: Legal Issues

(13) *Comment:* A premise for the proposed rule is that the Service was ordered by the court on August 10, 1998, to designate critical habitat by November 30, 2000. The court may not order critical habitat to be designated. Rather, the court may order the Service to make a decision on whether to designate critical habitat. The designation of critical habitat is an action that is ultimately discretionary, and the Service must apply the criteria in the Act and its regulations to decide whether to designate critical habitat. Thus, the Service should seek correction of that court order and reconsider whether, and to what extent, critical habitat should be designated.

Our Response: As stated earlier, on August 10, 1998, the court ordered us to publish proposed critical habitat designations or non-designations for at least 100 species by November 30, 2000, and to publish proposed designations or non-designations for the remaining 145 species by April 30, 2002 (24 F. Supp. 2d 1074). Among other things, the court did not order us to designate critical habitat for all species. In fact, the court state that it ''expresse[d] no opinion as to whether or not critical habitat should be designated for any of the subject species.'' (24 F. Supp. at 1288). Instead, Judge Kay remanded our 245 ''not prudent'' decisions to the Service to consider designation of critical habitat consistent with his opinion (*Id.* at 1288–89). The court explicitly stated that the designation of critical habitat was beneficial because it: (1) Triggers 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) focuses conservation activities on the most essential areas; (3) provides educational benefits to State or county governments or private entities; and (4) prevents people from causing inadvertent harm to the species (see 24 Supp.2d 1280 for the full text of Judge Kay's opinion). In the November 7, 2000, proposal we published proposed determinations of whether designation of critical habitat is prudent for 81 plants from Kauai and Niihau, and proposed designations of critical habitat for 76 of those plants. We have revised the proposed designations to incorporate new information, and/or address comments and new information received during the comment periods.

(14a) *Comment:* In the State of Hawaii, Native Hawaiians have a constitutional right to access and gather certain resources for traditional and cultural purposes. The proposal will limit and extinguish these rights. (14b) *Comment:* The designations of areas as critical habitat will affect human access to those areas. (14c) *Comment:* Hunting and recreational opportunities need to be considered when designating critical habitat. Also, the designation of critical habitat will prohibit recreational, commercial, and subsistence activities from taking place, as well as access for these activities.

Our Response: Critical habitat designation does not affect activities, including human access, on State or private lands unless some sort 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.

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.

(15) *Comment:* The Service needs to make its decisions on objective studies based on science rather than let the courts dictate its decisions.

Our Response: We must comply with the orders of Federal courts. See also our response to comment 13. When developing the proposed critical habitat designations, we used the best scientific and commercial data available at the time. We have revised the proposed designations to incorporate new information, and/or address comments and new information received during the comment periods. All of the information that we used in our decision-making process is part of our administrative record and can be reviewed at the Pacific Islands Field Office (see **ADDRESSES** section).

Issue 4: Section 7 Consultation Issues

(16) *Comment:* Does section 7 apply to State and county agencies with permit authority such as the Hawaii Pollution Discharge Elimination System permit issued by the State of Hawaii and authorized by the Environmental Protection Agency, and programs administered under the Natural Resources Conservation Service?

Our Response: Section 7 of the Act requires each Federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of critical habitat. Section 7 also requires that Federal agencies consult with us if their actions may affect a listed species. State or county agencies are not required to consult with us under section 7 of the Act if their programs are not authorized, permitted, or funded by a Federal agency.

The Environmental Protection Agency (EPA) may delegate the National Pollutant Discharge Elimination System (NPDES) permit authority to the State. Therefore, any individual permit that is issued by the State of Hawaii is not subject to section 7 consultation. Instead, procedures in the January 2001 Memorandum Of Understanding between ourselves and the EPA would apply. These procedures provide for us to notify EPA of any concerns we may have with individual permits, and the EPA would take corrective action if an individual permit has severe enough impacts on a listed species or designated critical habitat and the State fails to correct the problem. The Natural Resources Conservation Service (NRCS) does consult with us on projects and specific actions that they fund, authorize, or permit.

(17) *Comment:* The State of Hawaii endangered species law does not require critical habitat.

Our Response: There is no State equivalent of critical habitat designation under the State of Hawaii's endangered species law. However, the Federal Endangered Species Act of 1973, as amended, is applicable to all federally listed species, including those in the State of Hawaii.

Issue 5: Mapping and Primary Constituent Elements

(18a) *Comment:* The designated areas are too large. (18b) *Comment:* The units are not large enough, and don't allow for changes that occur during known environmental processes.

Our Response: We have revised the proposed designations to incorporate new information, and/or address comments and new information received during the comment periods. Areas that contain habitat necessary for recovery were identified and delineated on a species by species basis. When species units overlapped, we combined units for ease of mapping (see also Methods section). The areas we are proposing to designate as critical habitat provide some or all of the habitat components essential for the conservation of these plant species.

(19) *Comment:* Map exhibits in the proposed rule and at the public hearings did not show enough detail.

Our Response: The maps in the **Federal Register** are meant to provide a general location and shape of critical habitat. At the public hearing, these maps were expanded to wall-size to assist the public in better understanding the proposal. These larger scale GIS products also were provided to individuals upon request. The legal descriptions are readily plotted and transferable to a variety of mapping formats.

(20) *Comment:* Once the designations are made, they will become permanent.

Our Response: The Act specifically provides that we may, from time to time, revise designations as appropriate (16 U.S.C. 1533(a)(3)(B). Thus, if new information indicates any of these areas should not be included in the critical habitat designations because they no longer meet the definition of critical habitat, under the section 3(5)(A) definition, or because the benefits of exclusion outweigh the benefits of designation, provided the exclusion will not result in the extinction of the species, under section 4(b)(2), we may revise critical habitat designations to exclude these areas. Also, we can always revise the critical habitat designations to add land at a later date. Critical habitat designations are removed at the time a species is no longer protected under the Act (*i.e.,* delisted).

Issue 6: Definition of Critical Habitat

(21) *Comment:* Critical habitat is being designated in otherwise protected areas, such as State conservation lands, Navy lands with an INRMP, and State parks. Managers should have the opportunity to implement management actions that would avoid the additional regulatory burden of critical habitat.

Our Response: In the November 7, 2000, proposal we examined all currently occupied sites containing one or more of the primary constituent elements considered essential to the conservation of the Kauai and Niihau plant species to determine if additional special management considerations or protection are required above those currently provided. We reviewed all available management information on these plants at these sites, including published reports and surveys; annual performance and progress reports; management plans; grants; memoranda of understanding and cooperative agreements; DOFAW planning documents; internal letters and memos; biological assessments and environmental impact statements; and section 7 consultations. Additionally, each public (*i.e.,* county, State, or Federal government holdings) and private landowner on the islands of Kauai and Niihau with a known occurrence of one of the plant species was contacted by mail. We reviewed all information received in response to our landowner mailing and open houses held at three locations (Waimea, Lihue, and Kilauea) on the island of Kauai from October 19 to 21, 1999. When clarification was required on the information provided to us, we followed up with a telephone contact. Because of the large amount of land on the island of Kauai under State of Hawaii jurisdiction, we met with staff from Kauai's DOFAW office and Kauai State Parks to discuss their current management for the plants on their lands. And, we contacted the State's Department of Hawaiian Home Lands (DHHL) regarding management for the plants on lands under their jurisdiction. In addition, we reviewed new biological information and public comments received during the public comment periods and at the public hearing.

With regard to the areas newly proposed for designation by this revised proposal, we have also reviewed any management information available to use at this time. In addition, we are requesting information on management

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

Based upon review of the information available to us at this time, we have not been able to find that management on these lands is adequate to preclude proposed designations of critical habitat. We are aware that the State of Hawaii, the Navy, and other private landowners are considering the development of land management plans or agreements that may promote the conservation of endangered and threatened plant species on the island of Kauai. We support these efforts, and we view such plans as important in helping meet species recovery goals, and ultimately can result in delisting of the species. We intend to work closely with any interested landowner or land manager in the development of conservation planning efforts for these, and other, endangered and threatened plants. If new information indicates any of these areas should not be included in the critical habitat designations because they no longer meet the definition of critical habitat, we may revise the proposed critical habitat designations in this proposal to exclude these areas. We agree that implementation of management actions for the conservation of these species should proceed; however, both the Act and the relevant court order requires us to proceed with designation at this time based on the best information available.

(22) *Comment:* Critical habitat for Kauai and Niihau plants is not determinable because their biological needs are not sufficiently known. Hawaiian plants are ''biologically incompetent'' and cannot maintain self-sustaining wild populations. Recovery plans for the species recommend significant research; without such information it cannot be determined with reasonable scientific certainty which areas are essential to the species.

Our Response: We are required under section 4 of the Act to designate critical habitat based on what we know at the time of designation. When we designate critical habitat at the time of listing, or, as in this case, under court-ordered deadlines we will often not have sufficient information to identify all areas of critical habitat. We are required, nevertheless, to make a decision and thus must base our designation on the best available information we have at the time.

(23) *Comment:* There is no direct relationship between the recovery plans for these species and critical habitat.

Our Response: Development and completion of the recovery plans and designation of critical habitat for these plant species are two separate processes with two separate timeframes. The recovery plans for these species were completed between 1994 and 1999. We recognize that information contained within the recovery plans is directly relevant to the development of the critical habitat designations, and we relied heavily upon them. 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 finding may also lead to additional refinements. Because the HPPRCC identified essential habitat areas for all listed, proposed, and candidate plant species, and evaluated species of concern to determine if essential habitat areas would provide for their habitat needs as well, the HPPRCC's mapping of habitat is distinct from the regulatory designation of critical habitat as defined by the Act. More data has 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 in some way. New location data for many species has been gathered. Also, the HPPRCC identified areas as essential based on species clusters (areas that included listed species as well as candidate species, and species of concern) while we have only delineated areas that are essential for the conservation of the listed species at issue. As a result, the proposed critical habitat designations in this revised proposed rule include habitat that was not identified as essential in the 1998 recommendations.

Issue 7: Effects of Designation

(24) *Comment:* Designation of critical habitat will result in restrictions on subsistence hunting and State hunting programs funded under the Federal Aid in Wildlife Restoration Program (Pittman-Robertson program).

Our Response: We believe that game bird and mammal hunting in Hawaii is an important recreational and cultural activity, and we support the continuation of this tradition. The designation of critical habitat requires Federal agencies to consult under section 7 of the Act with us on actions they carry out, fund, or authorize that might destroy or adversely modify critical habitat. This requirement applies to us and includes funds distributed by the Service to the State through the Federal Aid in Wildlife Restoration Program (Pittman-Robertson Program). Under the Act, activities funded by us or other Federal agencies can not result in jeopardy to listed species, and they can not adversely modify or destroy critical habitat. It is well documented that game mammals affect listed plant and animal species. In such areas, we believe it is important to develop and implement sound land management programs that provide both for the recovery of listed species and for continued game hunting. We are committed to working closely with the State and other interested parties to ensure that game management programs are implemented consistent with this need.

(25) *Comment:* Critical habitat could be the first step toward making the area a national park or refuge.

Our Response: Critical habitat designation does not in any way create a wilderness area, preserve, national park, or wildlife refuge, nor does it close an area to human access or use. It's regulatory implications apply only to activities sponsored at least in part by

Federal agencies. Land uses such as logging, grazing, and recreation that may require Federal permits may take place if they do not adversely modify critical habitat. Critical habitat designations do not constitute land management plans.

(26) *Comment:* The designation of critical habitat would justify the ''destruction of private property rights,'' harassment from Federal agents, and lawsuits.

Our Response: Section 3(5) of the Act defines critical habitat as those specific areas which contain physical or biological features essential to the conservation of the species and which may require special management considerations or protection (16 U.S.C. 1532(5)). Designations of critical habitat are to be made on the basis of the best scientific and commercial data available, after taking into account the economic and other relevant impacts of specifying any area as critical habitat (16 U.S.C. 1533(b)(2)). An area may be excluded from designation as critical habitat if the Secretary determines the benefits of excluding the area outweigh the benefits of designating the area as critical habitat (and provided the exclusion would not result in the extinction of the species).

To a property owner, the designation of critical habitat becomes important when viewed in the context of section 7 of the Act, which requires all Federal agencies to ensure, in consultation with the Service, that any action authorized, funded, or carried out by the agency does not result in the destruction or adverse modification of designated critical habitat. If, after consultation, our biological opinion concludes that a proposed action is likely to result in the destruction or adverse modification of critical habitat, we are required to suggest reasonable and prudent alternatives to the action which would avoid the destruction or adverse modification of the critical habitat (16 U.S.C. 1536(b)(3)(A)). If we cannot suggest acceptable reasonable and prudent alternatives, the agency (or the applicant) may apply for an exemption from the Endangered Species Committee under section 7(e)–(p) of the Act.

The mere promulgation of a regulation, like the enactment of a statute, does not take private property unless the regulation on its face denies the property owners all economically beneficial or productive use of their land *(Agins* v. *City of Tiburon,* 447 U.S. 255, 260–263 (1980); *Hodel* v. *Virginia Surface Mining and Reclamation Ass'n,* 452 U.S. 264, 195 (1981); *Lucas* v. *South Carolina Coastal Council,* 505 U.S. 1003, 1014 (1992)). The designation of critical habitat alone does not deny anyone economically viable use of their property. The Act does not automatically restrict all uses of critical habitat, but only imposes restrictions under section 7(a)(2) on Federal agency actions that may result in destruction or adverse modification of designated critical habitat. Furthermore, as discussed above, if a biological opinion concludes that a proposed action is likely to result in destruction or modification of critical habitat, we are required to suggest reasonable and prudent alternatives.

We are aware of relatively few activities in the proposed critical habitat areas for these 83 plants that have Federal involvement, and thus, would require consultation or reinitiation of already completed consultations for on-going projects. We are not aware of any commercial activities on the Federal lands included in these proposed critical habitat designations.

Since these 83 plant species were listed (between 1990 and 1996), there have been no formal consultations on them, and we have conducted only one informal consultation on Kauai, in addition to consultations on purely Federal activities (ie. Defense installations). That informal consultation was conducted with the NRCS through their Wildlife Incentive Program for noxious weed control actions on leased cabin lots within Kokee State Park. NRCS does not anticipate the need to reinitiate consultation for these on-going actions as these actions are not occurring within the areas of proposed critical habitat (Terrell Kelly, NRCS, pers. comm., 2001). There have been no consultations on any of these 83 species on the island of Niihau.

Nearly all of the land within the critical habitat units is unsuitable for development or economically productive land uses because of the remote locations, lack of access, and rugged terrain of these lands. Also, nearly all of this land (99.2 percent) is within the State Conservation District where State land-use controls severely limit development and most activities. Approximately 0.7 percent of this land is within the State Agricultural District, and about 0.1 percent is within the State Urban District.

The limited economic activities that may occur consist of improvements to roads and communications and tracking facilities; recreational use such as hiking, camping, picnicking, game hunting, and fishing; botanical gardens; and crop farming. On lands that are in agricultural production, the types of activities that might trigger a consultation include irrigation ditch system projects that may require section 404 authorizations from the Corps, and watershed management and restoration projects sponsored by NRCS.

Lands that are within the State Urban District are located within undeveloped coastal areas. The types of activities that might trigger a consultation include shoreline restoration or modification projects that may require section 404 authorizations from the Corps or FEMA, housing or resort development that may require permits from the Department of Housing and Urban Development, and activities funded or authorized by the EPA. However, we are not aware of a significant future activities that would require Federal permitting or authorization in these coastal areas.

The entire island of Niihau is under one private ownership and within the State Agricultural District. The current and projected land uses on Niihau are cattle and sheep ranching, commercial game hunting, and military exercises to train downed combat pilots on how to evade capture (DAHI 2001).

The kinds of actions that may be included in future reasonable and prudent alternatives include conservation set-asides, management of competing non-native species, restoration of degraded habitat, propagation, outplanting and augmentation of existing populations, construction of protective fencing, and periodic monitoring. These measures are not likely to result in a significant economic impact. In addition, all of these species are protected under the State of Hawaii's Endangered Species Act (Hawaii Revised Statutes, Chap. 195D–4), and thus would have received some protections even without the Act.

As required under section 4(b)(2) of the Act, we will conduct an analysis of the potential economic impacts of this proposed critical habitat designation, and will make that analysis available for public review and comment before finalizing these designations. However, court deadlines require us to publish this proposed rule before the economic analysis can be completed. In the absence of this economic analysis, we have reviewed our previously available draft economic analysis of the likely economic impacts of designating critical habitat for 76 plants from the islands of Kauai and Niihau (66 FR 13691). In that analysis, which included proposed designations of critical habitat within 23 units on 24,349 ha (60,166 ac) on Kauai and 191 ha (471 ac) on Niihau, we determined that the designations would have modest economic impacts because nearly all of the land within the critical habitat units has limited suitability for development, land uses, and activities

because of the remote locations, lack of access, and rugged terrain, of the land, and their inclusion within the State Conservation District where State land-use controls severely limit development and most activities. The proposed critical habitat designations were expected to cause little or no increase in the number of section 7 consultations; and few, if any, increases in costs of projects or delays in, or modifications to planned projects, land uses and activities.

Issue 8: Economic Issues

(27) *Comment:* We should have been directly contacted for our opinions on the economic impacts of critical habitat designation.

Our Response: The methodogy outlined in the economic analysis report relies primarily on information provided by the Service, the State of Hawaii's Department of Land and Natural Resources (DNLR), and the consultant, Decision Analysts Hawaii, Inc. (DAHI). To better understand the concerns of stakeholders, the Service solicited comments and suggestions from the public, other concerned government agencies, the scientific community, industry, and other interested parties concerning aspects of the proposed rule and the proposed critical habitat. These comments and suggestions were taken into consideration in conducting the economic analysis. Additional clarifications were obtained directly from landowners and other parties.

In addition, we have revised the November 7, 2000, proposed designations to incorporate new information, and/or address comments and new information received during the three comment periods. In addition, we will conduct an analysis of the economic impacts of designating these areas as critical habitat prior to a final determination and revise the economic analysis. When completed, we will announce the availability of the draft revised economic analysis with a notice in the **Federal Register**, and we will open a 30-day public comment period on the revised draft economic analysis and proposed rule at that time. In addition, we will mail letters to landowners and other interested parties and publish a notice in the *Garden Island* newspaper announcing the availability of and seeking public comment on the draft economic analysis and proposed rule. We would strongly encourage anyone who has information or opinions concerning the economic impacts of this proposal to provide them to us.

(28) *Comment:* The Service failed to properly consider the economic (e.g., costs associated with hunting, costs associated with section 7 consultation, etc.) and other impacts (e.g., special management protections on private lands, planned highway projects, diminished activities on military lands, etc.) of designating particular areas as critical habitat.

Our Response: We originally proposed designation of critical habitat for 76 plants from the islands of Kauai and Niihau on November 7, 2000. On March 7, 2001, we published a notice announcing the availability of the draft economic analysis on the November 7, 2000, proposal. That draft economic analysis concluded that for the most part the critical habitat designations for Kauai and Niihau generally will have modest economic impacts. They are expected to cause little or no increase in the number of section 7 consultations with the Service; few, if any, increases in costs associated with consultations; and few, if any delays in, or modifications to planned projects, land uses and activities. These findings reflect the following:

—Nearly all of the land within the critical habitat units is unsuitable for development as well as for most projects, land uses, and activities. This is due to the remote locations, lack of access, and rugged terrain.

—On Kauai, nearly all of this land (98.5 percent) is within the State Conservation District where State land-use controls, severely limits development and most activities.

—Very few of the current and planned projects, land uses, and activities that could affect the proposed critical habitat units have a federal involvement requiring section 7 consultations with the Service, so they are not restricted by the Service requirements.

—And most of the activities that do have federal involvement are operations and maintenance of existing facilities and structures, so they would not be impacted by the critical habitat designation.

We have revised the proposed designations to incorporate new information, and/or address comments and new information received during the comment periods. In addition, we will conduct another analysis of the economic impacts of designating these areas as critical habitat prior to a final determination. When completed, we will announce the availability of the draft economic analysis with a notice in the **Federal Register**, and we will open a 30-day public comment period on the draft economic analysis and proposed rule at that time.

Summary of Changes From the Previous Proposal

We originally determined that designation of critical habitat, for 76 plants from the islands of Kauai and Niihau on November 7, 2000. These species are: *Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia pallida, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus clayi, Hibiscus waimeae* ssp. *hannerae, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hobdyi, Xylosma crenatum,* and *Zanthoxylum hawaiiense.* No change is made to these prudency determinations in this revised proposal and they are hereby incorporated by reference (65 FR 66808). In this proposal we have revised the proposed designations for the 76 plants based on new information received during the comment periods. In addition, we incorporate new information, and/or address comments and new information received during

the comment periods on the November 7, 2000, proposal.

In the November 7, 2000, proposal we did not propose critical habitat for three species of loulu palm, *Pritchardia aylmer-robinsonii, P. napaliensis,* and *P. viscosa.* We determined that critical habitat designation was not prudent because it would likely increase the threats from vandalism or collection of these species on Kauai and Niihau. No change is made to these determinations here and they are hereby incorporated by reference (65 FR 66808). In that proposal, we also determined that critical habitat was not prudent for *Melicope quadrangularis* and *Phyllostegia waimeae,* two species endemic to Kauai, because they had not been seen recently in the wild, and no viable genetic material of these species was known to exist. Due to new information received during the comment periods regarding the rediscovery of *Phyllostegia waimeae* on Kauai, we have reconsidered our earlier finding and determine that critical habitat is prudent for this species because we believe that such designation would be beneficial to this species. Designation of critical habitat is proposed for this species on Kauai. No change is made here to the November 7, 2000, not prudent determination for *Melicope quadrangularis* and it is hereby incorporated by reference (65 FR 66808).

In the November 7, 2000, proposal we did not determine prudency nor propose designation of critical habitat for 14 species that no longer occur on Kauai and Niihau but are reported from one or more other islands. We determined that critical habitat was prudent and proposed designation of critical habitat for nine of these species (*Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Hibiscus brackenridgei, Ischaemum byrone, Mariscus pennatiformis, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis*) in other proposed rules published on December 18, 2000 (Maui and Kahoolawe), on December 27, 2000 (Lanai), and on December 29, 2000 (Molokai). In this proposal, no change is made to the earlier prudency determinations for these nine species and they are hereby incorporated by reference (65 FR 79192, 65 FR 82086, 65 FR 83158). In this proposal, we propose designation of critical habitat for *Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Ischaemum byrone,* and *Mariscus pennatiformis* on the island of Kauai, based on new information and information received during the comment periods on the November 7, 2000, proposal. Critical habitat is not proposed for *Hibiscus brackenridgei, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis* on the islands of Kauai and Niihau because we are unable to determine habitat which is essential to their conservation on these islands.

No change is made here to the prudency determination for *Acaena exigua,* a species known only from Kauai and Maui, published in the proposed rule for Maui and Kahoolawe on December 18, 2000, and it is hereby incorporated by reference (65 FR 79192). In that proposal, we determined that critical habitat was no prudent for *Acaena exigua* because it had not been seen recently in the wild, and no viable genetic material was known to exist.

In this proposal, we determine that critical habitat is prudent for four other species (*Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans, Solanum incompletum*) for which prudency determinations have not been made previously, and that no longer occur on Kauai but are reported from one or more other islands. These four 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. In this proposal, we determine that critical habitat is prudent for these four species because we believe that such designation would be beneficial to these species. Critical habitat is proposed at this time for *Phlegmariurus nutans* on Kauai based on new information and information received during the comment periods on the November 7, 2000, proposal. Critical habitat is not proposed for *Achyranthes mutica, Isodendrion pyrifolium,* and *Solanum incompletum* on the islands of Kauai and Niihau because we are unable to determine habitat which is essential to their conservation on these islands.

Based on a review of new biological information and public comments received we have revised our November 7, 2000, proposal to incorporate the following changes in addition to those described above: changes in our approach to delineating proposed critical habitat (see Criteria Used to Identify Critical Habitat); adjustment and refinement of previously identified critical habitat units to more accurately follow the natural topographic features and to avoid nonessential landscape features (agricultural crops, urban or rural development) without primary constituent elements; and, inclusion of new areas within the proposed critical habitat units that are essential for the conservation of one or more of the 83 plant species.

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'' means the use of all methods and procedures that are necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. Section 7 also requires conferences on Federal actions that are likely to result in the destruction or adverse modification of proposed critical habitat. Aside from the added protection that may be provided under section 7, the Act does not provide other forms of protection to lands designated as critical habitat. 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 afford any additional regulatory protections under the Act.

Critical habitat also provides non-regulatory benefits to the species by informing the public and private sectors of areas that are important for species recovery and where conservation actions would be most effective. Designation of critical habitat can help focus conservation activities for a listed species by identifying areas that contain the physical and biological features that are essential for the conservation of that species, and can alert the public as well as land-managing agencies to the importance of those areas. Critical habitat also identifies areas that may require special management considerations or protection, and may help provide protection to areas where significant threats to the species have been identified to help to avoid accidental damage to such areas.

In order to be included in a critical habitat designation, the habitat must be ''essential to the conservation of the species.'' Critical habitat designations identify, to the extent known and using the best scientific and commercial data available, habitat areas that provide at least one of the physical or biological features essential to the conservation of the species (primary constituent elements, as defined at 50 CFR 424.12(b)). Section 3(5)(C) of the Act states that not all areas that can be occupied by a species should be designated as critical habitat unless the Secretary determines that all such areas are essential to the conservation of the species. Our regulations (50 CFR 424.12(e)) also state that, ''The Secretary shall designate as critical habitat areas outside the geographic area presently occupied by the species only when a designation limited to its present range would be inadequate to ensure the conservation of the species.''

Section 4(b)(2) of the Act requires that we take into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. We may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Our Policy on Information Standards Under the Endangered Species Act, published on July 1, 1994 (59 FR 34271), provides criteria, establishes procedures, and provides guidance to ensure that decisions made by the Service represent the best scientific and commercial data available. It requires that our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, 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 rule for the species. Additional information may be obtained from a recovery plan, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, and biological assessments or other unpublished materials.

Section 4 of the Act requires that we designate critical habitat based on what we know at the time of designation. Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species. For these reasons, 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 section 7(a)(2) jeopardy standard and the section 9 prohibitions, as determined on the basis of the best available information at the time of the action. 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, HCPs, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

A. Prudency Redeterminations

We originally determined that designation of critical habitat was prudent, and proposed designation of critical habitat for 76 plants from the islands of Kauai and Niihau on November 7, 2000. These species are: *Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia pallida, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyeniii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus clayi, Hibiscus warmeae* ssp. *hannetae, Idsodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiendea membranacea, Schieda nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hodbdvi, Xylosma crenatum*, and *Zanthoxylum hawaiiense*. No change is made to these prudency determinations in this revised proposal and they are hereby incorporated by reference (65 FR 66808).

In the November 7, 2000, proposal we did not propose critical haibtat for three species of loulu palm, *Pritchardia aylmer-robinsonii, P. napalienses*, and *P. viscosa*. Since publication of the listing rule for *Pritchardia aylmer-robinsonii, P. napalienses*, and *P. viscosa*, we learned of instances of vandalism, collection, and commercial trade involving these three species of *Pritchardia* (65 FR 66808). In light of this information, we believed that the designation of critical habitat would likely increase the threat to these three species of *Pritchardia* on Kauai and Niihau from vandalism and collection. We determined that the benefits of designation critical habitat designation did not outweigh the potential increased threats from vandalism or collection. Given these considerations, we determined that designation of critical habitat for *Pritcharida aylmer-robinsonii, P. napalienses*, and *P. viscosa* was not prudent. During the public comment periods for the November 7, 2000, proposal two commenters suggested that critical habitat should be designated for these three species of palm if the units are of adequate ecological size or because the habitat is too inaccessible and remote for vandals. We also received comments that critical habitat should not be designated for these three species of palm because of previous acts of vandalism to listed plant species. Given the considerations described in the November 7, 2000, proposal regarding instances of vandalism, collection, and commercial trade of these species no change is made to the earlier prudency determinations for *Pritcharida aylmer-robinsonii, P. napalienses*, and *P. viscosa* in this proposal and they are hereby incorporated by reference (65 FR 66808).

In the November 7, 2000, proposal, we determined that critical habitat was not prudent for *Melicope*

quadrangularis and *Phyllostegia waimeae*, two species endemic to Kauai, because they had not been seen recently in the wild, and no viable genetic material of these species was known to exist. Therefore, such designation would be of no benefit to these species. Since publication of the November 7, 2000, proposal we received new information during the comment periods regarding the rediscovery in August 2000 of six individuals of *Phyllostegia waimeae* in Kawaiiki Valley on Kauai, and have reconsidered our earlier prudency finding. We examined the evidence available for this species and have not, at this time, found specific evidence of taking, vandalism, collection or trade of this species or of similar species. Consequently, while we remain concerned that these activities could potentially threaten *Phyllostegia waimeae* 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 this species is 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 *Phyllostegia waimeae* 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 affects critical habitat. *Phyllostegia waimeae* does not occur on Federal lands on Kauai where actions are subject to section 7 consultation. This species is located exclusively on State land with limited Federal activities, though there could be Federal actions affecting this land in the future. While a critical habitat designation for habitat currently occupied by *Phyllostegia waimeae* would not likely change the section 7 consultation outcome, since an action that destroys or adversely modifies such critical habitat would also be likely to result in jeopardy to the species, 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 propose that designation of critical habitat is prudent for *Phyllostegia waimeae*.

No change is made here to the prudency determination for *Melicope quadrangularis*, a species known only from the Wahiawa drainage area on Kauai, published in the November 7, 2000, proposal and hereby incorporated by reference (65 FR 66808). *Melicope quadrangularis* was last observed in the Wahiawa drainage area in 1991 and has not been observed in this area in surveys following Hurricane Iniki in 1992 (S. Perlman and K. Wood, pers. comm., 2000). In addition, this species is not known to be in storage or under propagation. Given these circumstances, we determined that designation of critical habitat for *Melicope quadrangularis* was not prudent because such designation would be of no benefit to this species. If this species is rediscovered we may revise this proposal to incorporate or address new information as new data becomes available (See 16 U.S.C. 1532(5)(B); 50 CFR 424.13(f)).

In November 7, 2000, proposal we did not determine prudency nor propose designation of critical habitat for 14 species that no longer occur on Kauai and Niihau but are reported from one or more other islands. We determined that critical habitat was prudent and proposed designation of critical habitat for nine of these species (*Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Hibiscus brackenridgei, Ischaemum byrone, Mariscus pennatiformis, Phlegmariurus manni, Silene lanceolata*, and *Vigna o-wahuensis*) in other proposed rules published on December 18, 2000 (Maui and Kahoolawe), on December 27, 2000 (Lanai), or on December 29, 2000 (Molokai). No change is made to these prudency determinations for these nine species in this proposal and they are hereby incorporated by reference (65 FR 79192, 65 FR 82086, 65 FR 83158). In this proposal, we propose designation of critical habitat for *Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Ischaemum byrone*, and *Mariscus pennatiformis* on the island of Kauai, based on new information and information received during the comment periods on the November 7, 2000, proposal. Critical habitat is not proposed for *Hibiscus brackenridgei, Phlegmariurus manni, Silene lanceolata*, and *Vigna o-wahuensis* on the islands of Kauai and Niihau because we are unable to determine habitat which is essential to other conservation on these islands.

No changes is made here to the prudency determination for *Acaena exigua*, a species known only from Kauai and Maui, published in the proposed rule for Maui and Kahoolawe on December 18, 2000 and hereby incorporated by reference (65 FR 79192). On Kauai, this species was only known from a collection made between 1869 and 1870 (Wagner et al. 1999). On Maui, this species was last observed in 1997 and no individuals were observed during subsequent visits in 1998 and 1999 to the only known location (H. Oppenheimer and S. Perlman, pers. comm., 2000). In addition, this species is not known to be in storage or under propagation. Given these circumstances, we determined that designation would be of no benefit to this species. If this species is rediscovered we may revise this proposal to incorporate or address new information as new data becomes available (See 16 U.S.C. 1532(5)(B); 50 CFR 424.13(f)).

To determine whether critical habitat would be prudent for four other species (*Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans*, and *Solanum incompletum*) for which prudency determinations have not been made previously, and that no longer occur on Kauai but are reported from one or more other islands we analyzed the potential threats and benefits for each species in accordance with the court's order. These four plants were listed as endangered species under the Endangered Species Act of 1973, as amended 9Act) 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 four 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 *Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans*, and *Solanum incompletum* 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 *Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans*, and *Solanum incompletum* 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 affects critical habitat. None of these four species are reported from Federal lands on Kauai (the entire island of Niihau is privately-owned) where actions are subject to section 7 consultation. However, two of these species, *Phlegmariurus nutans* and *Solanum incompletum*, are reported from Federal lands or lands that are administered by a Federal agency on other islands (*S. incompletum* is reported from the United States Army's Pohakuloa Training Area on the island of Hawaii; *Phlegmariurus nutans* is reported from the United States Army's Schofield Barracks Military Reservation and Kawailoa Training Area, and the Service's Oahu Forest National Wildlife Refuge on Oahu). Although *Achyranthes mutica* and *Isodendrion pyrifolium* are located exclusively on non-Federal lands with limited Federal activities on the island of Hawaii, there could be Federal actions affecting these lands in the future. While a critical habitat designation for habitat currently occupied by *Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans*, and *Solanum incompletum* would not likely change the section 7 consultation outcome, since an action that destroys or adversely modifies such critical habitat would also be likely to result in jeopardy to the species, 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 propose that designation of critical habitat is prudent for *Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans*, and *Solanum incompletum*.

B. Methods

As required by the Act (section 4(b)(2)) and regulations at 50 CFR 424.12, we used the best scientific data available to determine areas that are essential to conserve *Achyranthes mutica, Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Ctenitis squamigera, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia erecta, Diellia pallida, Diplazium molokaiense, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus brackenridgei, Hibiscus clayi, Hibiscus waimeae* ssp. *hannerae, Ischaemum byrone, Isodendrion laurifolium, Isodendrion longifolium, Isodendrion pyrifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Mariscus pennatiformis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phlegmariurus mannii, Phlegmariurus nutans, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Silene lanceolata, Solanum incompletum, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Vigna o-wahuensis, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hobdyi, Xylosma crenatum,* 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 CPC's rare plant monitoring database housed at the University of Hawaii's Lyon Arboretum; island-wide GIS coverages (*e.g.* vegetation, soils, annual rainfall, elevation contours, land ownership); the final listing rules for these 90 species; the November 7, 2000, proposal; information received during the public comment periods and the public hearing; recent biological surveys and reports; our recovery plans for these species; information received in response to outreach materials and requests for species and management information we sent to all landowners, land managers, and interested parties on the islands of Kauai and Niihau; discussions with botanical experts; and recommendations from the HPPRCC (see also the discussion below)(Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999; HPPRCC 1998; CPC, *in litt.* 1999; HINHP Database 2000; K. Wood, pers. comm., 2001; M. Buck, *in litt.* 2001; 65 FR 66808).

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 has 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 in some way. New location data for many species has been

gathered. Also, the HPPRCC identified areas as essential based on species clusters (areas that included listed species as well as candidate species, and species of concern) while we have only delineated areas that are essential for the conservation of 83 listed species at issue. As a result, the proposed critical habitat designations in this proposed rule include not only some habitat that was identified as essential in the 1998 recommendation but also habitat that was not identified as essential in those recommendations.

C. Primary Constituent Elements

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

In the November 7, 2000, proposal we determined that the designation of critical habitat was prudent for 76 plant species known currently from the islands of Kauai or Niihau and in that proposal we identified the physical and biological features that are considered essential to the conservation of the 76 species on the islands of Kauai or Niihau (65 FR 66808). In other proposals published on December 18, 2000, December 27, 2000, or on December 29, 2000, we determined that the designation of critical habitat was prudent for nine species (*Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Hibiscus brackenridgei, Ishaemum byrone, Mariscus pennatiformis, Phlegmariurus manni, Silene laceolata,* and *Vigna o-wahuensis*) that no longer occur on Kauai and Niihau but are reported from one or more other islands. Based on new information and information received during the comment periods on the November 7, 2000, proposal we have identified the physical and biological features that are considered essential to the conservation of five of these nine species (*Ctenitis squamigera, Diellia erecta, Diplazium molokaiense, Ischaemum byrone,* and *Mariscus pennatiformis*) on the island of Kauai. We are unable to identify these features for *Hibiscus brackenridgei, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis* on the islands of Kauai and Niihau based on the information available at this time. Therefore, we were not able to identify the specific areas outside the geographic areas occupied by these species at the time of their listing (unoccupied habitat) that are essential for the conservation of *Hibiscus brackenridgei, Phlegmariurus manni, Silene landeolata,* and *Vigna o-wahuensis* on the islands of Kauai or Niihau. However, proposed critical habitat designations for *Hibiscus brackenridgei, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis* were included in proposals published on December 18, 2000, December 27, 2000, or December 29, 2000 (65 FR 79192, 65 FR 82086, 65 FR 83158). In addition, we will consider proposing designation of critical habitat for *Hibiscus brackenridgei, Phlegmariurus manni, Silene lanceolata,* and *Vigna o-wahuensis* within the historic range for each species on other Hawaiian islands.

In this proposal, we determine that the designation of critical habitat is prudent for *Phyllostegia waimeae* based on new information received during the comment periods on the November 7, 2000, proposal regarding the rediscovery of this species on Kauai. Based on new information received during the comment periods we have identified physical and biological features that are considered essential to the conservation of *Phyllostegia waimeae* on the island of Kauai.

In this proposal, we determine that the designation of critical habitat is prudent for four species (*Achyranthes mutica, Isodendrion pyrifolium, Phlegmariurus nutans,* and *Solanum incompletum*) for which prudency determinations have not been made previously, and which no longer occur on Kauai but are reported from one or more other islands. Based on new information and information received during the comment periods on the November 7, 2000, proposal we have identified the physical and biological features that are considered essential to the conservation of *Phlegmariurus nutans* on the island of Kauai. We are unable to identify these features for *Achyranthes muticca, Isodendrion pyrifolium,* and *Solanum incompletum* on the islands of Kauai and Niihau based on the information available at this time. Therefore, we were not able to identify the specific areas outside the geographic areas occupied by these species at the time of their listing (unoccupied habitat) that are essential for the conservation of *Achyranthes mutica, Isodendrion pyrifolium,* and *Solanum incompletum* on the islands of Kauai and Niihau. However, we will consider proposing designation of critical habitat for *Achyranthes mutica, Isodendion pyrifolium,* and *Solanum incompletum* within the historic range for each species on other Hawaiian Islands.

All areas proposed as critical habitat are within the historical range of one or more of the 83 species at issue and contain one or more of these physical or biological features (primary constituent elements) essential for the conservation of one or more of the species.

As described in the discussions for each of the 83 species for which we are proposing critical habitat, we are proposing to define the primary constituent elements on the basis of the habitat features of the areas in which the plant species are reported from, as described by the type of plant community, associated native plant species, locale information (e.g., steep rocky cliffs, talus slopes, stream banks), and elevation. The habitat features provide the ecological components required by the plant. The type of plant community and associated native plant species indicates specific microclimate conditions, retention and availability of water in the soil, soil microorganism community, and nutrient cycling and availability. The locale indicated information on soil type, elevation, rainfall regime, and temperature. Elevation indicates information on daily and seasonal termperature 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 these 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 islands of Kauai and Niihau.

D. Criteria Used To Identify Critical Habitat

In the November 7, 2000, proposal we defined the primary constituent elements based on the general habitat features of the areas in which the plants currently occur such as the type of plant community the plants are growing in, their physical location (e.g., steep rocky cliffs, talus slopes, stream banks), and

elevation. The areas we proposed to designate as critical habitat provided some or all of the habitat components essential for the conservation of the 76 plant species. Specific details regarding the delineation of the proposed critical habitat units were given in the November 7, 2000, proposal (65 FR 66808). In that proposal we did not include potentially suitable unoccupied habitat that is important to the recovery of the 76 species due to our limited knowledge of the historical range (the geographical area outside the area presently occupied by the species) and our lack of more detailed information on the specific physical or biological features essential for the conservation of the species.

Based on a review of new biological information and public comments received following publication of the four proposals to designate critical habitat for Hawaiian plants on Kauai and Niihau (65 FR 66808), Maui and Kahoolawe (65 FR 79192), Lanai (65 FR 82086), and Molokai (65 FR 83158), we have reevaluated the manner in which we delineated proposed critical habitat. In addition, we met with members of the HPPRCC, and State, Federal, and private entities to discuss criteria and methods to delineate critical habitat units for these Hawaiian plants.

We considered several factors in the selection and proposal of specific boundaries for critical habitat for these 83 species. For each of these species, the overall recovery strategy outlined in the approved recovery plans includes the following components: (1) stabilization of existing wild populations, (2) protection and management of habitat, (3) enhancement of existing small populations and reestablishment of new populations within historic range, and (4) research on species' biology and ecology (Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999). Therefore, the long-term recovery of these species is dependent upon the protection of existing population sites and potentially suitable unoccupied habitat within historic range.

The overall recovery goal stated in the recovery plans for each of these species includes the establishment of 8 to 10 populations with a minimum of 100 mature individuals per population for long-lived perennials, 300 individuals per population for short-lived perennials, and 500 mature individuals per population for annuals. (However, 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 (e.g., the Wahiawa plant cluster (Service 1994) and *Schiedea spergulina* var. *leiopoda*), and the proposed critical habitat designations reflect this exception for these species.). To be considered recovered each population of a species endemic to the islands of Kauai or Niihau should occur on the island to which it is endemic, and likewise the populations of a multi-island species should be distributed among the islands of its known historic range (Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999). A population, for the purposes of this discussion and as defined in the recovery plans for these species, is defined as a unit in which the individuals within a population could be regularly cross-pollinated, individuals that could be influenced by the same small-scale events (such as landslides), and should be considered at recover-level numbers of individuals (e.g., 100–500 individuals) for each population (rather than current numbers).

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

The general justification for these objectives is found in the current conservation biology literature addressing the coonservation of rare and endangered plants and animals (Beissinger and Westphal 1998; Burgman *et al.* 2001; Falk *et al.* 1996; Ginzburg *et al.* 1990; Hendrix and Kyhl 2000; Karieva and Wennergren 1995; Luijten *et al.* 2000; Meffe and Carroll 1996; Podolsky 2000; Menges 1990; Murphy *et al.* 1990; Quintana-Ascencio and Menges 1996: Taylor 1995; Tear *et al.* 1995; Wolf and Harrison 2001). The overall goal of recovery and reintroduction in the short-term is a successful population that can carry on basic life-history processes, such as establishment, reproduction, and dispersal, at a level where the probability of extinction is low. In the long-term, the species and its populations should be at a reduced risk of extinction and be adaptable to environmental change through evolution and migration. The long-term objectives, as reviewed by Pavlik, range from 50 to 2,500 individuals per population, based largely on research and theoretical modeling on endangered animals. Many aspects of species life history are typically considered to determine guidelines for species interim stability and recovery, including longevity, breeding system, growth form, fecundity, ramet (a plant that is an independent member of a clone) production, survivorship, seed duration, environmental variation, and successional stage of the habitat. Hawaiian species are poorly studied, and the only one of the afore-mentioned characteristics that can be uniformly applied to all species is longevity (i.e., long-lived perennial, short-lived perennial, and annual). In general, long-lived woody perennial species would be expected to be viable at population levels of 50 to 250 individuals per population, while short-lived perennial species would be viable at population levels of 1,500 to 2,500 individuals or more per population. These population numbers were refined for Hawaiian plant species by the HPPRCC (1994) due to the restricted distribution of suitable habitat typical of Hawaiian plants and the likelihood of smaller genetic diversity of several species that evolved from one single introduction. For recovery of Hawaiian plants, the HPPRCC recommended a general recovery guideline of 100 mature individuals per population for long-lived perennial species, 300 individuals per population for short-lived perennial species, and 500 individuals per population for annual species. These guidelines are general and we expect to revise them for individual species to incorporate new data as it becomes available.

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 (NRC 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, 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 and professional judgement of non-Service scientists and members of the HPPRCC, to identify

potentially suitable habitat within the known historic range of each species.

The HPPRCC recommended the conservation and establishment of 8–10 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 PVA models described above (Burgman *et al.* 2001), this approach nevertheless employs two widely recognized and scientifically accepted goals for promoting viable populations of listed species—(1) Creation or maintenance of multiple populations so that a single or series of catastrophic events cannot destroy the 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 2000; Service 1997; Tear *et al.* 1995; Wolf and Harrison 2001). In general, the larger the number of populations and the larger the size of each population, the lower the probability of extinction (Raup 1991; Meffe and Carroll 1996. This basic conservation principle of redundancy applies to Hawaiian plants. By maintaining 8 to10 viable populations in the several proposed critical habitat units, the threats represented by a fluctuating environment are alleviated and the species has a greater likelihood of achieving long-term survival and conservation. Conversely, loss of one or more of the plant populations within any critical habitat unit could result in an increase in the risk that the entire listed species may not survive and recover.

Due to the reduced size of suitable habitat areas for these Hawaiian plant species, they are now more susceptible to the variations and weather fluctuations affecting quality and quantity of available habitat, as well as direct pressure from hundreds of species of non-native plants and animals. Establishing and conserving 8 to 10 viable populations on one or more islands(s) within the historic range of the species will provide each species with a reasonable expectation of persistence and eventual recovery, even with the high potential that one or more of these populations will be eliminated by normal or random adverse events, such as hurricanes which occurred in 1982 and 1992 on Kauai, fires, and alien plant invasions (HPPRCC 1994; Luijten *et al.* 2000; Mangel and Tier 1994; Pimm *et al.* 1998; Stacey and Taper 1992). We conclude that designation of adequate suitable habitat for 8 to 10 populations as critical habitat—and implementation of recovery actions thereon—gives the species a reasonable likelihood of long-term survival and recovery, based on currently available information. These guidelines are general and we expect to revise for individual species to incorporate new data as it becomes available.

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

Changes in our approach to delineate proposed critical habitat units were incorporated in the following manner:

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

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

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

We began by creating rough units for each species by screen digitizing polygons (map units) using ArcView (ESRI), a computer GIS program. The polygons were created by overlaying current and historic plant location points onto digital topographic maps of each of the islands.

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

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

Using the above criteria, we delineated the proposed critical habitat for each species. When species units overlapped, we combined units for ease of mapping. Such critical habitat units encompass a number of plant communities. Using satellite imagery and parcel data we then eliminated areas that did not contain the appropriate vegetation, associated native plant species, or elevations such as cultivated agriculture fields, housing developments or other areas that are unlikely to contribute to the conservation of one or more of the 83 plant species. Geographic features (ridge lines, valleys, streams, coastlines, etc.) or man-made features (roads or obvious land use) that created an obvious boundary for a unit were used as unit area boundaries. We also used watershed delineations to dissect very large proposed critical habitat units in order to simplify the unit mapping and their descriptions.

Within the critical habitat boundaries, adverse modification could occur only if the primary constituent elements are affected. Therefore, not all activities within critical habitat would trigger an adverse modification conclusion. In

addition, existing features and structures within proposed areas, such as buildings, roads, aqueducts, telecommunications equipment, telemetry antennas, radars, missile launch sites, arboreta and gardens, heiau (indigenous places of worship or shrines), and other man-made features do not contain, and are not likely to develop, constituent elements and would be excluded under the terms of this proposed regulation. Therefore, unless a Federal action related to such features or structures indirectly affected nearby habitat containing the primary constituent elements, operation and maintenance of such features or structures generally would not be impacted by the designation of critical habitat. When delineating critical habitat units, we made an effort to avoid developed areas such as towns, agricultural lands, and other lands unlikely to contribute to the conservation of the 83 species.

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

E. Managed Lands

Currently occupied or historically known sites containing one or more of the primary constituent elements considered essential to the conservation of these 83 plant species were examined to determine if additional special management considerations or protection are required above those currently provided. We reviewed all available management information on these plants at these sites, including published reports and surveys; annual performance and progress reports; management plans; grants; memoranda of understanding and cooperative agreements; DOFAW planning documents; internal letters and memos; biological assessments and environmental impact statements; and section 7 consultations. Additionally, each public (*i.e.,* county, State, or Federal government holdings) and private landowner on the islands of Kauai and Niihau with a known occurrence of one of the 83 species was contacted by mail. We reviewed all information received in response to our landowner mailing and open houses held at three locations (Waimea, Lihue, and Kilauea) on the island of Kauai from October 19 to 21, 1999. When clarification was required on the information provided to us, we followed up with a telephone contact. Because of the large amount of land on the island of Kauai under State of Hawaii jurisdiction, we met with staff from Kauai's DOFAW office and Kauai State Parks to discuss their current management for the plants on their lands. And, we contacted the State's DHHL regarding management for the plants on lands under their jurisdiction (any species of aquatic life, wildlife, or plant that is federally listed as endangered or threatened is State listed as well). In addition, we reviewed new biological information and public comments received during the public comment periods and at the public hearing.

Pursuant to the definition of critical habitat in section 3 of the Act, the primary constituent elements as found in any area so designated must also require ''special management considerations or protections.'' Adequate special management or protection is provided by a legally operative plan that addresses the maintenance and improvement of the essential elements and provides for the long-term conservation of the species. We consider a plan adequate when it:

(1) Provides a conservation benefit to the species (*i.e.,* the plan must maintain or provide for an increase in the species' population or the enhancement or restoration of its habitat within the area covered by the plan);

(2) Provides assurances that the management plan will be implemented (*i.e.,* those responsible for implementing the plan are capable of accomplishing the objectives, have an implementation schedule and/or have adequate funding for the management plan); and,

(3) Provides assurances the conservation plan will be effective (*i.e.,* it identifies biological goals, has provisions for reporting progress, and is of a duration sufficient to implement the plan and achieves the plan's goals and objectives). If an area is covered by a plan that meets these criteria, it does not constitute critical habitat as defined by the Act because the primary constituent elements found there are not in need of special management.

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

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

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

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

(3) The management actions needed for assurance of survival and ultimate recovery of Hawaii's endangered plants. These actions are described in our recovery plans for these 83 species (Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999), in the 1998 HPPRCC report to us (HPPRCC 1998), and in various other documents and publications relating to plant conservation in Hawaii (Mueller-Dombois 1985; Smith 1985; Stone 1985; Cuddihy and Stone 1990; Stone *et al.*

1992). In addition to monitoring the plant populations, these actions include, but are not limited to: (1) feral ungulate control; (2) non-native plant control; (3) rodent control; (4) invertebrate pest control; (5) fire management; (6) maintenance of genetic material of the endangered and threatened plants species; (7) propagation, reintroduction, and/or augmentation of existing populations into areas deemed essential for the recovery of these species; (8) ongoing management of the wild, outplanted, and augmented populations; and (9) habitat management and restoration in areas deemed essential for the recovery of these species.

In general, taking all of the above recommended management actions into account, the following management actions are ranked in order of importance (Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999). It should be noted, however, that, on a case-by-case basis, some of these actions may rise to a higher level of importance for a particular species or area, depending on the biological and physical requirements of the species and the location(s) of the individual plants: feral ungulate control; wildfire management; non-native plant control; rodent control; invertebrate pest control; maintenance of genetic material of the endangered and threatened plant species; propagation, reintroduction, and/or augmentation of existing populations into areas deemed essential for the recovery of the species; ongoing management of the wild, outplanted, and augmented populations; maintenance of natural pollinators and pollinating systems, when known; habitat management and restoration in areas deemed essential for the recovery of the species; monitoring of the wild, outplanted, and augmented populations; rare plant surveys; and control of human activities/access.

As shown in Table 3, the proposed critical habitat designations for 83 species of plants are found on Federal, State, and private lands on the islands of Kauai and Niihau. In response to our public notices; letters to landowners; open houses; meetings; the November 7, 2000, proposal; public comment periods; the March 7, 2001, draft economic analysis; and the February 6, 2001, public hearing along with information in our files, we received varying amounts and various types of information on the conservation management actions occurring on these lands. Some landowners reported that they are not conducting conservation management actions on their lands while others provided information on various activities such as fencing, weeding, ungulate control, hunting, control of human access, scientific research, fire control, and propagation and/or planting of native plants.

Federal Lands

The PMRF at Barking Sands and Makaha Ridge, both on Kauai's west side, are on federally owned or State leased lands administered by the Navy for instrumented and multi-environment weapon testing and tracking. *Wilkesia hobdyi* occurs on lands at the Makaha Ridge Facility while *Sesbania tomentosa* and *Panicum niihauense* are reported from the dunes on State lands adjacent to the Barking Sands Facility at Polihale State Park. The dune system extends from Polihale State Park through the Barking Sands Facility to State-owned lands at Kekaha, and may be one of the best intact coastal dune systems remaining on the main Hawaiian Islands. We evaluated the dune habitat at the Barking Sands Facility for *Sesbania tomentosa* and *Panicum niihauense* and determined that these lands are not essential for the conservation of *Sesbania tomentosa* though they are essential for *Panicum niihauense.* The Navy is currently engaged in discussions with us to identify training-related impacts to *Wilkesia hobdyi* and *Panicum niihauense* and to develop an Integrated Natural Resources Management Plan (INRMP 2001) that will identify measures that will address the maintenance and improvement of the essential elements for these two plant species and provide for their long-term conservation.

Management at the Barking Sands and Makaha Ridge Facility lands currently consists of restricting human access and mowing landscaped areas. These actions alone are not sufficient to address the factors inhibiting the long-term conservation of *Panicum niihauense* and *Wilkesia hobdyi.* Therefore, we can not at this time find that management on these lands under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. If the Navy completes and implements an INRMP or other endangered species management plans that addresses the maintenance and improvement of the essential elements for these two plant species and provides for their long-term conservation we will reassess the critical habitat boundaries in light of these management plans. We will solicit specific comments from the Navy on their concerns on our proposed designation on military lands, and its effect of military activities. We will give full consideration to their comments, and after completing our analysis of public comments, we may exclude some or all of these Navy lands under section 4(b)(2) of the Act.

State of Hawaii Lands

The State lands on the island of Kauai include ceded and leased lands, and those that are administered by the Department of Land and Natural Resources (DLNR). DLNR lands are made up of State Parks, which are administered by the State Division of State parks; and Forest Reserves, Natural Area Reserves, and the Alakai Wilderness Preserve which are administered by the DOFAW. The DLNR also manages DHHL lands on the island of Kauai. We determined that habitat that is essential to the conservation of 74 of the 83 federally threatened or endangered plant species is found on State lands: *Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia erecta, Diellia pallida, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus clayi, Hibiscus waimeae* ssp. *hannerae, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pritchardia napaliensis, Pritchardia viscosa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Wilkesia hobdyi, Xylosma crenatum,* and *Zanthoxylum hawaiiense.*

Although the State conducts some conservation management actions on these lands and provides access to others who are conducting such activities, these programs do not adequately address the threats to these listed plant species on their lands. In addition, there are no comprehensive management plans for the long-term conservation of endangered and threatened plants on these lands, no updated detailed reports on management actions conducted, and no assurances that management actions will be implemented. Therefore, we cannot, at this time, find that management on these State lands is adequate to preclude a proposed designation of critical habitat. However, we will work with the State in developing conservation planning efforts.

Private Lands

We determined that habitat that is essential to the conservation of 32 of the 83 federally listed plant species is found on privately owned lands on Kauai and Niihau: *Adenophorus periens, Bonamia menziesii, Brighamia insignis, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Dubautia pauciflorula, Exocarpos luteolus, Flueggea neowawraea, Hesperomannia lydgatei, Hibiscus waimeae* ssp. *hannerae, Ischaemum byrone, Isodendrion longifolium, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta micrantha, Lobelia niihauensis, Munroidendron racemosum, Myrsine linearifolia, Peucedanum sandwicense, Phyllostegia wawrana, Plantago princeps, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Solanum sandwicense,* and *Viola helenae,* and *Viola kauaiensis* var. *wahiawaensis.*

We received 25 responses from the over 160 private landowners who received letters inquiring about management actions on their lands. The main activities being conducted by several of these landowners are weeding, control of human access, and planting of native species. In addition, responses and comments we received during the three comment periods and the public hearing, and new information used in preparing this revised proposal did not adequately address the threats to these listed plant species on private lands on Kauai and Niihau. We are aware of only a few private landowners who are drafting management plans for their areas. Without such plans and assurances that the plans will be implemented, we are unable to find that the lands in question do not require special management or protection.

If we receive information during the public comment period that any of the lands within the proposed designations are actively managed to promote the conservation and recovery of the 83 listed species at issue in this revised proposed designation, in accordance with long term conservation plans or agreements, and there are assurances that the proposed management actions will be implemented and effective, we can consider this information when making a final determination of critical habitat.

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

The proposed critical habitat units described below constitute our best assessment of the physical and biological features needed for the conservation of the 83 plant species, and the special management needs of these species, and are based on the best scientific and commercial information available and described above. We put forward this revised proposal acknowledging that we may have incomplete information regarding many of the primary biological and physical requirements for these species. However, both the Act and the relevant court order requires us to proceed with designation at this time based on the best information available. As new information accrues, we may reevaluate which areas warrant critical habitat designation. We anticipate that comments received through the public review process and from the public hearing will provide us with additional information to use in our decision making process and in assessing the potential impacts of designating critical habitat for one or more of these species.

The approximate areas of proposed critical habitat by landownership or jurisdiction are shown in Table 5.

TABLE 5.—APPROXIMATE PROPOSED CRITICAL HABITAT AREA BY UNIT AND LAND OWNERSHIP OR JURISDICTION, KAUAI COUNTY, HAWAII [1]

Unit name	State/local	Private	Federal	Total
Kauai A1		2 ha (6 ac)		2 ha (6 ac)
Kauai A2		6 ha (16 ac)		6 ha (16 ac)
Kauai A3		6 ha (16 ac)		6 ha (16 ac)
Kauai B	271 ha (669 ac)			271 ha (669 ac)
Kauai C	<0.5 ha (<1 ac)	97 ha (239 ac)		97 ha (239 ac)
Kauai D1	2 ha (4 ac)	13 ha (31 ac)		15 ha (35 ac)
Kauai D2		240 ha (594 ac)		240 ha (594 ac)
Kauai E		563 ha (1,390 ac)		563 ha (1,390 ac)
Kauai F		5 ha (12 ac)		5 ha (12 ac)
Kauai G	317 ha (784 ac)			317 ha (784 ac)
Kauai H1	67 ha (165 ac)		71 ha (176 ac)	138 ha (341 ac)
Kauai H2	3 ha (7 ac)		104 ha (258 ac)	107 ha (265 ac)
Kauai H3	42 ha (103 ac)		42 ha (103 ac)	84 ha (206 ac)
Kauai I	8,226 ha (20,326 ac)	12 ha (29 ac)		8,237 ha (20,355 ac)
Kauai J	363 ha (898 ac)	5,173 ha (12,783 ac)		5,536 ha (13,681 ac)
Kauai K	718 ha (1,774 ac)	1,034 ha (2,556 ac)		1,752 ha (4,330 ac)
Kauai L	3,372 ha (8,333 ac)	35 ha (85 ac)		3,407 ha (8,418 ac)
Kauai M	1,459 ha (3,606 ac)	1,843 ha (4,554 ac)		3,302 ha (8,160 ac)
Kauai N	2,713 ha (6,704 ac)	3,886 ha (9,603 ac)		6,599 ha (16,307 ac)

TABLE 5.—APPROXIMATE PROPOSED CRITICAL HABITAT AREA BY UNIT AND LAND OWNERSHIP OR JURISDICTION, KAUAI COUNTY, HAWAII [1]—Continued

Unit name	State/local	Private	Federal	Total
Kauai O	9,451 ha (23,355 ac)	11 ha (27 ac)		9,462 ha (23,382 ac)
Kauai Total	27,004 ha (66,728 ac)	12,926 ha (31,941 ac)	217 ha (537 ac)	40,147 ha (99,206 ac)
Niihau A		282 ha (697 ac)		282 ha (697 ac)
Grand Total	27,004 ha (66,728 ac)	13,208 ha (32,638 ac)	217 ha (537 ac)	40,429 ha (99,903 ac)

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

Proposed critical habitat includes habitat for 83 species under private, State, and Federal jurisdiction (owned and leased lands), with Federal lands including lands managed by the Department of Defense. Lands proposed as critical habitat have been divided into 15 units (Kauai A through Kauai O) on the island of Kauai, and one unit on the island of Niihau (Niihau A). A brief description of each unit is presented below.

Descriptions of Critical Habitat Units

Kauai A

The proposed unit Kauai A (units A1 through A3) provides occupied habitat for one species: *Ischaemum byrone.* It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Kauai and provides habitat to support one or more of the 8 to 10 populations and 300 mature individuals per population for *Ischaemum byrone,* throughout its known historical range considered by the recovery plan to be necessary for the conservation of this species. This unit also provides unoccupied habitat for one species: *Centaurium sebaeoides.* Designation of this unit is essential to the conservation of this species because it contains the physical and biological features that are considered essential for its conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for this species of 8 to 10 populations and 500 mature individuals per population for *Centaurium sebaeoides,* throughout its known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai A).

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Table for Kauai A

Species	1. 8–10 pop. guidelines	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to destruction	7. Species with variable habitats.	8. Not all occupied habitat needed	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements	14. Hybridization is possible.	Notes
Centaurium sebaeoides	X*		X		X	X					X		X**		*Species is wide ranging.‡ **Volcanic or clay coastal cliffs with native associates.
Ischaemum byrone	X*		X		X	X				X			X**		*Species is wide ranging.‡ **Coastal shrubland, near the ocean among rocks and seepy cliffs.

This unit (Kauai A) cluster contains a total of 15 ha (38 ac) on privately owned land. It is bordered on the northeast by the coastline and on the west by Princeville or Kilauea Point. Areas of dense development and subdivisions are excluded. It is within portions of the Anini and Kauapea watersheds. The natural features include: In unit A1, inland of the beach north of Princeville and north of Princeville Makai Golf Courses; unit A2, inland of the beach

north of Princeville, including Kaweonui Point; and in unit A3, inland of Kauapea Beach, between Niu flat and Kilauea Point.

Kauai B

The proposed unit Kauai B provides occupied habitat for two species: *Hibiscus clayi,* and *Munroidendron racemosum.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations and 100 mature individuals per population for *Hibiscus clayi,* or 300 mature individuals per population for *Munroidendron racemosum,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species (see the discussion of conservation requirements in Section D, and in the table for Kauai B).

Table for Kauai B

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

The unit (Kauai B) contains a total of 271 ha (669 ac) on State owned land. It is bounded on the south by the Wailua watershed and on the north by the Waiakaea watershed. It contains the Nonou Forest Reserve. The natural features found in this unit are the Nonou summit, and the Nonou Mountain or Sleeping Giant.

Kauai C

The proposed unit Kauai C provides occupied habitat for two species: *Brighamia insignis* and *Lobelia niihauensis*. It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations and 100 mature individuals per population (*Brighamia insignis*) or 300 mature individuals per population (*Lobelia niihauensis*), throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species (see the discussion of conservation requirements in Section D, and in the table for Kauai C).

Table for Kauai C

Species	1. 8–10 pop. guidelines	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to destruction	7. Species with variable habitats.	8. Not all occupied habitat needed	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements	14. Hybridization is possible.	Notes
Brighamia insignis	X		X		X	X			X				X*		*Rocky ledges and cliffs.
Lobelia niihauensis	X*		X		X	X	X			X					*Species is wide ranging.‡

This unit (Kauai C) contains a total of 97 ha (239 ac) on State and privately owned lands. It is within the Huleia watershed. The natural features found in this unit are the cliffs north of Keopaweo and Kalanipuu summits and south of Huleia Stream (as it empties into Nawiliwili Harbor).

Kauai D

The proposed unit Kauai D (units D1 and D2) provides unoccupied habitat for one species: *Sesbania tomentosa.*

Designation of this unit is essential to the conservation of this species because it contains the physical and biological features that are considered essential for its conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for this species of 8 to 10 populations and 300 mature individuals per population, throughout its known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai D).

Table for Kauai D

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

This unit (Kauai D) cluster contains a total of 255 ha (629 ac) on State and privately owned lands. It is within the Mahaulepu and Kipu Kai watersheds. The natural features include: in unit D1, Haula bay, Kamala Point, Kawailoa Bay, Kawelikoa Point, Kuahonu Point, Makawehi beach, Molehu cape, Naakea cape, Pakamoi bay, Paoo Point, and Puu Pihakapuu and in unit D2, Kaneaukai cape, Keoniloa Bay and Makahuena Point.

Kauai E

The proposed unit Kauai E provides occupied habitat for eight species: *Brighamia insignis, Delissea rhytidosperma, Isodendrion longifolium, Lipochaeta micrantha, Munroidendron racemosum, Peucedanum sandwicense, Pteralyxia kauaiensis and Schiedea nuttallii.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai and provides habitat to support one or more of the 8 to 10 populations for each species and 100 mature individuals per population for *Brighamia insignis, Munroidendron racemosum, Pteralyxia kauaiensis,* and *Schiedea nuttallii,* or 300 mature individuals per population for *Delissea rhytidosperma, Isodendrion longifolium, Lipochaeta micrantha,* and *Peucedanum sandwicense* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for two species: *Melicope haupuensis* and *Myrsine linearifolia.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for these species of 8 to 10 populations and 100 mature individuals per population for each species, throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai E).

Table for Kauai E

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Brighamia insignis	X		X		X	X			X				X*		*Rocky ledges and cliffs.
Delissea rhytidosperma	X	X			X			X		X					Not enough suitable habitat exists for 8 to 10 populations at this time.
Isodendrion longifolium	X		X		X	X		X		X			X*	X	*Steep slopes and some flats in gulches and stream banks.
Lipochaeta micrantha	X*	X			X	X	X			X				X	*Not enough suitable habitat exists for 8 to 10 populations at this time.
Melicope haupuensis	X	X			X	X			X				X*		*Moist tallus slopes.
Munroidendron racemosum	X*	X			X	X	X	X	X						*Species is wide ranging.‡
Myrsine linearifolia	X	X			X	X	X	X	X						
Peucedanum sandwicense	X		X		X	X		X		X			X*		*Cliff habitats.
Pteralyxia kauaiensis	X*	X			X	X	X	X	X						*Species is wide ranging.‡
Schiedea nuttallii	X		X		X	X			X				X*	X	*Cliffs in lowland diverse mesic forest dominated by Metrosideros polymorpha.

This unit (Kauai E) contains a total of 563 ha (1,390 ac) on privately owned land. It is within the Huleia, Mahaulepu and Kipu Kai watersheds. The natural features include: the Haupu summit, Hokulei Peak, Naluakeina summit, and Queen Victoria's Profile (a natural stone pillar).

Kauai F

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

Table for Kauai F

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Schiedea spergulina var. leiopoda	X*	X			X	X				X		X	X* *	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Bare rock outcrops or sparsely vegetated portions of rocky cliffs.

The unit (Kauai F) contains a total of 5 ha (12 ac) on privately owned land. It is within the Lawai watershed. The natural features include: the north-eastern facing cliffs above Lawai Stream within the NTBG property and just below the Luawai Reservoir.

Kauai G

The proposed unit Kauai G provides occupied habitat for two species: *Lipochaeta waimeaensis* and *Spermolepis hawaiiensis.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 300 mature individuals per population (*Lipochaeta waimeaensis*), or 500 mature individuals per population (*Spermolepis hawaiiensis*), throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for one species: *Schiedea spergulina* var. *spergulina.* Designation of this unit is essential to the conservation of this species because it contains the physical and biological features that are considered essential for its conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for this species of 8 to 10 populations and 300 mature individuals per population, throughout its known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai G).

Table for Kauai G

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Lipochaeta waimeaensis	X*	X			X	X				X		X	X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Eroded soil, precipitous shrub-covered gulches.
Schiedea spergulina var. spergulina	X	X			X			X		X			X*	X	*Bare rock outcrops or sparsely vegetated portions of rocky cliffs.
Spermolepis hawaiiensis	X*		X		X		X				X				*Species is wide ranging.‡

This unit (Kauai G) contains a total of 317 ha (784 ac) on State owned land. It is within the Waimea watershed. The natural features include the east-facing cliffs of Waimea Canyon.

Kauai H

The proposed unit Kauai H (units H1 through H3) provides occupied habitat for two species: *Panicum niihauense* and *Sesbania tomentosa.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 300 mature individuals per population for each species, throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species (see the discussion of conservation requirements in Section D, and in the table for Kauai H).

Table for Kauai H

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Panicum niihauense	X*			X	X	X				X		X	X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Scattered in sand dunes in coastal shrubland.
Sesbania tomentosa	X*		X		X	X	X			X					*Species is wide ranging.‡

This unit (Kauai H) cluster contains a total of 329 ha (812 ac) on Federal and State owned lands. It is within the Nohomalu, Kaawaloa, Niu, and Hoea watersheds. The natural features include: in unit H1, inland and along the beach in the Polihale State Park and PMRF from Barking Sands up to Nohili Point; unit H2, inland and along the beach in the PMRF including the geographic features Mana Point and Waieli Draw stream; and in H3, inland and along the beach, partially in the PMRF, including Kokole Point and up to Second Ditch next to the drag strip.

Kauai I

The proposed unit Kauai I provides occupied habitat for 49 species: *Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Cyperus trachysanthos, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia pallida, Dubautia latifolia, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hibiscadelphus woodii, Hibiscus waimeae ssp. hannerae, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Lipochaeta fauriei, Lobelia niihauensis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Peucedanum sandwicense, Phyllostegia wawrana, Plantago princeps, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea kauaiensis, Schiedea membranacea, Schiedea spergulina* var. *spergulina, Solanum sandwicense, Stenogyne campanulata, Wilkesia hobdyi,* and *Xylosma crenatum.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 100 mature individuals per population for *Alectryon macrococcus, Alsinidendron lychnoides, Brighamia insignis, Flueggea neowawraea, Hibiscadelphus woodii, Hibiscus waimeae* ssp. *hannerae, Kokia kauaiensis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Pteralyxia kauaiensis, and Xylosma crenatum,* or 300 mature individuals per population for *Bonamia menziesii, Chamaesyce halemanui, Cyperus trachysanthos, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia pallida, Dubautia latifolia, Euphorbia haeleeleana, Exocarpos luteolus, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Isodendrion laurifolium, Isodendrion longifolium, Lipochaeta fauriei, Lobelia niihauensis, Peucedanum sandwicense, Phyllostegia wawrana, Plantago princeps, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea kauaiensis, Schiedea membranacea, Schiedea spergulina* var. *spergulina, Solanum sandwicense, Stenogyne campanulata,* and *Wilkesia hobdyi,* or 500 mature individuals per population for *Centaurium sebaeoides,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species.

This unit also provides unoccupied habitat for eleven species: *Ctenitis squamigera, Cyanea recta, Cyanea remyi, Cyrtandra limahuliensis, Diplazium molokaiense, Hesperomannia lydgatei, Ischaemum byrone, Labordia lydgatei, Panicum niihauense, Platanthera holochila,* and *Sesbania tomentosa.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one of more additional populations necessary to meet the recovery objectives of 8 to 10 populations for each species and 100 mature individuals per population for *Hesperomannia lydgatei,* or 300 mature individuals per population for *Ctenitis squamigera, Cyanea recta, Cyanea remyi, Cyrtandra limahuliensis, Diplazium molokaiense, Ischaemum byrone, Labordia lydgatei, Panicum niihauense, Platanthera holochila,* and *Sesbania tomentosa,* throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai I).

Table for Kauai I

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Adenophorus periens	X*		X		X					X			X**		*Species is wide ranging.‡ **Epiphyte usually growing on Metrosideros polymorpha trunks, in riparian banks of stream systems in well-developed, closed, shady canopy.
Alectryon macrococcus	X*		X		X	X		X	X						*Species is wide ranging.‡

Alsinidendron lychnoides	X	X			X	X		X	X				X*		*Steep riparian clay or silty soil banks in montane wet forests.
Bonamia menziesii	X*		X		X	X	X	X		X					*Species is wide ranging.‡
Brighamia insignis	X		X		X	X			X				X*		*Rocky ledges and cliffs.
Centaurium sebaeoides	X*		X		X	X					X		X**		*Species is wide ranging.‡ **Volcanic or clay coastal cliffs with native associates.
Chamaesyce halemanui	X	X			X	X		X		X			X*		*Steep slopes of gulches.
Ctenitis squamigera	X*		X							X			X**		*Species is wide ranging.‡ **Rock faces in gulches in the forest understory.
Cyanea recta	X	X			X	X	X	X		X					
Cyanea remyi	X	X			X	X		X		X			X*		*Tight drainages and wet stream banks in lowland wet forest or shrubland.
Cyperus trachysanthos	X*		X		X	X				X			X**		*Species is wide ranging.‡ **Wet sites on seepy flats or tallus slopes.

Cyrtandra limahuliensis	X	X			X	X		X		X			X*		*Stream banks in lowland wet forest.
Delissea rhytidosperma	X	X			X			X		X					Not enough suitable habitat exists for 8 to 10 populations at this time.
Delissea rivularis	X*	X			X	X				X			X**	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Steep slopes near streams in wet or mesic forest.
Delissea undulata	X*		X		X	X				X			X**	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Dry or open Metrosideros polymorpha-Acacia koa forest or Alphitonia ponderosa forest.

Diellia pallida	X	X			X	X		X		X			X*		*Bare granular soil with dry to mesophytic leaf litter with a pH of 6.9 to 7.9 on steep slopes in lowland mesic forest.
Diplazium molokaiense	X*		X							X			X**		*Species is wide ranging.‡ **Brown soil with basalt outcrops near waterfalls.
Dubautia latifolia	X*	X			X	X	X	X		X					*Species is wide ranging.‡
Euphorbia haeleeleana	X*		X		X	X	X	X		X					*Species is wide ranging.‡
Exocarpos luteolus	X	X			X	X	X	X		X					
Flueggea neowawraea	X*		X		X	X	X	X	X						*Species is wide ranging.‡
Gouania meyenii	X		X		X	X		X		X			X*		*Rocky ledges, cliff faces, ridge tops.
Hedyotis cookiana	X			X	X	X				X			X*		*Stream beds or steep cliffs close to waterfalls.

Hedyotis st.-johnii	X*	X			X	X		X		X		X	X**		*Species is wide ranging.‡ **Crevices of north-facing, near vertical, coastal, cliff faces.
Hesperomannia lydgatei	X	X			X		X	X	X						
Hibiscadelphus woodii	X*	X			X	X			X			X	X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Basalt tallus or cliff walls.
Hibiscus waimeae ssp. hannerae	X	X			X	X		X	X						
Ischaemum byrone	X*		X		X	X				X			X*		*Species is wide ranging.‡ **Coastal shrubland, near the ocean among rocks and seepy cliffs.
Isodendrion laurifolium	X		X		X	X	X	X		X				X	
Isodendrion longifolium	X		X		X	X		X		X			X*	X	*Steep slopes and some flats in gulches and stream banks.

Kokia kauaiensis	X	X			X	X				X					
Labordia lydgatei	X	X			X			X		X			X*	X	*Stream banks in Metrosideros polymorpha-Dicranopteris linearis forest.
Lipochaeta fauriei	X	X			X	X		X		X			X*	X	*Side of steep gulches in diverse mesic forests.
Lobelia niihauensis	X*		X		X	X	X			X					*Species is wide ranging.‡
Melicope haupuensis	X	X			X	X			X				X*		*Moist tallus slopes.
Melicope knudsenii	X		X		X	X		X	X				X*		*Forested flats with brown granular soil.
Melicope pallida	X		X		X	X		X	X				X*		*Steep rock faces.
Munroidendron racemosum	X*	X			X	X	X	X	X						*Species is wide ranging.‡
Myrsine linearifolia	X	X			X	X	X	X	X						
Nothocestrum peltatum	X*	X			X	X		X	X				X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Rich soil on steep slopes.

Panicum niihauense	X*			X	X	X				X		X	X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Scattered in sand dunes in coastal shrubland.
Peucedanum sandwicense	X		X		X	X		X		X			X*		*Cliff habitats.
Phyllostegia wawrana	X	X			X			X		X				X	
Plantago princeps	X		X		X	X	X*	X		X			X*	X	*Very specific, variable habitat requirements, i.e. windswept areas near waterfalls, cliff and ridges on rocky outcrops, windblown basalt cliffs with little vegetation.
Platanthera holochila	X		X		X	X	X			X			X*		*Mixed bogs – mid to high elevation, or montane bog, wet forest, mesic scrub.
Poa mannii	X	X			X	X		X		X			X*		*Cliff or rock faces.

Poa sandvicensis	X*	X			X	X	X	X		X					*Not enough suitable habitat exists for 8 to 10 populations at this time.
Poa siphonoglossa	X	X			X	X		X		X			X*		*Shady banks on steep slopes.
Pteralyxia kauaiensis	X*	X			X	X	X	X	X						*Species is wide ranging.‡
Remya kauaiensis	X*	X			X	X		X		X			X**		*Species is wide ranging.‡ **Steep north- or northeast-facing slopes.
Remya montgomeryi	X*	X			X	X				X			X**		*Species is wide ranging.‡ **Steep north- or northeast-facing slopes.
Schiedea apokremnos	X	X			X	X				X			X*	X	*Crevices of near vertical basalt cliff faces.
Schiedea kauaiensis	X*	X			X	X				X				X	*Not enough suitable habitat exists for 8 to 10 populations at this time.
Schiedea membranacea	X	X			X	X		X		X			X*	X	*Cliff and cliff faces.

Schiedea spergulina var. spergulina	X	X			X			X		X			X*	X	*Bare rock outcrops or sparsely vegetated portions of rocky cliffs.
Solanum sandwicense	X			X	X	X	X	X		X					*Species is wide ranging.‡
Sesbania tomentosa	X*		X		X	X	X			X					
Stenogyne campanulata	X*	X			X	X				X		X	X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Rock faces of nearly vertical north-facing cliffs.
Wilkesia hobdyi	X*	X			X	X				X			X*		*Species is wide ranging.‡ **Coastal dry cliffs or ridges.
Xylosma crenatum	X*	X			X	X	X	X	X						*Species is wide ranging.‡

This unit (Kauai I) contains a total of 8,238 ha (20,355 ac) on State and privately owned lands. It is bordered by the Kaulaula watershed in the west and Maunapuluo watershed in the east and includes the Awaawapuhi, Haeleele, Hanakapiai, Hanakoa, Hikimoe, Honopu, Hoolulu, Kaaweiki, Kalalau, Kauhao, Limahuli, Makaha, Milolii, Nahomalu, Nakeikionaiwi, Nualolo, Pohakuao, Waiahuakua, Waimea, Wainiha, and Waiolaa watersheds. The natural features include: Alapii Point, Alealau summit, Awaawapuhi Valley, Haeleele Valley, Hanakapiai Stream, Hanakoa Stream, Honopu Valley, Hoolulu Stream, Kaaalahina Ridge, Kaahole Valley, Kainamanu summit, Kalahu summit, Kalalau Beach, Kalalau Stream, Kalalau Trail, Kalalau Valley, Kalepa Ridge, Kanakou summit, Kauhao Ridge, Kauhao Valley, Kaunuohua Ridge, Kawaiula Valley, Keanapuka summit, Kopakaka Ridge, Kuia Valley, Mahanaloa Valley, Makaha Ridge, Makaha Valley, Manono Ridge, Milolii Ridge, Milolii Valley, Moaalele summit, Mukuaiki Point, Na Pali, Nianiau summit, Nualolo Valley, Paaiki Valley, Pihea summit, Pohakea summit, Poopooiki Valley, Puanaiea Point, Puu Ki summit, Puu o Kila summit, Waiahuakua summit, and Waiahuakua Stream. This unit contains portions of Haena State Park, Kokee State Park, Na Pali-Kona Forest Reserve, Polihale State Park, Puu Ka Pele Forest Reserve, and Waimea Canyon State Park and all of the Hono o Na Pali Natural Area Reserve, Kuia Natural Area Reserve, Na Pali Coast State Park, and the PMRF Makaha Ridge Facility.

Kauai J

The proposed unit Kauai J provides occupied habitat for 14 species: *Adenophorus periens, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Hesperomannia lydgatei, Hibiscus waimeae* ssp. *hannerae, Isodendrion longifolium, Labordia lydgatei, Lobelia niihauensis, Myrsine linearifolia, Peucedanum sandwicense, Plantago princeps*, and *Schiedea membranacea*. It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 100 mature individuals per population for *Hesperomannia lydgatei, Hibiscus waimeae* ssp. *hannerae*, and *Myrsine linearifolia*, or 300 mature individuals per population for *Adenophorus periens, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Isodendrion longifolium, Labordia lydgatei, Lobelia niihauensis, Peucedanum sandwicense, Plantago princeps*, and *Schiedea membranacea*, throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species.

This unit also provides unoccupied habitat for 12 species: *Alsinidendron lychnoides, Bonamia menziesii, Brighamia insignis, Delissea rivularis, Delissea undulata, Euphorbia haeleeleana, Exocarpos luteolus, Munroidendron racemosum, Phyllostegia wawrana, Platanthera holochila, Remya montgomeryi*, and *Schiedea kauaiensis*. Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives of 8 to 10 populations and 100 mature individuals per population for *Alsinidendron lychnoides, Brighamia insignis*, and *Munroidendron racemosum*, or 300 mature individuals per population for *Bonamia menziesii, Delissea rivularis, Delissea undulata, Euphorbia haeleeleana, Exocarpos luteolus, Phyllostegia wawrana, Platanthera holochila, Remya montgomeryi*, and *Schiedea kauaiensis*, throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai J).

Table for Kauai J

Species	Notes
Adenophorus periens	*Epiphyte usually growing on Metrosideros polymorpha trunks, in riparian banks of stream systems in well-developed, closed, shady canopy.
1. 8–10 pop. guidelines	X
2. Island endemic.	
3. Multi-island/current other islands.	X
4. Multi-island/no current other islands.	
5. Non-viable populations.	X
6. Several occ. vulnerable to destruction	
7. Species with variable habitats.	
8. Not all occupied habitat needed	
9. Long-lived perennial–100/pop.	
10. Short-lived perennial–300/pop.	X
11. Annual–500/pop.	
12. Poss. 1 large pop per island.	X
13. Narrow endemic.	
14. Restricted habitat requirements	X*
15. Hybridization is possible.	

Alsinidendron lychnoides	X	X			X	X		X	X					X*		*Steep riparian clay or silty soil banks in montane wet forests.
Bonamia menziesii	X*		X		X	X	X	X		X		X				*Species is wide ranging.‡
Brighamia insignis	X		X		X	X			X					X*		*Rocky ledges and cliffs.
Cyanea recta	X	X			X	X	X	X		X						
Cyanea remyi	X	X			X	X		X		X				X*		*Tight drainages and wet stream banks in lowland wet forest or shrubland.
Cyrtandra cyaneoides	X	X			X	X		X		X				X*		*Tallus rubble on steep slopes or cliff with water seeps running below, near streams or waterfalls.
Cyrtandra limahuliensis	X	X			X	X		X		X				X*		*Stream banks in lowland wet forest.

Delissea rivularis	X*	X			X	X				X				X**	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Steep slopes near streams in wet or mesic forest.
Delissea undulata	X*		X		X	X				X				X**	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Dry or open Metrosideros polymorpha-Acacia koa forest or Alphitonia ponderosa forest.
Euphorbia haeleeleana	X*		X		X	X	X	X		X		X				*Species is wide ranging.‡
Exocarpos luteolus	X	X			X	X	X	X		X						
Hesperomannia lydgatei	X	X			X		X	X	X							

Hibiscus waimeae ssp. hannerae	X	X			X	X		X	X							
Isodendrion longifolium	X		X		X	X		X		X				X*	X	*Steep slopes and some flats in gulches and stream banks.
Labordia lydgatei	X	X			X			X		X				X*	X	*Stream banks in Metrosideros polymorpha -Dicranopteris linearis forest.
Lobelia niihauensis	X*		X		X	X	X			X		X				*Species is wide ranging.‡
Munroidendron racemosum	X*	X			X	X	X	X	X			X				*Species is wide ranging.‡
Myrsine linearifolia	X	X			X	X	X	X	X							
Peucedanum sandwicense	X		X		X	X		X		X				X*		*Cliffs.
Phyllostegia wawrana	X	X			X			X		X					X	

Plantago princeps	X		X		X	X	X	X		X				X*	X	*Very specific, variable habitat requirements, i.e. windswept areas near waterfalls, cliff and ridges on rocky outcrops, windblown basalt cliffs with little vegetation.
Platanthera holochila	X		X		X	X	X			X				X*		*Mixed bogs – mid to high elevation, or montane bog, wet forest, mesic scrub.
Remya montgomeryi	X*	X			X	X				X		X		X**		*Species is wide ranging.‡ **Steep north- or northeast-facing slopes.
Schiedea kauaiensis	X*	X			X	X				X					X	*Not enough suitable habitat exists for 8 to 10 populations at this time.
Schiedea membranacea	X	X			X	X		X		X				X*	X	*Cliff and cliff bases.

This unit (Kauai J) contains a total of 5,536 ha (13,681 ac) on State and privately owned lands. It is bordered by the Limahuli watershed in the north, the Wainiha watershed in the south and contains a portion of the Manoa watershed. The natural features include: Hinalele Falls, Hono o Na Pali, Kilohana summit, Kulanaililia summit, Limahuli Falls, Mahinakehau Ridge, Makana summit, Maunahina Stream, Maunapuluo summit, Pali Eleele summit, Pohakukane cliff, Puu Iliahi, Puwainui Falls, Waikanaloa Wet Cave, Waikapalae Wet Cave, and Wainiha Pali. It contains portions of the Halelea Forest Reserve.

Kauai K

The proposed unit Kauai K provides occupied habitat for ten species: *Adenophorus periens, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Hesperomannia lydgatei, Isodendrion longifolium, Labordia lydgatei, Myrsine linearifolia*, and *Plantago princeps*. It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 100 mature individuals per population for *Hesperomannia lydgatei* and *Myrsine linearifolia*, or 300 mature individuals per population for *Adenophorus periens, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Isodendrion longifolium, Labordia lydgatei*, and *Plantago princeps*, throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for three species: *Alsinidendron lychnoides, Bonamia menziesii*, and *Schiedea membranacea*. Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Kauai and provides habitat to support one or more additional populations necessary to meet the recovery objectives of 8 to 10 populations for each species and 100 mature individuals per population for *Alsinidendron lychnoides*, or 300 mature individuals per population for *Bonamia menziesii*, and *Schiedea membranacea*, throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai K).

Table for Kauai K

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Adenophorus periens	X*		X		X					X			X**		*Species is wide ranging.‡ **Epiphyte usually growing on Metrosideros polymorpha trunks, in riparian banks of stream systems in well-developed, closed, shady canopy.

Alsinidendron lychnoides	X	X			X	X		X	X				X*		*Steep riparian clay or silty soil banks in montane wet forests.
Bonamia menziesii	X*		X		X	X	X	X		X					*Species is wide ranging.‡
Cyanea recta	X	X			X	X	X	X		X					
Cyanea remyi	X	X			X	X		X		X			X*		*Tight drainages and wet stream banks in lowland wet forest or shrubland.
Cyrtandra cyaneoides	X	X			X	X		X		X			X*		*Tallus on steep slopes or cliffs with water seeps running below, near streams or waterfalls.
Cyrtandra limahuliensis	X	X			X	X		X		X			X*		*Stream banks in lowland wet forest.
Hesperomannia lydgatei	X	X			X		X	X	X						
Isodendrion longifolium	X		X		X	X		X		X			X*	X	*Steep slopes and some flats in gulches and stream banks.
Labordia lydgatei	X	X			X			X		X			X*	X	*Stream banks in Metrosideros polymorpha - Dicranopteris linearis forest.

Myrsine linearifolia	X	X			X	X	X	X	X						
Plantago princeps	X		X		X	X	X	X		X			X*	X	*Very specific, variable habitat requirements, i.e. windswept areas near waterfalls, cliff and ridges on rocky outcrops, windblown basalt cliffs with little vegetation.
Schiedea membranacea	X	X			X	X		X		X			X*	X	*Cliff and cliff bases.

This unit (Kauai K) contains a total of 1,752 ha (4,330 ac) on State and privately owned lands. It is bordered on the west by the Lumahai watershed and on the east by Waioli watershed and contains a portion of the Waipa watershed. The natural features include: Hihimanu summit, Mamalahoa summit, Namolokama Mountain, and Puu Manu. The westernmost portion of this unit is in the Halelea Forest Reserve.

Kauai L

The proposed unit Kauai L provides occupied habitat for one species: *Plantago princeps*. It is proposed for designation because it contains the physical and biological features that are considered essential for its conservation on Kauai, and provides habitat to support one or more of the 8 to10 populations and 300 mature individuals per population, throughout its known historical range considered by the recovery plan to be necessary for the conservation of this species. This unit also provides unoccupied habitat for 12 species: *Adenophorus periens, Bonamia menziesii, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Hesperomannia lydgatei, Isodendrion longifolium, Labordia lydgatei, Lysimachia filifolia, Myrsine linearifolia*, and *Platanthera holochila*. Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives of 8 to 10 populations for each species and 100 mature individuals per population for *Hesperomannia lydgatei* and *Myrsine linearifolia*, or 300 mature individuals per population for *Adenophorus periens, Bonamia menziesii, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Isodendrion longifolium, Labordia lydgatei, Lysimachia filifolia*, and *Platanthera holochila*, throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai L).

Table for Kauai L

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Adenophorus periens	X*		X		X					X			X*		*Epiphyte usually growing on Metrosideros polymorpha trunks, in riparian banks of stream systems in well-developed, closed, shady canopy.
Bonamia menziesii	X*		X		X	X	X	X		X					*Species is wide ranging.‡
Cyanea recta	X	X			X	X	X	X		X					

Cyanea remyi	X	X			X	X		X		X			X*		*Tight drainages and wet stream banks in lowland wet forest or shrubland.
Cyrtandra cyaneoides	X	X			X	X		X		X			X*		*Tallus on steep slopes or cliffs with water seeps running below, near streams or waterfalls.
Cyrtandra limahuliensis	X	X			X	X		X		X			X*		*Stream banks in lowland wet forest.
Hesperomannia lydgatei	X	X			X		X	X	X						
Isodendrion longifolium	X		X		X	X		X		X			X*	X	*Steep slopes and some flats in gulches and stream banks.
Labordia lydgatei	X	X			X			X		X			X*	X	*Stream banks in Metrosideros polymorpha - Dicranopteris linearis forest.
Lysimachia filifolia	X		X		X	X				X			X*		*Mossy banks at the base of cliffs within the spray zone of waterfalls or along streams.

Myrsine linearifolia	X	X			X	X	X	X	X						
Plantago princeps	X		X		X	X	X	X		X			X*	X	*Very specific, variable habitat requirements, i.e. windswept areas near waterfalls, cliff and ridges on rocky outcrops, windblown basalt cliffs with little vegetation.
Platanthera holochila	X		X		X	X	X			X			X*		*Mixed bogs – mid to high elevation, or montane bog, wet forest, mesic scrub.

This unit (Kauai L) contains a total of 3,407 ha (8,418 ac) on State and privately owned lands. It is within the Hanalei watershed. The natural features include: Kaliko summit, Kaumanalehua summit, Kawailewa summit, Keanaawi Ridge, Kiloa summit, Maheo summit, and Pohakupele summit. This unit is within a portion of the Halelea Forest Reserve.

Kauai M

The proposed unit Kauai M provides occupied habitat for eight species: *Adenophorus periens, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Labordia lydgatei*, and *Phyllostegia wawrana*. It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 300 mature individuals per population throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for one species: *Bonamia menziesii*. Designation of this unit is essential to the conservation of this species because it contains the physical and biological features that are considered essential for its conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives for this species of 8 to10 populations and 300 mature individuals per population, throughout its known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai M).

Table for Kauai M

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Adenophorus periens	X*		X		X					X			X**		*Species is wide ranging.‡ **Epiphyte usually growing on Metrosideros polymorpha trunks, in riparian banks of stream systems in well-developed, closed, shady canopy.
Bonamia menziesii	X*		X		X	X	X	X		X					*Species is wide ranging.‡

Cyanea asarifolia	X	X			X	X*				X			X**		*The only occurrence. **Pockets of soil on sheer, wet, rock cliffs and waterfalls in lowland wet forest.
Cyanea recta	X	X			X	X	X	X		X					
Cyanea remyi	X	X			X	X		X		X			X*		*Tight drainages and wet stream banks in lowland wet forest or shrubland.
Cyrtandra cyaneoides	X	X			X	X		X		X			X*		*Tallus on steep slopes or cliffs with water seeps running below, near streams or waterfalls.
Cyrtandra limahuliensis	X	X			X	X		X		X			X*		*Stream banks in lowland wet forest.
Labordia lydgatei	X	X			X			X		X			X*	X	*Stream banks in Metrosideros polymorpha - Dicranopteris linearis forest.
Phyllostegia wawrana	X	X			X			X		X				X	

This unit (Kauai M) contains a total of 3,302 ha (8,160 ac) on State and privately owned lands. It contains portions of the Anahola, Kalihiwai, Kapaa, and Kilauea watersheds. The natural features include: Haleone summit, Kahili summit, Kamahuna summit, Kamalii Ridge, Keahua summit, Kekoiki summit, Leleiwi summit, Makaleha summit, Makaleha Mountains, Malamalamaiki summit, Namahana Mount, Pohakupili summit, Puu Awa, Puu Eu, Uluawaa summit, and Waihunehune Falls. It contains portions of Kealia Forest Reserve and Moloaa Forest Reserve.

Kauai N

The proposed unit Kauai N provides occupied habitat for 16 species: *Adenophorus periens, Bonamia menziesii, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyrtandra limahuliensis, Dubautia pauciflorula, Exocarpos luteolus, Isodendrion longifolium, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lysimachia filifolia, Myrsine linearifolia, Plantago princeps, Viola helenae, and Viola kauaiensis* var. *wahiawaensis.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 100 mature individuals per population for *Labordia tinifolia* var. *wahiawaensis* and *Myrsine linearifolia,* or 300 mature individuals per population for *Adenophorus periens, Bonamia menziesii, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyrtandra limahuliensis, Dubautia pauciflorula, Exocarpos luteolus, Isodendrion longifolium, Labordia lydgatei, Lysimachia filifolia, Plantago princeps, Viola helenae,* and *Viola kauaiensis* var. *wahiawaensis,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for seven species: *Cyanea undulata, Cyrtandra cyaneoides, Delissea rivularis, Hesperomannia lydgatei, Phlegmariurus nutans, Phyllostegia wawrana,* and *Platanthera holochila.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objectives of 8 to 10 populations for each species and 100 mature individuals per population for *Hesperomannia lydgatei,* or 300 mature individuals per population for *Cyanea undulata, Cyrtandra cyaneoides, Delissea rivularis, Phlegmariurus nutans, Phyllostegia wawrana,* and *Platanthera holochila),* throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai N).

Table for Kauai N

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Adenophorus periens	X*		X		X					X			X**		*Species is wide ranging.‡ **Epiphyte usually growing on Metrosideros polymorpha trunks, in riparian banks of stream systems in well-developed, closed, shady canopy.
Bonamia menziesii	X*		X		X	X	X	X		X					*Species is wide ranging.‡

Cyanea asarifolia	X	X			X	X*				X			X**		*The only occurrence. **Pockets of soil on sheer, wet, rock cliffs and waterfalls in lowland wet forest.
Cyanea recta	X	X			X	X	X	X		X					
Cyanea remyi	X	X			X	X		X		X			X*		*Tight drainages and wet stream banks in lowland wet forest or shrubland.
Cyanea undulata	X*	X			X	X**				X		X	X***		*Not enough suitable habitat exists for 8 to 10 populations at this time. **The only occurrence. ***Tight drainages, wet streambanks in Wahiawa drainage.

Cyrtandra cyaneoides	X	X			X	X		X		X			X*		*Tallus on steep slopes or cliffs with water seeps running below, near streams or waterfalls.
Cyrtandra limahuliensis	X	X			X	X		X		X			X*		*Stream banks in lowland wet forest.
Delissea rivularis	X*	X			X	X				X			X**	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Steep slopes near streams in wet or mesic forest.
Dubautia pauciflorula	X	X			X	X				X		X	X*		*Stream drainages.
Exocarpos luteolus	X	X			X	X	X	X		X					
Hesperomannia lydgatei	X	X			X		X	X	X						
Isodendrion longifolium	X		X		X	X		X		X			X*	X	*Steep slopes and some flats in gulches and stream banks.

Labordia lydgatei	X	X			X			X		X			X*	X	*Stream banks in Metrosideros polymorpha - Dicranopteris linearis forest.
Labordia tinifolia var. wahiawaensis	X*	X			X	X				X		X	X**	X	*Species is wide ranging.‡ **Stream banks in lowland wet forest.
Lysimachia filifolia	X		X		X	X				X			X*		*Mossy banks at the base of cliffs within the spray zone of waterfalls or along streams.
Myrsine linearifolia	X	X			X	X	X	X	X						
Phlegmariurus nutans	X*		X		X	X				X			X**		*Species is wide ranging.‡ **Tree trunks on open ridges and slopes in Metrosideros polymorpha-Dicranopteris linearis wet forest.
Phyllostegia wawrana	X	X			X			X		X				X	

Plantago princeps	X		X		X	X	X	X	X			X*	X	*Very specific, variable habitat requirements, i.e. windswept areas near waterfalls, cliff and ridges on rocky outcrops, windblown basalt cliffs with little vegetation.
Platanthera holochila	X		X		X	X	X	X				X*		*Mixed bogs – mid to high elevation, or montane bog, wet forest, mesic scrub.
Viola helenae	X*	X			X	X	X				X	X**	X	*Species is wide ranging.‡ **Stream drainage bottoms and or adjacent valley bottoms.
Viola kauaiensis var. wahiawaensis	X*	X			X	X	X				X	X**	X	*Species is wide ranging.‡ **Lowland bog and surrounding forest.

This unit (Kauai N) contains a total of 6,599 ha (16,307 ac) on State and privately owned lands. The majority of this unit is in the Wailua watershed with the southernmost portion in the Wahiawa watershed with the Huleia watershed in between. The natural features include: Hanalei summit, Iole summit, Iole Stream, Kahili summit, Kalalea summit, Kamanu summit, Kanaele Swamp, Kapakaiki Falls, Kapakanui Falls, Kapalaoa summit,

Kapehuaala summit, Kaulu Stream, Kawaikini summit, Kualapa summit, Kuilau Ridge, Palikea summit, and Wekiu summit. Includes a portion of the Lihue-Koloa Forest Reserve.

Kauai O

The proposed unit Kauai O provides occupied habitat for 41 species: *Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Chamaesyce halemanui, Diellia erecta, Diellia pallida, Dubautia latifolia, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Isodendrion laurifolium, Kokia kauaiensis, Lipochaeta fauriei, Lipochaeta micrantha, Lobelia niihauensis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Platanthera holochila, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea helleri, Schiedea membranacea, Schiedea spergulina var. spergulina, Schiedea stellarioides, Solanum sandwicense, Spermolepis hawaiiensis, Xylosma crenatum, Zanthoxylum hawaiiense.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more of the 8 to 10 populations for each species and 100 mature individuals per population for *Alectryon macrococcus, Alsinidendron lychnoides, Flueggea neowawraea, Kokia kauaiensis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Xylosma crenatum, and Zanthoxylum hawaiiense,* or 300 mature individuals per population for *Alsinidendron viscosum, Bonamia menziesii, Chamaesyce halemanui, Diellia erecta, Diellia pallida, Dubautia latifolia, Euphorbia haeleeleana, Exocarpos luteolus, Gouania meyenii, Isodendrion laurifolium, Lipochaeta fauriei, Lipochaeta micrantha, Lobelia niihauensis, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Platanthera holochila, Poa sandvicensis, Poa siphonoglossa, Remya kauaiensis, Remya montgomeryi, Schiedea helleri, Schiedea membranacea, Schiedea spergulina var. spergulina, Schiedea stellarioides,* and *Solanum sandwicense,* or 500 mature individuals per population for *Spermolepis hawaiiensis,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species. This unit also provides unoccupied habitat for 10 species: *Adenophorus periens, Cyanea recta, Delissea rivularis, Diplazium molokaiensis, Isodendrion longifolium, Mariscus pennatiformis, Plantago princeps, Poa mannii, Schiedea kauense,* and *Stenogyne campanulata.* Designation of this unit is essential to the conservation of these species because it contains the physical and biological features that are considered essential for their conservation on Kauai, and provides habitat to support one or more additional populations necessary to meet the recovery objective of 8 to 10 populations and 300 mature individuals per population for each species, throughout their known historical range (see the discussion of conservation requirements in Section D, and in the table for Kauai O).

Table for Kauai O

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Adenophorus periens	X*		X		X					X			X**		*Species is wide ranging.‡ **Epiphyte usually growing on Metrosideros polymorpha trunks, in riparian banks of stream systems in well-developed, closed, shady canopy.
Alectryon macrococcus	X*		X		X	X		X	X						*Species is wide ranging.‡

Alsinidendron lychnoides	X	X			X	X		X	X				X*		*Steep riparian clay or silty soil banks in montane wet forests.
Alsinidendron viscosum	X*	X			X	X		X		X			X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Steep slopes.
Bonamia menziesii	X*		X		X	X	X	X		X			X		*Species is wide ranging.‡
Chamaesyce halemanui	X	X			X	X		X		X			X*		*Steep slopes of gulches.
Cyanea recta	X	X			X	X	X	X		X					
Delissea rivularis	X*	X			X	X				X			X**	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Steep slopes near streams in wet or mesic forest.

Diellia erecta	X*		X		X	X				X			X*		*Species is wide ranging.‡ **Granular soil with leaf litter and moss on north-facing slopes in deep shade or gulch bottoms.
Diellia pallida	X	X			X	X		X		X			X*		*Bare granular soil with dry to mesophytic leaf litter with a pH of 6.9 to 7.9 on steep slopes in lowland mesic forest.
Diplazium molokaiensis	X*		X							X			X**		*Species is wide ranging.‡ **Brown soil with basalt outcrops near waterfalls.
Dubautia latifolia	X	X			X	X	X	X		X					
Euphorbia haeleeleana	X*		X		X	X	X	X		X					*Species is wide ranging.‡
Exocarpos luteolus	X	X			X	X	X	X		X					
Flueggea neowawraea	X*		X		X	X	X	X	X						*Species is wide ranging.‡
Gouania meyenii	X		X		X	X		X		X			X*		*Rocky ledges, cliff faces, ridge tops.

Isodendrion laurifolium	X		X		X	X	X	X		X				X	
Isodendrion longifolium	X		X		X	X		X		X			X*	X	*Steep slopes and some flats in gulches and stream banks.
Kokia kauaiensis	X	X			X	X				X					
Lipochaeta fauriei	X	X			X	X		X		X			X*	X	*Side of steep gulches in diverse mesic forests.
Lipochaeta micrantha	X*	X			X	X	X			X				X	*Not enough suitable habitat exists for 8 to 10 populations at this time.
Lobelia niihauensis	X*		X		X	X	X			X					*Species is wide ranging.‡
Mariscus pennatiformis	X		X		X	X	X			X					
Melicope haupuensis	X	X			X	X			X				X*		*Moist tallus slopes.
Melicope knudsenii	X		X		X	X		X	X				X*		*Forested flats with brown granular soil.
Melicope pallida	X		X		X	X		X	X				X*		*Steep rock faces.
Munroidendron racemosum	X*	X			X	X	X	X	X						*Species is wide ranging.‡
Myrsine linearifolia	X	X			X	X	X	X	X						

Nothocestrum peltatum	X*	X			X	X		X	X				X**		*Not enough suitable habitat exists for 8 to 10 populations at this time. **Rich soil on steep slopes.
Peucedanum sandwicense	X		X		X	X		X		X			X*		*Cliffs.
Phyllostegia knudsenii	X*	X			X	X				X		X		X	*Not enough suitable habitat exists for 8 to 10 populations at this time.
Phyllostegia waimeae	X*	X			X	X				X		X		X	*Not enough suitable habitat exists for 8 to 10 populations at this time.
Phyllostegia wawrana	X	X			X			X		X				X	
Plantago princeps	X		X		X	X	X	X		X			X*	X	*Very specific, variable habitat requirements, i.e. windswept areas near waterfalls, cliff and ridges on rocky outcrops, windblown basalt cliffs with little vegetation.

Platanthera holochila	X		X		X	X	X			X			X*		*Mixed bogs – mid to high elevation, or montane bog, wet forest, mesic scrub.
Poa mannii	X	X			X	X		X		X			X*		*Cliff or rock faces.
Poa sandvicensis	X*	X			X	X	X	X		X					*Not enough suitable habitat exists for 8 to 10 populations at this time.
Poa siphonoglossa	X	X			X	X		X		X			X*		*Shady banks on steep slopes.
Pteralyxia kauaiensis	X*	X			X	X	X	X	X						*Species is wide ranging.‡
Remya kauaiensis	X*	X			X	X		X		X			X**		*Species is wide ranging.‡ **Steep north- or northeast-facing slopes.
Remya montgomeryi	X*	X			X	X				X			X**		*Species is wide ranging.‡ **Steep north- or northeast-facing slopes.

Schiedea helleri	X*	X			X					X			X**	X	*Not enough suitable habitat exists for 8 to 10 populations at this time. **Cliff faces.
Schiedea kauaiensis	X*	X			X	X				X				X	Not enough suitable habitat exists for 8 to 10 populations at this time.
Schiedea membranacea	X	X			X	X		X		X			X*	X	*Cliff and cliff bases.
Schiedea spergulina var. spergulina	X	X			X			X		X			X*	X	*Bare rock outcrops or sparsely vegetated portions of rocky cliffs.
Schiedea stellarioides	X	X			X	X				X				X	
Solanum sandwicense	X			X	X	X	X	X		X					
Spermolepis hawaiiensis	X*		X		X		X				X				*Species is wide ranging.‡
Stenogyne campanulata	X*	X			X	X				X		X	X**		*Species is wide ranging.‡ **Rock faces of nearly vertical north-facing cliffs.
Xylosma crenatum	X*	X			X	X	X	X	X						*Species is wide ranging.‡
Zanthoxylum hawaiiense	X*		X		X		X	X	X						*Species is wide ranging.‡

This unit (Kauai O) contains a total of 9,462 ha (23.382 ac) on State and privately owned lands. This unit is predominately in the Waimea watershed with a small portion extending into upper reaches of the Haeleele, Hikimoe, Kaaweiki, Kaulaula, and Nahomalu watersheds. The natural features include: the Alakai Swamp, Awini Falls, Awini Stream, Halehaha Stream, Halemanu Stream, Halepaakai Stream, Hipalau Valley, Kaaha summit, Kaluahaulu Ridge, Kaou summit, Kauaikinana Stream, Kawaiiki Ridge, Kawaiiki Valley, Kawaikoi Stream, Kipalau Valley, Koali summit, Kohua Ridge, Kokee Stream, Kumuwela Ridge, Loli River, Moeloa Falls, Mohihi Falls, Mohihi Stream, Nawaimaka Stream, Puu Lua summit, Wahane Valley, Waiakoali Stream, Waialae Falls, and Waipoo Falls. This unit contains portions of Alakai Wilderness Preserve, Halelea Forest Reserve, Hono o Na Pali Natural Area Reserve, Kokee State Park, Kuia Natural Area Reserve, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, Puu Ka Pele Forest Reserve, and Waimea Canyon State Park.

Niihau A

The proposed unit Niihau A provides occupied habitat for two species: *Brighamia insignis,* and *Cyperus trachysanthos.* It is proposed for designation because it contains the physical and biological features that are considered essential for their conservation on Niihau, and provides habitat to support one or more of the 8 to 10 populations for each species and 100 mature individuals per population for *Brighamia insignis* or 300 mature individuals per population for *Cyperus trachysanthos,* throughout their known historical range considered by the recovery plans to be necessary for the conservation of each species (see the discussion of conservation requirements in Section D, and in the table for Niihau A).

Table for Niihau A

Species	1. 8–10 pop. guidelines.	2. Island endemic.	3. Multi-island/current other islands.	4. Multi-island/no current other islands.	5. Non-viable populations.	6. Several occ. vulnerable to	7. Species with variable habitats.	8. Not all occupied habitat needed.	9. Long-lived perennial–100/pop.	10. Short-lived perennial–300/pop.	11. Annual–500/pop.	12. Narrow endemic.	13. Restricted habitat requirements.	14. Hybridization is possible.	Notes
Brighamia insignis	X		X		X	X			X				X*		*Rocky ledges and cliffs.
Cyperus trachysanthos	X*		X		X	X				X			X**		*Species is wide ranging.‡ **Wet sites on seepy flats or tallus slopes.

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Key for Tables Kauai A–O and Niihau A

‡ Not all suitable habitat is designated, only those areas essential to the conservation of the species.

1. This unit is needed to meet the recovery plan objectives of 8 to 10 viable populations (self perpetuating and sustaining for at least 5 years) with 100 to 500 mature, reproducing individuals per species throughout its historical range as specified in the recovery plans.
2. Island endemic.
3. Multi-island species with current locations on other islands.
4. Multi-island species with no current locations on other islands.
5. Current locations do not necessarily represent viable populations with the required number of mature individuals.
6. Several current locations may be affected by one naturally occurring, catastrophic event.
7. Species with variable habitat requirements, usually over wide areas. Wide ranging species require more space per individual over more land area to provide needed primary constituent elements to maintain healthy population size.
8. Not all currently occupied habitat was determined to be essential to the recovery of the species.
9. Life history, long-lived perennial—100 mature, reproducing individuals needed per population.
10. Life history, short-lived perennial—300 mature, reproducing individuals needed per population.
11. Life history, annual—500 mature, reproducing individuals needed per population.
12. Narrow endemic, the species probably never naturally occurred in more than a single or a few populations.
13. Species has extremely restricted, specific habitat requirements.
14. Hybridization is possible so distinct populations of related species should not overlap, requiring more land area.

This unit (Niihau A) contains a total of 282 ha (697 ac) on privately owned land. The natural features include Puu Alala, Mokouia Valley, and two unnamed intermittent bodies of water near Puu Alala.

Effects of Critical Habitat Designation

Section 7 Consultation

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

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is designated or proposed. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. Conference reports provide conservation recommendations to assist the agency in eliminating conflicts that may be caused by the proposed action. The conservation recommendations in a conference report are advisory.

We may issue a formal conference report, if requested by the Federal action agency. Formal conference reports include an opinion that is prepared according to 50 CFR 402.14, as if the species was listed or critical habitat was designated. We may adopt the formal conference report as the biological opinion when the species is listed or critical habitat is designated, if no substantial new information or changes in the action alter the content of the opinion (see 50 CFR 402.10(d)).

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

If we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we would also provide reasonable and prudent alternatives to the project, if any are identifiable. Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

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

Activities on Federal lands that may affect critical habitat of one or more of the 83 plant species will require Section 7 consultation. Activities on private or State lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act (33 U.S.C. 1344 *et seq.*), or a section 10(a)(1)(B) permit from us, or some other Federal action, including funding (*e.g.* from the Federal Highway Administration, Federal Aviation Administration (FAA), Federal Emergency Management Agency (FEMA)), permits from the Department of Housing and Urban Development, activities funded by the EPA, Department of Energy, or any other Federal agency; regulation of airport improvement activities by the FAA; and construction of communication sites licensed by the Federal Communication Commission will also continue to be subject to the section 7 consultation process. Federal actions not affecting critical habitat and actions on non-Federal lands that are not federally funded, authorized, or permitted do not require section 7 consultation.

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

Activities that, when carried out, funded, or authorized by a Federal agency, may directly or indirectly

adversely affect critical habitat include, but are not limited to—

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

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

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

(4) Recreational activities that appreciably degrade vegetation.

(5) Mining of sand or other minerals.

(6) Introducing or encouraging the spread of non-native plant species.

(7) Importation of non-native species for research, agriculture, and aquaculture, and the release of biological control agents.

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

Relationship to Habitat Conservation Plans and Other Planning Efforts

Currently, there are no HCPs that include any of the plant species discussed in this proposal as covered species. In the event that future HCPs covering any of the discussed plant species are developed within the boundaries of designated critical habitat, we will work with applicants to encourage them to provide for protection and management of habitat areas essential to the conservation of the species. This could be accomplished by either directing development and habitat modification to nonessential areas, or appropriately modifying activities within essential habitat areas so that such activities will not adversely modify the primary constituent elements. The HCP development process would provide an opportunity for more intensive data collection and analysis regarding the use of particular areas by these plant species. If an HCP that addresses one or more of the 83 plant species as covered species is ultimately approved, we will reassess the critical habitat boundaries in light of the HCP. We intend to undertake this review when the HCP is approved, but funding and priority constraints may influence the timing of such a review.

Application of the Section 3(5)(A) Criteria Regarding Special Management Considerations or Protection

Critical habitat is defined in section 3, paragraph (5)(A) 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. Special management and protection are not required if adequate management and protection are already in place. Adequate special management or protection is provided by a legally operative plan/agreement that addresses the maintenance and improvement of the primary constituent elements important to the species and manages for the long-term conservation of the species. If any areas containing the primary constituent elements are currently being managed to address the conservation needs of one or more of the 83 plant species and do not require special management or protection, these areas would not meet the definition of critical habitat in section 3(5)(A)(i) of the Act and would not be included in this proposed rule.

To determine if a plan provides adequate management or protection we consider—(1) Whether there is a current plan specifying the management actions and whether such actions provide sufficient conservation benefit to the species; (2) whether the plan provides assurances that the conservation management strategies will be implemented; and (3) whether the plan provides assurances that the conservation management strategies will be effective. In determining if management strategies are likely to be implemented, we consider whether—(a) A management plan or agreement exists that specifies the management actions being implemented or to be implemented; (b) there is a timely schedule for implementation; (c) there is a high probability that the funding source(s) or other resources necessary to implement the actions will be available; and (d) the party(ies) have the authority and long-term commitment to implement the management actions, as demonstrated, for example, by a legal instrument providing enduring protection and management of the lands. In determining whether an action is likely to be effective, we consider whether—(a) The plan specifically addresses the management needs, including reduction of threats to the species; (b) such actions have been successful in the past; (c) there are provisions for monitoring and assessment of the effectiveness of the management actions; and (d) adaptive management principles have been incorporated into the plan.

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

the plan must provide assurances that the conservation management strategies will be implemented; and (3) the plan must provide assurances that the conservation management strategies will be effective, by providing for periodic monitoring and revisions as necessary. If all of these criteria are met, then the lands covered under the plan would not meet the definition of critical habitat.

Two species, *Panicum niihauense* and *Wilkesia hobdyi,* occur on the Barking Sands and Makaha Ridge Facility lands, and we believe these lands are needed for the recovery of these species. Management on these lands currently consist of restricting human access and mowing landscaped areas. We do not believe that these measures are sufficient to address the primary threats to these species, nor do we believe that appropriate conservation management strategies will be adequately funded or effectively implemented. Therefore, we cannot at this time find that management of these lands under Federal jurisdiction is adequate to preclude a proposed designation of critical habitat. However, if an INRMP or other endangered species management plan that addresses the maintenance and improvement of the essential elements for these two plant species, and provides for their long-term conservation and assurances that it will is completed and implemented, we will reassess the critical habitat boundaries in light of these management plans. Also, we may exclude these military lands under section 4(b)(2) of the Act if benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Economic and Other Relevant Impacts

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

We prepared an analysis of the economic effects of critical habitat designation for 76 Kauai and Niihau plants (Decision Analysts Hawaii, Inc. (DAHI) 2001) and made it available for public review on March 7, 2001 (66 FR 13691). In that document, we concluded that no significant economic impacts were expected from critical habitat designation above and beyond those already caused by the listing of the 76 plant species because nearly all of the land within the proposed critical habitat unit is unsuitable for development due to their remote locations, lack of access, and rugged terrain; nearly all of this land (98.5 percent) is within the State Conservation District where state land use controls severely limit development and most activities; very few of the current and planned projects, land uses, and activities that could affect the proposed critical habitat units have a Federal involvement requiring section 7 consultations and most of the activities that do have Federal involvement are operations and maintenance of existing facilities and structures, so they would not be impacted by the critical habitat designation. We will conduct a reanalysis of the economic impacts of designating these areas as critical habitat in light of this new proposal and in accordance with recent decisions in the *N.M. Cattlegrowers Ass'n* v. *U.S. Fish and Wildlife Serv.,* 248 F.3d 1277 (10th Cir. 2001) prior to a final determination. The economic analysis will include detailed information on the baseline costs and benefits of the critical habitat designation regardless of whether the costs are coextensive with listing, where such estimates are available. This information on the baseline will allow a fuller appreciation of the economic impacts associated with critical habitat designation. When completed, we will announce the availability of the revised draft economic analysis with a notice in the **Federal Register**, and we will open a public comment period on the revised draft economic analysis and re-open the comment period on the proposed rule at that time.

We will utilize the final economic analysis, and take into consideration all comments and information regarding economic or other impacts submitted during the public comment period and the public hearing, to make final critical habitat designations. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as part of critical habitat; however, we cannot exclude areas from critical habitat when such exclusion will result in the extinction of the species.

Public Comments Solicited

It is our intent that any final action resulting from this proposal be as accurate and as effective as possible. Therefore, we solicit comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry or any other interested party concerning this proposed rule.

We invite comments from the public that provide information on whether lands within proposed critical habitat are currently being managed to address conservation needs of these listed plants. As stated earlier in this revised proposed rule, if we receive information that any of the areas proposed as critical habitat are adequately managed, we may delete such areas from the final rule, because they would not meet the definition in section 3(5)(A)(i) of the Act. In determining adequacy of management, we must find that the management effort is sufficiently certain to be implemented and effective so as to contribute to the elimination or adequate reduction of relevant threats to the species.

We are soliciting comment in this revised proposed rule on whether current land management plans or practices applied within areas proposed as critical habitat adequately address the threat to these listed species.

We are aware that the State of Hawaii and some private landowners are considering the development and implementation of land management plans or agreements that may promote the conservation and recovery of endangered and threatened plant species on the island of Kauai. We are soliciting comments in this proposed rule on whether current land management plans or practices applied within the areas proposed as critical habitat provide for the conservation of the species by adequately addressing the threats. We are also soliciting comments on whether future development and approval of conservation measures (e.g., HCPs, Conservation Agreements, Safe Harbor Agreements) should be excluded from critical habitat and if so, by what mechanism.

In addition, we are seeking comments on the following:

(1) The reasons why critical habitat for any of these species is prudent or not prudent as provided by section 4 of the Act and 50 CFR 424.12(a)(1), including those species for which prudency determinations have been published in previous proposed rules and which have been incorporated by reference;

(2) The reasons why any particular area should or should not be designated as critical habitat for any of these species, as critical habitat is defined by section 3 of the Act (16 U.S.C. 1532 (5));

(3) Specific information on the amount and distribution of habitat for the 83 species, and what habitat is

essential to the conservation of the species and why;

(4) Land use practices and current or planned activities in the subject areas and their possible impacts on proposed critical habitat;

(5) Any economic or other impacts resulting from the proposed designations of critical habitat, including any impacts on small entities, energy development, low income households, and local governments;

(6) Economic and other potential values associated with designating critical habitat for the above plant species such as those derived from non-consumptive uses (*e.g.,* hiking, camping, birding, enhanced watershed protection, increased soil retention, ''existence values,'' and reductions in administrative costs);

(7) The methodology we might use, under section 4(b)(2) of the Act, in determining if the benefits of excluding an area from critical habitat outweigh the benefits of specifying the area as critical habitat; and

(8) The effects of critical habitat designation on military lands, and how it would affect military activities, particularly military activities at the PMRF at Barking Sands and Makaha Ridge Facility lands, both on the island of Kauai. Whether there will be a significant impact on military readiness or national security if we designate critical habitat on these facilities. Whether these facilities should be excluded from the designation under section 4(b)(2) of the Act.

Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address, which we will honor to the extent allowable by law. There also may be circumstances in which we would withhold a respondent's identity, as allowable by law. If you wish us to withhold your name and/or address, you must state this request prominently at the beginning of your comment. However, we will not consider anonymous comments. To the extent consistent with applicable law, we will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address (see **ADDRESSES** section).

The comment period closes on March 29, 2002. Written comments should be submitted to the Service Office listed in the **ADDRESSES** section. We are seeking comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested parties concerning the proposed rule. For additional information on public hearings see the **ADDRESSES** section.

Public Hearing

The Act provides for a public hearing on this proposal, if requested. Requests for public hearings must be made within 45 days of the date of publication of this proposal in the **Federal Register**. Given the high likelihood of requests and the need to publish the final determination by July 30, 2002, we have scheduled a public hearing to be held 6:00 p.m. to 8:00 p.m., Wednesday, February 13, 2002, at the Radisson Kauai Beach Resort.

Anyone wishing to make an oral statement for the record is encouraged to provide a written copy of their statement and present it to us at the hearing. In the event there is a large attendance, the time allotted for oral statements may be limited. Oral and written statements receive equal consideration. There are no limits to the length of written comments presented at the hearing or mailed to the Service.

The public hearing will be held from 6:00 p.m. to 8:00 p.m. on Tuesday, January 29, 2002, on the island of Kauai, Hawaii. Prior to the public hearing, we will be available from 3:30 to 4:30 p.m. to provide information and to answer questions. Registration for the hearing will begin at 5:30 p.m. The public hearing will be held at the Radisson Kauai Beach Resort, 4331 Kauai Beach Drive, Lihue, Kauai.

Peer Review

In accordance with our policy published on July 1, 1994 (59 FR 34270), we will seek the expert opinions of at least three appropriate and independent specialists regarding this proposed rule. The purpose of such a review is to ensure listing and critical habitat decisions are based on scientifically sound data, assumptions, and analyses. We will send copies of this proposed rule to these peer reviewers immediately following publication in the **Federal Register**. We will invite the peer reviewers to comment, during the public comment period, on the specific assumptions and conclusions regarding the proposed designations of critical habitat.

We will consider all comments and data received during the 60-day comment period on this revised proposed rule during preparation of a final rulemaking. Accordingly, the final decision may differ from this proposal.

Clarity of the Rule

Executive Order 12866 requires each agency to write regulations and notices that are easy to understand. We invite your comments on how to make this proposed rule easier to understand including answers to questions such as the following: (1) Are the requirements in the proposed rule clearly stated? (2) Does the proposed rule contain technical language or jargon that interferes with the clarity? (3) Does the format of the proposed rule (grouping and order of sections, use of headings, paragraphing, etc.) aid or reduce its clarity? (4) Is the description of the proposed rule in the ''Supplementary Information'' section of the preamble helpful in understanding the document? (5) What else could we do to make the proposed rule easier to understand?

Please send any comments that concern how we could make this notice easier to understand to the Field Supervisor, Pacific Islands Office (see **ADDRESSES**).

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, this document is a significant rule and was reviewed by the Office of Management and Budget (OMB) in accordance with the four criteria discussed below. We are preparing a revised economic analysis of this proposed action, which will be available for public comment, to determine the economic consequences of designating the specific areas identified as critical habitat. The availability of the draft economic analysis will be announced in the **Federal Register** so that it is available for public review and comments.

(a) While we will prepare an economic analysis to assist us in considering whether areas should be excluded pursuant to section 4 of the Act, we do not believe this rule will have an annual economic effect of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State or local governments or communities. Therefore, at this time, we do not believe a cost benefit and economic analysis pursuant to Executive Order 12866 is required. We will revisit this if the economic analysis indicates greater impacts than currently anticipated.

The dates for which the 83 plant species were listed as threatened or endangered can be found in Table 4(b). Consequently, and as needed, we will conduct formal and informal section 7 consultations with other Federal agencies to ensure that their actions will not jeopardize the continued existence of these species. Under the Act, critical habitat may not be adversely modified by a Federal agency action. Critical habitat does not impose any restrictions on non-Federal persons unless they are conducting activities funded or otherwise sponsored, authorized, or permitted by a Federal agency (see Table 6).

TABLE 6.—IMPACTS OF CRITICAL HABITAT DESIGNATION FOR 83 PLANTS FROM THE ISLANDS OF KAUAI AND NIIHAU

Categories of activities	Activities potentially affected by species listing only	Additional activities potentially affected by critical habitat designation [1]
Federal Activities Potentially Affected [2].	Activities conducted by the Army Corps of Engineers, Department of Transportation, Department of Defense, Department of Agriculture, Environmental Protection Agency, Federal Emergency Management Agency, Federal Aviation Administration, Federal Communications Commission, Department of Interior activities that require a Federal action (permit, authorization, or funding) and may remove or destroy habitat for these plants by mechanical, chemical, or other means (*e.g.,* overgrazing, clearing, cutting native live trees and shrubs, water diversion, impoundment, groundwater pumping, road building, mining, herbicide application, recreational use etc.) or appreciably decrease habitat value or quality through indirect effects (*e.g.,* edge effects, invasion of exotic plants or animals, fragmentation of habitat).	These same activities carried out by Federal Agencies in designated areas where section 7 consultations would not have occurred but for the critical habitat designation.
Private or other non-Federal Activities Potentially Affected [3].	Activities conducted by the Army Corps of Engineers, Department of Transportation, Department of Defense, Department of Agriculture, Environmental Protection Agency, Federal Emergency Management Agency, Federal Aviation Administration, Federal Communications Commission, Department of Interior activities that require a Federal action (permit, authorization, or funding) and may remove or destroy habitat for these plants by mechanical, chemical, or other means (*e.g.,* overgrazing, clearing, cutting native live trees and shrubs, water diversion, impoundment, groundwater pumping, road building, mining, herbicide application, recreational use etc.) or appreciably decrease habitat value or quality through indirect effects (*e.g.,* edge effects, invasion of exotic plants or animals, fragmentation of habitat).	These same activities carried out by Federal Agencies in designated areas where section 7 consultations would not have occurred but for the critical habitat designation.

[1] This column represents activities potentially affected by the critical habitat designation in addition to those activities potentially affected by listing the species.
[2] Activities initiated by a Federal agency.
[3] Activities initiated by a private or other non-Federal entity that may need Federal authorization or funding.

Section 7 of the Act requires Federal agencies to ensure that they do not jeopardize the continued existence of these species. Based on our experience with these species and their needs, we conclude that most Federal or federally-authorized actions that could potentially cause an adverse modification of the proposed critical habitat would currently be considered as ''jeopardy'' under the Act in areas occupied by the species because consultation would already be required due to the presence of the listed species, and the duty to avoid adverse modification of critical habitat would not trigger additional regulatory impacts beyond the duty to avoid jeopardizing the species. Accordingly, we do not expect the designation of currently occupied areas as critical habitat to have any additional incremental impacts on what actions may or may not be conducted by Federal agencies or non-Federal persons that receive Federal authorization or funding.

The designation of areas as critical habitat where section 7 consultations would not have occurred but for the critical habitat designation (that is, in areas currently unoccupied by the listed species), may have impacts that are not attributable to the species listing on what actions may or may not be conducted by Federal agencies or non-Federal persons who receive Federal authorization or funding. We will evaluate any impact through our economic analysis (under section 4 of the Act; *see* Economic Analysis section of this rule). Non-Federal persons who do not have a Federal nexus with their actions are not restricted by the designation of critical habitat.

(b) We do not expect this rule to create inconsistencies with other agencies' actions. As discussed above, Federal agencies have been required to ensure that their actions not jeopardize the continued existence of the 83 plant species since their listing between 1991 and 1996. For the reasons discussed above, the prohibition against adverse modification of critical habitat would be expected to impose few, if any, additional restrictions to those that currently exist in the proposed critical habitat on currently occupied lands. However, we will evaluate any impact of designating areas where section 7 consultations would not have occurred but for the critical habitat designation through our economic analysis. Because of the potential for impacts on other Federal agency activities, we will continue to review this proposed action for any inconsistencies with other Federal agency actions.

(c) We do not expect this proposed rule, if made final, to significantly affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients. Federal agencies are currently required to ensure that their activities do not jeopardize the continued existence of a listed species, and, as discussed above, we do not anticipate that the adverse modification prohibition, resulting from critical habitat designation will have any incremental effects in areas of occupied habitat on any Federal entitlement, grant, or loan program. We will evaluate any impact of designating areas where section 7 consultation would not have occurred but for the critical habitat designation through our economic analysis.

(d) OMB has determined that this rule may raise novel legal or policy issues

and, as a result, this rule has undergone OMB review.

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

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the Regulatory Flexibility Act (RFA) to require Federal agencies to provide a statement of the factual basis for certifying that the rule will not have a significant economic effect on a substantial number of small entities. SBREFA also amended the RFA to require a certification statement. In today's rule, we are certifying that the rule will not have a significant effect on a substantial number of substantial entities. However, should our revised economic analysis provide a contrary indication, we will revisit this determination at that time. The following discussion explains our rationale.

Small entities include small organizations, such as independent non-profit organizations, and small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents, as well as small businesses. Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule as well as the types of project modifications that may result. In general, the term significant economic impact is meant to apply to a typical small business firm's business operations.

To determine if the rule would affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities (*e.g.,* housing development, grazing, oil and gas production, timber harvesting, etc.). We apply the ''substantial number'' test individually to each industry to determine if certification is appropriate. In estimating the numbers of small entities potentially affected, we also consider whether their activities have any Federal involvement; some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation.

Designation of critical habitat only affects activities conducted, funded, or permitted by Federal agencies; non-Federal activities are not affected by the designation. In areas where the species is present, Federal agencies are already required to consult with us under section 7 of the Act on activities that they fund, permit, or implement that may affect *Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Ctenitis squamigera, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia erecta, Diellia pallida, Diplazium molokaiense, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus clayi, Hibiscus waimeae ssp. hannerae, Ischaemum byrone, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Mariscus pennatiformis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phlegmariurus nutans, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hobdyi, Xylosma crenatum,* and *Zanthoxylum hawaiiense.* If these critical habitat designations are finalized, Federal agencies must also consult with us if their activities may affect designated critical habitat. However, in areas where the species is present, we do not believe this will result in any additional regulatory burden on Federal agencies or their applicants because consultation would already be required due to the presence of the listed species, and the duty to avoid adverse modification of critical habitat likely would not trigger additional regulatory impacts beyond the duty to avoid jeopardizing the species.

Even if the duty to avoid adverse modification does not trigger additional regulatory impacts in areas where the species is present, designation of critical habitat could result in an additional economic burden on small entities due to the requirement to reinitiate consultation for ongoing Federal activities. However, since these 83 plant species were listed (between 1990 and 1996), there have been no formal consultations, and we have conducted only six informal consultations, in addition to consultations on Federal grants to State wildlife programs, which would not affect small entities. On the island of Kauai there have been no formal consultations regarding *Alsinidendron lychnoides, Cyrtandra limahuliensis, Cyanea recta, Diellia erecta, Dubautia latifolia, Exocarpos luteolus, Panicum niihauense, Sesbania tomentosa, and* Wilkesia hobdyi, with the Corps, Navy, and the U.S. Department of Agriculture. One informal consultation was conducted on behalf of the Corps for the Defense Environmental Restoration Program, who requested a list of endangered species on a site formerly used by the Department of Defense at the Wailua Impact Area. Three of the 83 species, *Cyanea recta, Cyrtandra limahuliensis,* and *Exocarpos luteolus* were reported from the project area. Four informal consultations were conducted with the Navy: one for the construction of a missile support facility at the PMRF at Barking Sands regarding several listed birds, a turtle, the Hawaiian monk seal,

Hawaiian hoary bat, and the endangered plant *Sesbania tomentosa;* one on the PMRF's Enhanced Capability regarding several listed birds and turtles, the Hawaiian hoary bat, Hawaiian monk seal, several whale species, and the plants *Panicum niihauense* and *Sesbania tomentosa;* one for the mountaintop surveillance sensor test integration center facility at PMRF at Barking Sands regarding several listed birds, the Hawaiian hoary bat, and the endangered plants *Panicum niihauense* and *Sesbania tomentosa;* and, one for the Navy's INRMP for PMRF at Barking Sands regarding several listed birds, a listed turtle, the Hawaiian hoary bat, and *Wilkesia hobdyi*. In addition, *Panicum niihauense* and *Sesbania tomentosa* were identified as occurring in Polihale State Park, adjacent to the Naval facility. The fifth informal consultation was conducted on one listed bird, the Hawaiian hoary bat, and three plants (*Alsinidendron lychnoides, Dubautia latifolia,* and *Diellia erecta*) with the NRCS through their Wildlife Incentive Program for noxious weed control actions on leased cabin lots within Kokee State Park. NRCS does not anticipate the need to reinitiate consultation for these on-going actions as these actions are not occurring within the areas of proposed critical habitat (Terrell Kelly, NRCS, pers. comm., 2001).

Except for the NRCS project, none of these consultations affected or concerned small entities. In all five consultations, we concurred with each agency's determination that the project, as proposed, was not likely to adversely affect listed species. None of these consultations affected or concerned small entities, and none of the proposed projects are ongoing. As a result, the requirement to reinitiate consultation for ongoing projects will not affect a substantial number of small entities on Kauai.

There have been no consultations on any of these 83 species on the island of Niihau. Therefore, the requirement to reinitiate consultations for ongoing projects will not affect a substantial number of small entities on Niihau.

In areas where the species is clearly not present, designation of critical habitat could trigger additional review of Federal activities under section 7 of the Act, that would otherwise not be required. We are aware of relatively few activities in the proposed critical habitat areas for these 83 plants that have Federal involvement, and thus, would require consultation or reinitiation of already completed consultations for on-going projects. As mentioned above, we have conducted only five informal consultations under section 7 involving any of the species. As a result, we can not easily identify future consultations that may be due to the listing of the species or the increment of additional consultations that may be required by this critical habitat designation. Therefore, for the purposes of this review and certification under the Regulatory Flexibility Act, we are assuming that any future consultations in the area proposed as critical habitat will be due to the critical habitat designations.

On Kauai, approximately 0.5 percent of the designations are on Federal lands, 66.8 percent are on State lands, and 32.7 percent are on private lands. Nearly all of the land within the critical habitat units will have limited suitability for development, land uses, and activities because of the remote locations, lack of access, and rugged terrain of these lands. Also, nearly all of this land (99.2 percent) is within the State Conservation District where State land-use controls severely limit development and most activities. Approximately 0.7 percent of this land is within the State Agricultural District, and about 0.1 percent is within the State Urban District. On non-Federal lands, activities that lack Federal involvement would not be affected by the critical habitat designations. However, activities of an economic nature that are likely to occur on non-Federal lands in the area encompassed by these proposed designations consist of improvements in State parks and communications and tracking facilities; road improvements; recreational use such as hiking, camping, picnicking, game hunting, fishing; botanical gardens; and, crop farming. On lands that are in agricultural production, the types of activities that might trigger a consultation include irrigation ditch system projects that may require section 404 authorizations from the Corps, and watershed management and restoration projects sponsored by NRCS. However the NRCS restoration projects typically are voluntary, and the irrigation ditch system projects within lands that are in agricultural production are rare, and may affect only a small percentage of the small entities within these proposed critical habitat designations.

Lands that are within the State Urban District are located within undeveloped coastal areas. The types of activities that might trigger a consultation include shoreline restoration or modification projects that may require section 404 authorizations from the Corps or FEMA, housing or resort development that may require permits from the Department of Housing and Urban Development, and activities funded or authorized by the EPA. However, we are not aware of a significant number of future activities that would be federally funded, permitted, or authorized in these coastal areas. Therefore, we conclude that the proposed rule would not affect a substantial number of small entities. We are not aware of any commercial activities on the Federal lands included in these proposed critical habitat designations.

The entire island of Niihau is under one private ownership and within the State Agricultural District. The current and projected land uses on Niihau are cattle and sheep ranching, commercial game hunting, and military exercises to train downed combat pilots on how to evade capture (DAHI 2001). The proposed rule would not affect a substantial number of small agricultural entities on the island of Niihau. Therefore, we conclude that the proposed rule would not affect a substantial number of small entities.

We also considered the likelihood that this rule would result in significant economic impacts to small entities. In general, two different mechanisms in section 7 consultations could lead to additional regulatory requirements. First, if we conclude, in a biological opinion, that a proposed action is likely to jeopardize the continued existence of a species or adversely modify its critical habitat, we can offer ''reasonable and prudent alternatives.'' Reasonable and prudent alternatives are alternative actions that can be implemented in a manner consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that would avoid jeopardizing the continued existence of listed species or resulting in adverse modification of critical habitat. A Federal agency and an applicant may elect to implement a reasonable and prudent alternative associated with a biological opinion that has found jeopardy or adverse modification of critical habitat. An agency or applicant could alternatively choose to seek an exemption from the requirements of the Act or proceed without implementing the reasonable and prudent alternative. However, unless an exemption were obtained, the Federal agency or applicant would be at risk of violating section 7(a)(2) of the Act if it chose to proceed without implementing the reasonable and prudent alternatives. Secondly, if we find that a proposed action is not likely to jeopardize the continued existence of a listed animal species, we may identify reasonable and prudent measures designed to minimize the amount or extent of take and require

the Federal agency or applicant to implement such measures through non-discretionary terms and conditions. However, the Act does not prohibit the take of listed plant species or require terms and conditions to minimize adverse effect to critical habitat. We may also identify discretionary conservation recommendations designed to minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, help implement recovery plans, or to develop information that could contribute to the recovery of the species.

Based on our experience with section 7 consultations for all listed species, virtually all projects—including those that, in their initial proposed form, would result in jeopardy or adverse modification determinations in section 7 consultations—can be implemented successfully with, at most, the adoption of reasonable and prudent alternatives. These measures must be economically feasible and within the scope of authority of the Federal agency involved in the consultation. As we have a very limited consultation history for these 83 species from Kauai and Niihau, we can only describe the general kinds of actions that may be identified in future reasonable and prudent alternatives. These are based on our understanding of the needs of these species and the threats they face, especially as described in the final listing rule and in this proposed critical habitat designation, as well as our experience with similar listed plants in Hawaii. In addition, all of these species are protected under the State of Hawaii's Endangered Species Act (Hawaii Revised Statutes, Chap. 195D–4). Therefore, we have also considered the kinds of actions required under the State licensing process for these species. The kinds of actions that may be included in future reasonable and prudent alternatives include conservation set-asides, management of competing non-native species, restoration of degraded habitat, propagation, outplanting and augmentation of existing populations, construction of protective fencing, and periodic monitoring. These measures are not likely to result in a significant economic impact to a substantial number of small entities because there are not a substantial number of small entities affected.

As required under section 4(b)(2) of the Act, we will conduct an analysis of the potential economic impacts of this proposed critical habitat designation, and will make that analysis available for public review and comment before finalizing these designations. In the absence of a revised economic analysis at this time, we have reviewed our previously available draft economic analysis of the likely economic impacts of designating critical habitat for 76 plants from the islands of Kauai and Niihau (66 FR 13691). In that analysis, which included proposed designations of critical habitat within 23 units on 24,349 ha (60,166 ac) on Kauai and 191 ha (471 ac) on Niihau, we determined that the designations would have modest economic impacts because nearly all of the land within the critical habitat units has limited suitability for development, land uses, and activities because of the remote locations, lack of access, and rugged terrain, of the land, and their inclusion within the State Conservation District where State land-use controls severely limit development and most activities. The proposed critical habitat designations were expected to cause little or no increase in the number of section 7 consultations; few, if any, increases in costs associated with consultations; and few, if any delays in, or modifications to planned projects, land uses and activities).

In general, two different mechanisms in section 7 consultations could lead to additional regulatory requirements. First, if we conclude, in a biological opinion, that a proposed action is likely to jeopardize the continued existence of a species or adversely modify its critical habitat, we can offer ''reasonable and prudent alternatives.'' Reasonable and prudent alternatives are alternative actions that can be implemented in a manner consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that would avoid jeopardizing the continued existence of listed species or resulting in adverse modification of critical habitat. A Federal agency and an applicant may elect to implement a reasonable and prudent alternative associated with a biological opinion that has found jeopardy or adverse modification of critical habitat. An agency or applicant could alternatively choose to seek an exemption from the requirements of the Act or proceed without implementing the reasonable and prudent alternative. However, unless an exemption were obtained, the Federal agency or applicant would be at risk of violating section 7(a)(2) of the Act if it chose to proceed without implementing the reasonable and prudent alternatives. Secondly, if we find that a proposed action is not likely to jeopardize the continued existence of a listed animal species, we may identify reasonable and prudent measures designed to minimize the amount or extent of take and require the Federal agency or applicant to implement such measures through non-discretionary terms and conditions. However, the Act does not prohibit the take of listed plant species or require terms and conditions to minimize adverse effect to critical habitat. We may also identify discretionary conservation recommendations designed to minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, help implement recovery plans, or to develop information that could contribute to the recovery of the species.

Based on our experience with section 7 consultations for all listed species, virtually all projects—including those that, in their initial proposed form, would result in jeopardy or adverse modification determinations in section 7 consultations—can be implemented successfully with, at most, the adoption of reasonable and prudent alternatives. These measures, by definition, must be economically feasible and within the scope of authority of the Federal agency involved in the consultation.

In summary, we have considered whether this proposed rule would result in a significant economic effect on a substantial number of small entities. It would not affect a substantial number of small entities. Approximately 67 percent of the lands proposed as critical habitat are on State of Hawaii lands. The State of Hawaii is not a small entity. Approximately 33 percent of the lands proposed as critical habitat are on private lands. Many of these parcels are located in areas where likely future land uses are not expected to result in Federal involvement or section 7 consultations. As discussed earlier, most of the private and State parcels within the proposed designation are currently being used for recreational and agricultural purposes and, therefore, are not likely to require any Federal authorization. In the remaining areas, Federal involvement—and thus section 7 consultations, the only trigger for economic impact under this rule—would be limited to a subset of the area proposed. The most likely future section 7 consultations resulting from this rule would be for informal consultations on federally funded land and water conservation projects, species-specific surveys and research projects, and watershed management and restoration projects sponsored by NRCS. These consultations would likely occur on only a subset of the total number of parcels and therefore not likely to affect a substantial number of small entities. This rule would result in project modifications only when proposed Federal activities would destroy or

adversely modify critical habitat. While this may occur, it is not expected frequently enough to affect a substantial number of small entities. Even when it does occur, we do not expect it to result in a significant economic impact, as the measures included in reasonable and prudent alternatives must be economically feasible and consistent with the proposed action. Therefore, since we are certifying that the proposed designation of critical habitat for the following species: *Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Ctenitis squamigera, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia erecta, Diellia pallida, Diplazium molokaiense, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus clayi, Hibiscus waimeae* ssp. *hannerae, Ischaemum byrone, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Mariscus pennatiformis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phlegmariurus nutans, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hobdyi, Xylosma crenatum, and Zanthoxylum hawaiiense* will not have a significant economic impact on a substantial number of small entities, and an initial regulatory flexibility analysis is not required. However, should the revised economic analysis of this rule indicate otherwise, we will revisit this determination.

Executive Order 13211

On May 18, 2001, the President issued Executive Order 13211 on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. Although this rule is a significant regulatory action under Executive Order 12866, it is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action and no Statement of Energy Effects is required.

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

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

a. We believe this rule, as proposed, will not ''significantly or uniquely'' affect small governments. A Small Government Agency Plan is not required. Small governments will not be affected unless they propose an action requiring Federal funds, permits or other authorizations. Any such activities will require that the Federal agency ensure that the action will not adversely modify or destroy designated critical habitat. However, as discussed above, these actions are currently subject to equivalent restrictions through the listing protections of the species, and no further restrictions are anticipated to result from critical habitat designation of occupied areas. In our economic analysis, we will evaluate any impact of designating areas where section 7 consultations would not have occurred but for the critical habitat designation.

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

Takings

In accordance with Executive Order 12630 (''Government Actions and Interference with Constitutionally Protected Private Property Rights''), we have analyzed the potential takings implications of designating critical habitat for the 83 species from Kauai and Niihau in a preliminary takings implication assessment. The takings implications assessment concludes that this proposed rule does not pose significant takings implications. Once the revised economic analysis is completed for this proposed rule, we will review and revise this preliminary assessment as warranted.

Federalism

In accordance with Executive Order 13132, the proposed rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of Interior policy, we requested information from appropriate State agencies in Hawaii. The designation of critical habitat in areas currently occupied by one or more of the 83 plant species imposes no additional restrictions to those currently in place, and, therefore, has little incremental impact on State and local governments and their activities. The designation of critical habitat in unoccupied areas may require section 7 consultation on non Federal lands (where a Federal nexus occurs) that might otherwise not have occurred. However, there will be little additional impact on State and local governments and their activities because all but one of the proposed critical habitat areas are occupied by at least one species. The designations may have some benefit to these governments in that the areas essential to the conservation of these species are more clearly defined, and the primary constituent elements of the habitat necessary to the survival of the species are specifically identified. While this definition and identification does not alter where and what federally sponsored activities may occur, it may assist these local governments in long range planning, rather than waiting for case-by-case section 7 consultation to occur.

Civil Justice Reform

In accordance with Executive Order 12988, the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and does meet the requirements of sections 3(a) and 3(b)(2) of the Order. We are proposing to designate critical habitat in accordance with the provisions of the Endangered Species Act. The rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs of the 83 plant species.

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

This rule does not contain any new collections of information that require

approval by OMB under the Paperwork Reduction Act. This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act

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

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ''Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951) E.O. 13175 and 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. We have determined that there are no Tribal lands essential for the conservation of these 83 plant species. Therefore, designation of critical habitat for these 83 species has not been proposed on Tribal lands.

References Cited

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

Authors

The primary authors of this notice are Marigold Zoll, Gregory Koob, Christa Russell, and Michelle Stephens (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

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

Proposed Regulation Promulgation

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

PART 17—[AMENDED]

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

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

2. In § 17.12(h) revise the entries for ''*Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyanea undulata, Cyperus trachysanthos, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Dubautia latifolia, Dubautia pauciflorula, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hesperomannia lydgatei, Hibiscadelphus woodii, Hibiscus clayi, Hibiscus waimeae* ssp. *hannerae, Ischaemum byrone, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lipochaeta fauriei, Lipochaeta micrantha, Lipochaeta waimeaensis, Lobelia niihauensis, Lysimachia filifolia, Mariscus pennatiformis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Panicum niihauense, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Plantago princeps, Platanthera holochila, Poa mannii, Poa sandvicensis, Poa siphonoglossa, Pteralyxia kauaiensis, Remya kauaiensis, Remya montgomeryi, Schiedea apokremnos, Schiedea helleri, Schiedea kauaiensis, Schiedea membranacea, Schiedea nuttallii, Schiedea spergulina* var. *leiopoda, Schiedea spergulina* var. *spergulina, Schiedea stellarioides, Sesbania tomentosa, Solanum sandwicense, Spermolepis hawaiiensis, Stenogyne campanulata, Viola helenae, Viola kauaiensis* var. *wahiawaensis, Wilkesia hobdyi, Xylosma crenatum,* and *Zanthoxylum hawaiiense*'' under ''FLOWERING PLANTS'' and ''*Adenophorus periens, Ctenitis squamigera, Diellia erecta, Diellia pallida, Diplazium molokaiense,* and *Phlegmariurus nutans* '' under ''FERNS AND ALLIES'' to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species—Scientific name	Common name	Historic range	Family	Status	When listed	Critical habitat	Special rules
FLOWERING PLANTS							
* *	*	*	*	*	*	*	
Alectryon macrococcus	Mahoe	U.S.A. (HI)	Sapindaceae	E	467	17.96(a)	NA
* *	*	*	*	*	*	*	
Alsinidendron lychnoides	Kuawawaenohu	U.S.A. (HI)	Caryophyllaceae	E	590	17.96(a)	NA
* *	*	*	*	*	*	*	
Alsinidendron viscosum	None	U.S.A. (HI)	Caryophyllaceae	E	590	17.96(a)	NA
* *	*	*	*	*	*	*	
Bonamia menziesii	None	U.S.A. (HI)	Convolvulaceae	E	559	17.96(a)	NA
* *	*	*	*	*	*	*	
Brighamia insignis	Olulu	U.S.A. (HI)	Campanulaceae	E	530	17.96(a)	NA
* *	*	*	*	*	*	*	
Centaurium sebaeoides	Awiwi	U.S.A. (HI)	Gentianaceae	E	448	17.96(a)	NA

Species—Scientific name	Common name	Historic range	Family	Status	When listed	Critical habitat	Special rules
*	*	*	*		*		*
Chamaesyce halemanui	None	U.S.A. (HI)	Euphorbiaceae	E	464	17.96(a)	NA
*	*	*	*		*		*
Cyanea asarifolia	Haha	U.S.A (HI)	Campanulaceae	E	530	17.96(a)	NA
*	*	*	*		*		*
Cyanea recta	Haha	U.S.A (HI)	Campanulaceae	T	590	17.96(a)	NA
*	*	*	*		*		*
Cyanea remyi	Haha	U.S.A (HI)	Campanulaceae	E	590	17.96(a)	NA
*	*	*	*		*		*
Cyanea undulata	None	U.S.A. (HI)	Campanulaceae	E	436	17.96(a)	NA
*	*	*	*		*		*
Cyperus trachysanthos	Puukaa	U.S.A. (HI)	Cyperaceae	E	592	17.96(a)	NA
*	*	*	*		*		*
Cyrtandra cyaneoides	Mapele	U.S.A. (HI)	Gesneriaceae	E	590	17.96(a)	NA
*	*	*	*		*		*
Cyrtandra limahuliensis	Haiwale	U.S.A. (HI)	Gesneriaceae	T	530	17.96(a)	NA
*	*	*	*		*		*
Delissea rhytidosperma	None	U.S.A. (HI)	Campanulaceae	E	530	17.96(a)	NA
*	*	*	*		*		*
Delissea rivularis	Oha	U.S.A. (HI)	Campanulaceae	E	590	17.96(a)	NA
*	*	*	*		*		*
Delissea undulata	None	U.S.A. (HI)	Campanulaceae	E	593	17.96(a)	NA
*	*	*	*		*		*
Dubautia latifolia	Naenae	U.S.A. (HI)	Asteraceae	E	464	17.96(a)	NA
*	*	*	*		*		*
Dubautia pauciflorula	Naenae	U.S.A. (HI)	Asteraceae	E	436	17.96(a)	NA
*	*	*	*		*		*
Euphorbia haeleeleana	Akoko	U.S.A. (HI)	Euphorbiaceae	E	592	17.96(a)	NA
*	*	*	*		*		*
Exocarpos luteolus	Heau	U.S.A. (HI)	Santalaceae	E	530	17.96(a)	NA
*	*	*	*		*		*
Flueggea neowawraea	Mehamehame	U.S.A. (HI)	Euphorbiaceae	E	559	17.96(a)	NA
*	*	*	*		*		*
Gouania meyenii	None	U.S.A. (HI)	Rhamnaceae	E	448	17.96(a)	NA
*	*	*	*		*		*
Hedyotis cookiana	Awiwi	U.S.A. (HI)	Rubiaceae	E	530	17.96(a)	NA
*	*	*	*		*		*
Hedyotis st.-johnii	Na Pali beach hedyotis.	U.S.A. (HI)	Rubiaceae	E	441	17.96(a)	NA
*	*	*	*		*		*
Hesperomannia lydgatei	None	U.S.A. (HI)	Asteraceae	E	436	17.96(a)	NA
*	*	*	*	*	*	*	
Hibiscadelphus woodii	Hau kuahiwi	U.S.A. (HI)	Malvaceae	E	590	17.96(a)	NA
*	*	*	*	*	*	*	
Hibiscus clayi	Clay's hibiscus	U.S.A. (HI)	Malvaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Hibiscus waimeae spp. *hannerae*.	Kokio keokeo	U.S.A. (HI)	Malvaceae	E	590	17.96(a)	NA
*	*	*	*	*	*	*	
Ischaemum byrone	Hilo ischaemum	U.S.A. (HI)	Poaceae	E	532	17.96(a)	NA

Species—Scientific name	Common name	Historic range	Family	Status	When listed	Critical habitat	Special rules
*	*	*	*	*	*	*	
Isodendrion laurifolium	Aupaka	U.S.A. (HI)	Violaceae	E	592	17.96(a)	NA
*	*	*	*	*	*	*	
Isodendrion longifolium	Aupaka	U.S.A. (HI)	Violaceae	T	592	17.96(a)	NA
*	*	*	*	*	*	*	
Kokia kauaiensis	Kokio	U.S.A. (HI)	Malvaceae	E	590	17.96(a)	NA
*	*	*	*	*	*	*	
Labordia lydgatei	Kamakahala	U.S.A. (HI)	Loganiaceae	E	436	17.96(a)	NA
*	*	*	*	*	*	*	
Labordia tinifolia var. *wahiawaensis*.	Kamakahala	U.S.A. (HI)	Loganiaceae	E	590	17.96(a)	NA
*	*	*	*	*	*	*	
Lipochaeta fauriei	Nehe	U.S.A. (HI)	Asteraceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Lipochaeta micrantha	Nehe	U.S.A. (HI)	Asteraceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Lipochaeta waimeaensis	Nehe	U.S.A. (HI)	Asteraceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Lobelia niihauensis	None	U.S.A. (HI)	Campanulaceae	E	448	17.96(a)	NA
*	*	*	*	*	*	*	
Lysimachia filifolia	None	U.S.A. (HI)	Primulaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Mariscus pennatiformis	None	U.S.A. (HI)	Cyperaceae	E	559	17.96(a)	NA
*	*	*	*	*	*	*	
Melicope haupuensis	Alani	U.S.A. (HI)	Rutaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Melicope knudsenii	Alani	U.S.A. (HI)	Rutaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Melicope pallida	Alani	U.S.A. (HI)	Rutaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Munroidendron racemosum	None	U.S.A. (HI)	Araliaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Myrsine linearifolia	Kolea	U.S.A. (HI)	Myrsinaceae	T	590	17.96(a)	NA
*	*	*	*	*	*	*	
Nothocestrum peltatum	Aiea	U.S.A. (HI)	Solanaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Panicum niihauense	Lau ehu	U.S.A. (HI)	Poaceae	E	592	17.96(a)	NA
*	*	*	*	*	*	*	
Peucedanum sandwicense	Makou	U.S.A. (HI)	Apiaceae	T	530	17.96(a)	NA
*	*	*	*	*	*	*	
Phyllostegia knudsenii	None	U.S.A. (HI)	Lamiaceae	E	590	17.96(a)	NA
*	*	*	*	*	*	*	
Phyllostegia waimeae	None	U.S.A. (HI)	Lamiaceae	E	530	17.96(a)	NA
*	*	*	*	*	*	*	
Phyllostegia wawrana	None	U.S.A. (HI)	Lamiaceae	E	590	17.96(a)	NA
*	*	*	*	*	*	*	
Plantago princeps	Laukahi kuahiwi	U.S.A. (HI)	Plantaginaceae	E	559	17.96(a)	NA
*	*	*	*	*	*	*	
Platanthera holochila	None	U.S.A. (HI)	Orchidaceae	E	592	17.96(a)	NA

Species—Scientific name	Common name	Historic range	Family	Status	When listed	Critical habitat	Special rules
*	*	*	*	*			
Poa mannii	Mann's bluegrass	U.S.A. (HI)	Poaceae	E	558	17.96(a)	NA
*	*	*	*	*			
Poa sandvicensis	Hawaiian bluegrass.	U.S.A. (HI)	Poaceae	E	464	17.96(a)	NA
*	*	*	*	*			
Poa siphonoglossa	None	U.S.A. (HI)	Poaceae	E	464	17.96(a)	NA
*	*	*	*	*			
Pteralyxia kauaiensis	Kaulu	U.S.A. (HI)	Apocynaceae	E	530	17.96(a)	NA
*	*	*	*	*			
Remya kauaiensis	None	U.S.A. (HI)	Asteraceae	E	413	17.96(a)	NA
*	*	*	*	*			
Remya montgomeryi	None	U.S.A. (HI)	Asteraceae	E	413	17.96(a)	NA
*	*	*	*	*			
Schiedea apokremnos	Maolioli	U.S.A. (HI)	Caryophyllaceae	E	441	17.96(a)	NA
*	*	*	*	*			
Schiedea helleri	None	U.S.A. (HI)	Caryophyllaceae	E	590	17.96(a)	NA
*	*	*	*	*			
Schiedea kauaiensis	None	U.S.A. (HI)	Caryophyllaceae	E	592	17.96(a)	NA
*	*	*	*	*			
Schiedea membranacea	None	U.S.A. (HI)	Caryophyllaceae	E	590	17.96(a)	NA
*	*	*	*	*			
Schiedea nuttallii	None	U.S.A. (HI)	Caryophyllaceae	E	592	17.96(a)	NA
*	*	*	*	*			
Schiedea spergulina var. *leiopoda*.	None	U.S.A. (HI)	Caryophyllaceae	E	530	17.96(a)	NA
*	*	*	*	*			
Schiedea spergulina var. *spergulina*.	None	U.S.A. (HI)	Caryophyllaceae	T	530	17.96(a)	NA
*	*	*	*	*			
Schiedea stellarioides (=Maolioli).	Laulihilihi	U.S.A. (HI)	Caryophyllaceae	E	590	17.96(a)	NA
*	*	*	*	*			
Sesbania tomentosa	Ohai	U.S.A. (HI)	Fabaceae	E	559	17.96(a)	NA
*	*	*	*	*			
Solanum sandwicense	Aiakeakua, popolo.	U.S.A. (HI)	Solanaceae	E	530	17.96(a)	NA
*	*	*	*	*			
Spermolepis hawaiiensis	None	U.S.A. (HI)	Apiaceae	E	559	17.96(a)	NA
*	*	*	*	*			
Stenogyne campanulata	None	U.S.A. (HI)	Lamiaceae	E	464	17.96(a)	NA
*	*	*	*	*			
Viola helenae	None	U.S.A. (HI)	Violaceae	E	436	17.96(a)	NA
*	*	*	*	*			
Viola kauaiensis var. *wahiawaensis*.	Nani wai ale ale	U.S.A. (HI)	Violaceae	E	590	17.96(a)	NA
*	*	*	*	*			
Wilkesia hobdyi	Dwarf iliau	U.S.A. (HI)	Asteraceae	E	473	17.96(a)	NA
*	*	*	*	*			
Xylosma crenatum	None	U.S.A. (HI)	Flacourtiaceae	E	464	17.96(a)	NA

Species—Scientific name	Common name	Historic range	Family	Status	When listed	Critical habitat	Special rules
* *	*	*	*		*		*
Zanthoxylum hawaiiense	Ae	U.S.A. (HI)	Rutaceae	E	532	17.96(a)	NA
* *	*	*	*		*		*
FERNS AND ALLIES							
Adenophorus periens	Pendant kihi fern	U.S.A. (HI)	Grammitidaceae	E	559	17.96(a)	NA
* *	*	*	*		*		*
Ctenitis squamigera	Pauoa	U.S.A. (HI)	Aspleniaceae	E	553	17.96(a)	NA
* *	*	*	*		*		*
Diellia erecta	Asplenium-leaved diellia.	U.S.A. (HI)	Aspleniaceae	E	559	17.96(a)	NA
* *	*	*	*		*		*
Diellia pallida	None	U.S.A. (HI)	Aspleniaceae	E	530	17.96(a)	NA
* *	*	*	*		*		*
Diplazium molokaiense	None	U.S.A. (HI)	Aspleniaceae	E	553	17.96(a)	NA
* *	*	*	*		*		*
Phlegmariurus nutans	Wawae iole	U.S.A. (HI)	Lycopodiaceae	E	536	17.96(a)	NA
* *	*	*	*		*		*

3. In § 17.96, as proposed to be amended at 65 FR 66865, November 7, 2000, add introductory text to paragraph (a)(1)(i), and revise paragraphs (a)(1)(i)(A) and (a)(1)(i)(B) to read as follows:

§ 17.96 Critical habitat—plants.

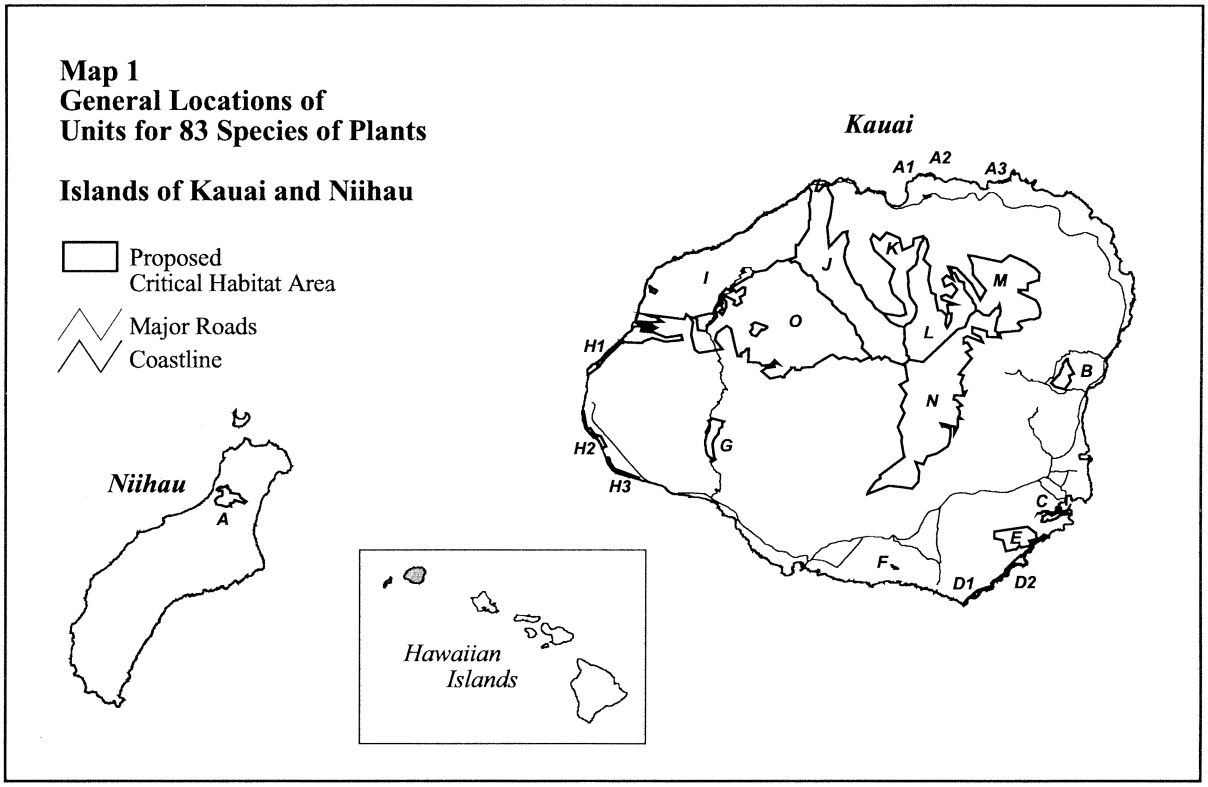
(a) * * *

(1) * * *

(i) *Maps and critical habitat unit descriptions.* The following sections contain the legal descriptions of the critical habitat units designated for each of the Hawaiian Islands. Existing features and structures within proposed areas, such as buildings, roads, aqueducts, telecommunications equipment, telemetry antennas, radars, missile launch sites, arboreta and gardens, heiau (indigenous places of worship or shrines), and other man-made features, do not contain, and are not likely to develop, the constituent elements described for each species in paragraphs (a)(1)(ii)(A) and (a)(1)(ii)(B) of this section. Therefore, these features or structures are not critical habitat.

(A) *Kauai.* Critical habitat units are described below. Coordinates in UTM Zone 4 with units in meters using North American Datum of 1983 (NAD83). The following map shows the general locations of the 15 critical habitats units designated on the island of Kauai.

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


Map 1
General Locations of
Units for 83 Species of Plants
Islands of Kauai and Niihau
Proposed
Critical Habitat Area
Major Roads
Coastline
Kauai
A1
A2
A3
I
J
K
M
O
L
H1
B
N
H2
G
H3
C
E
F
D1
D2
Niihau
A
Hawaiian
Islands

(*2*) Kauai A1 (2 ha; 6 ac):

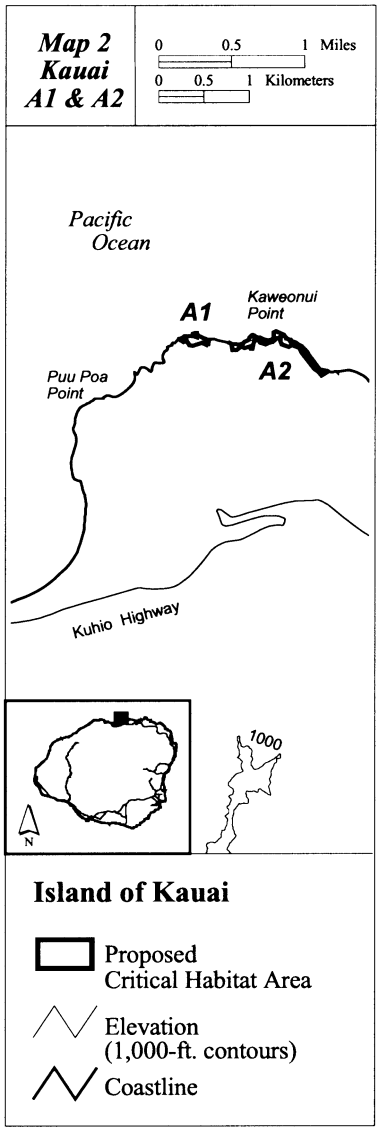
(*i*) Unit consists of the following 10 boundary points and the intermediate coastline: 450111, 2458178; 450040, 2458211; 449937, 2458177; 449899, 2458187; 449875, 2458235; 449837, 2458220; 449804, 2458237; 449797, 2458256; 450118, 2458243; 450111, 2458178.

(*ii*) **Note:** See Map 2.

(*3*) Kauai A2 (6 ha; 16 ac):

(*i*) Unit consists of the following 29 boundary points and the intermediate coastline: 451432, 2457896; 451355, 2457848; 451317, 2457895; 451277, 2457919; 451132, 2458101; 451110, 2458153; 451031, 2458185; 450999, 2458165; 450916, 2458191; 450900, 2458226; 450902, 2458273; 450852, 2458252; 450818, 2458217; 450778, 2458211; 450737, 2458190; 450679, 2458208; 450673, 2458233; 450650, 2458236; 450636, 2458255; 450615, 2458247; 450600, 2458145; 450574, 2458143; 450568, 2458168; 450506, 2458152; 450472, 2458173; 450420, 2458129; 450376, 2458129; 450360, 2458202; 451432, 2457896.

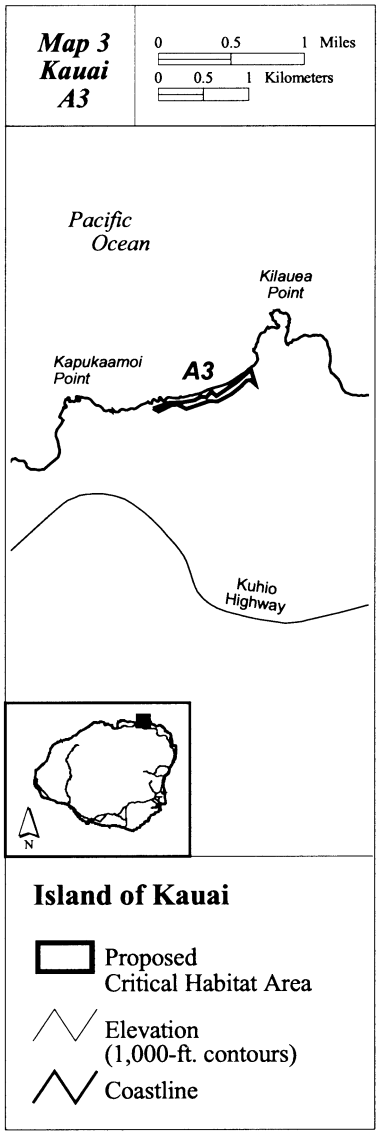
(*ii*) **Note:** Map 2 follows:



(*4*) Kauai A3 (6 ha; 16 ac):

(*i*) Unit consists of the following 22 boundary points: 457168, 2457531; 457342, 2457591; 457498, 2457593; 457625, 2457613; 457697, 2457660; 457754, 2457649; 457811, 2457710; 457865, 2457661; 458080, 2457809; 458248, 2457952; 458296, 2457792; 458241, 2457839; 458199, 2457830; 458122, 2457761; 458032, 2457682; 457883, 2457600; 457794, 2457610; 457536, 2457524; 457441, 2457569; 457364, 2457561; 457230, 2457492; 457168, 2457531.

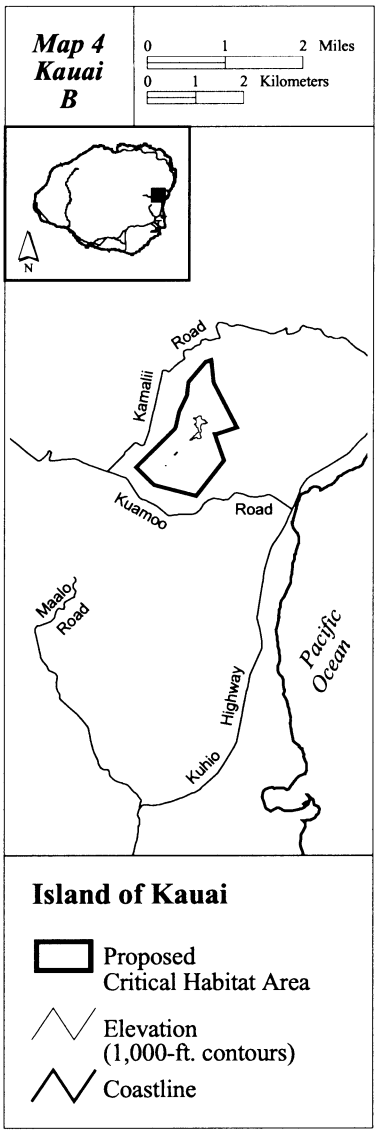
(*ii*) **Note:** Map 3 follows:



(*5*) Kauai B (271 ha; 669 ac):

(*i*) Unit consists of the following 16 boundary points: 462951, 2439791; 463026, 2440139; 463194, 2440476; 463197, 2440513; 463212, 2440748; 463578, 2441162; 463693, 2441201; 463739, 2440731; 464227, 2439803; 463785, 2439663; 463768, 2439658; 463960, 2439113; 463380, 2438382; 462504, 2438614; 462139, 2438979; 462951, 2439791.

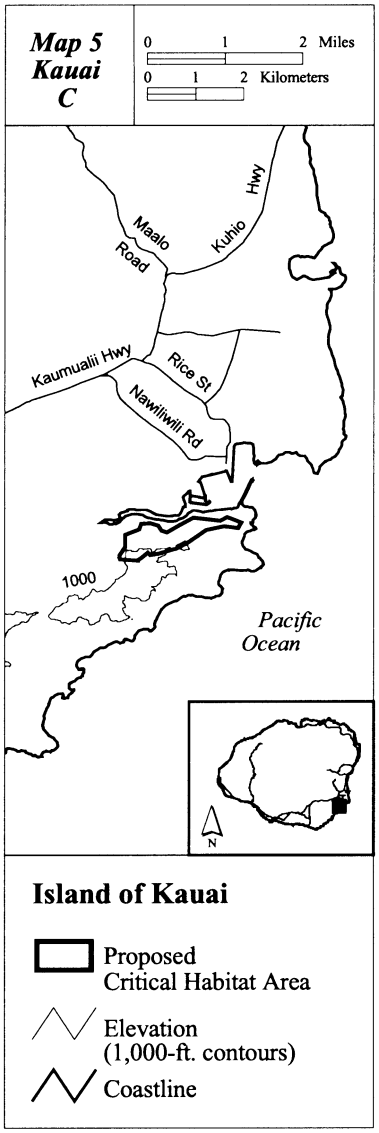
(*ii*) **Note:** Map 4 follows:



(*6*) Kauai C (97 ha; 239 ac):

(*i*) Unit consists of the following 32 boundary points: 461253, 2426125; 461390, 2426310; 461387, 2426567; 461678, 2426687; 461714, 2426795; 461907, 2426808; 462068, 2426762; 462130, 2426658; 462247, 2426612; 462487, 2426760; 462793, 2426916; 463349, 2426860; 463493, 2426936; 463781, 2426818; 463743, 2426750; 463719, 2426707; 463425, 2426746; 463363, 2426733; 463062, 2426671; 462693, 2426409; 462532, 2426329; 462422, 2426274; 462417, 2426272; 462234, 2426225; 462055, 2426178; 461911, 2426141; 461862, 2426197; 461719, 2426089; 461655, 2426041; 461649, 2426036; 461289, 2426053; 461253, 2426125.

(*ii*) **Note:** Map 5 follows:



(*7*) Kauai D1 (14 ha; 35 ac):

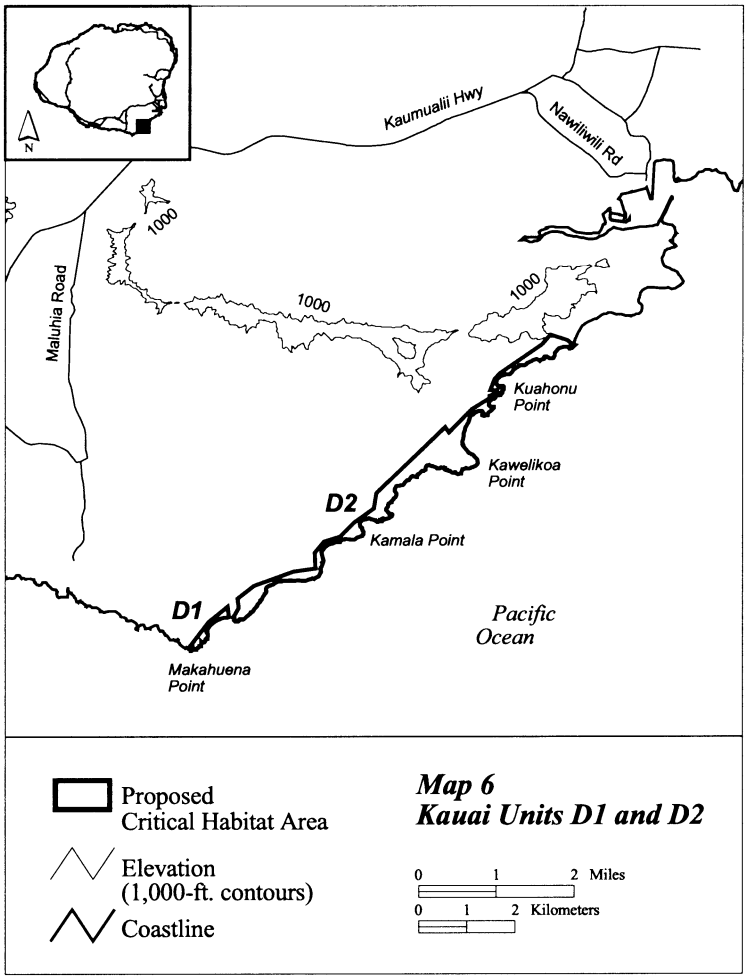
(*i*) Unit consists of the following 5 boundary points and the intermediate coastline: 454015, 2418349; 454018, 2418363; 454442, 2418909; 454833, 2419220; 454863, 2419007.

(*ii*) **Note:** *See* Map 6.

(*8*) Kauai D2 (240 ha; 594 ac):

(*i*) Unit consists of the following 30 boundary points and the intermediate coastline: 455383, 2419661; 456197, 2419949; 456652, 2420011; 456632, 2420344; 456832, 2420571; 457154, 2420676; 457451, 2420968; 457851, 2421259; 457907, 2421577; 458908, 2422538; 459329, 2422943; 459406, 2422835; 459880, 2423311; 460246, 2423542; 460249, 2423591; 460406, 2423648; 460400, 2423702; 460256, 2423702; 460348, 2423941; 460461, 2424061; 461318, 2424658; 461502, 2424866; 461855, 2424745; 461990, 2424632; 454952, 2418994; 455018, 2419106; 455066, 2419201; 455056, 2419302; 455037, 2419384; 455383, 2419661.

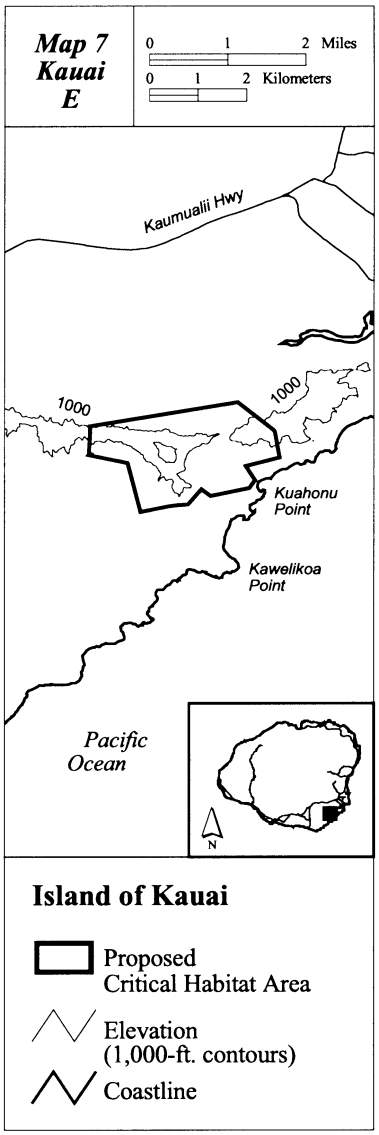
(*ii*) **Note:** Map 6 follows:


N
Kaumualii Hwy
Nawiliwili Rd
Maluhia Road
1000
1000
1000
Kuahonu Point
Kawelikoa Point
D2
Kamala Point
D1
Makahuena Point
Pacific Ocean
Proposed Critical Habitat Area
Elevation (1,000-ft. contours)
Coastline
Map 6
Kauai Units D1 and D2
0 1 2 Miles
0 1 2 Kilometers

(*9*) Kauai E (563 ha; 1,390 ac):

(*i*) Unit consists of the following 21 boundary points: 456926, 2424980; 456931, 2425122; 459982, 2425617; 460718, 2425043; 460747, 2425021; 460838, 2424471; 460139, 2424297; 460339, 2424005; 460222, 2423839; 459424, 2423673; 459236, 2423816; 458949, 2423502; 458737, 2423478; 458542, 2423456; 458541, 2423457; 457976, 2423340; 457712, 2424357; 456908, 2424519; 456913, 2424541; 456911, 2424542; 456926, 2424980.

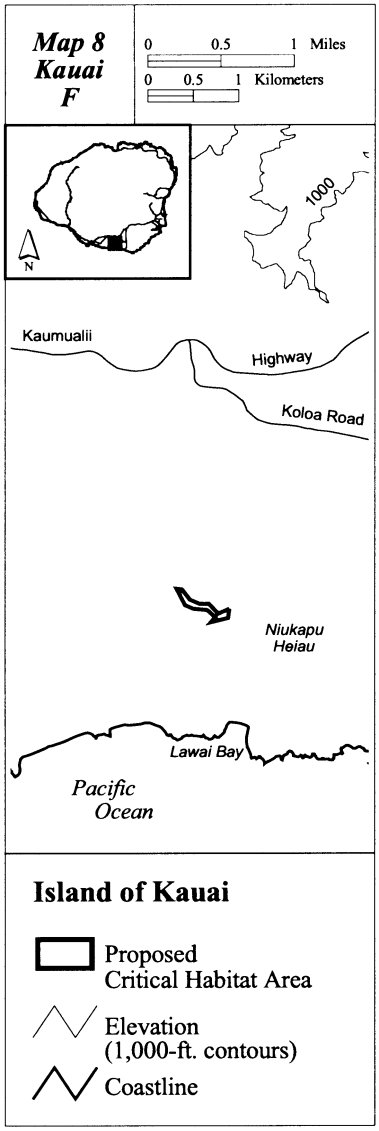
(*ii*) **Note:** Map 7 follows:



(*10*) Kauai F (5 ha; 12 ac):

(*i*) Unit consists of the following 14 boundary points: 447961, 2421793; 447951, 2421694; 447757, 2421647; 447804, 2421699; 447721, 2421781; 447569, 2421791; 447473, 2421836; 447380, 2422014; 447443, 2422008; 447527, 2421894; 447636, 2421848; 447736, 2421847; 447843, 2421739; 447961, 2421793.

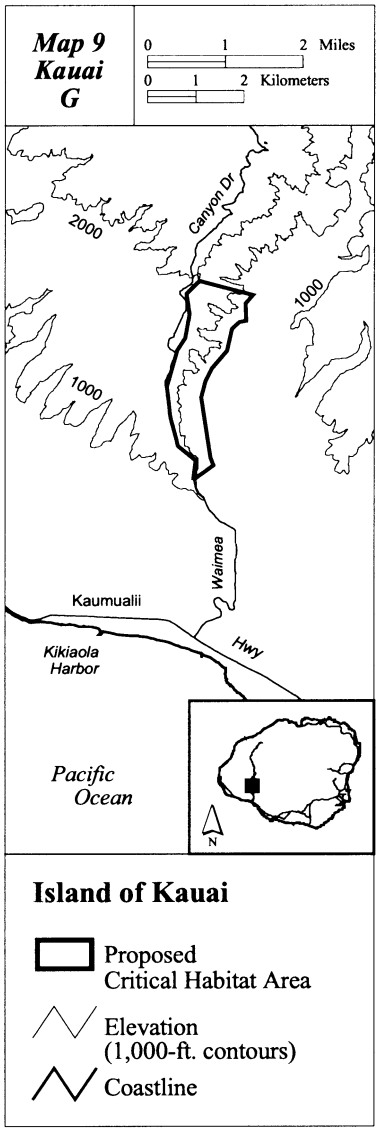
(*ii*) **Note:** Map 8 follows:



(*11*) Kauai G (317 ha; 784 ac):

(*i*) Unit consists of the following 28 boundary points: 430576, 2431555; 430622, 2431957; 430275, 2432253; 430256, 2432269; 430228, 2432381; 430120, 2432802; 430088, 2432926; 430087, 2432937; 430073, 2433073; 430051, 2433291; 430032, 2433480; 430239, 2434243; 430413, 2434499; 430495, 2434992; 430433, 2435411; 430703, 2435680; 431807, 2435389; 431657, 2435218; 431661, 2434861; 431524, 2434832; 431378, 2434688; 431271, 2434232; 430955, 2433867; 430825, 2433606; 430743, 2433270; 430926, 2432023; 430997, 2431853; 430576, 2431555.

(*ii*) **Note:** Map 9 follows:



(*12*) Kauai H1 (138 ha; 341 ac):

(*i*) Unit consists of the following 21 boundary points and the intermediate coastline: 422157, 2442895; 422253, 2442799; 422313, 2442829; 422340, 2442802; 422267, 2442675; 420764, 2441227; 420336, 2440626; 420237, 2440644; 420191, 2440681; 420140, 2440696; 420065, 2440682; 420011, 2440623; 420030, 2440550; 420059, 2440472; 420121, 2440503; 420131, 2440566; 420224, 2440562; 420256, 2440546; 420246, 2440519; 419159, 2439682; 422157, 2442895.

(*ii*) **Note:** *See* Map 10.

(*13*) Kauai H2 (107 ha; 265 ac):

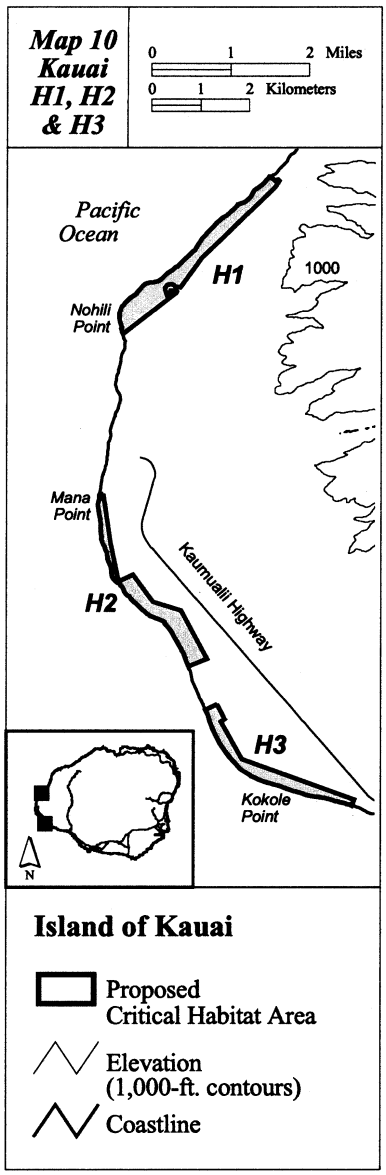
(*i*) Unit consists of the following 10 boundary points and the intermediate coastline: 418768, 2436406; 418924, 2435411; 419092, 2434621; 419386, 2434766; 419792, 2434204; 420366, 2434018; 420895, 2433034; 420508, 2432883; 418693, 2436403; 418768, 2436406.

(*ii*) **Note:** *See* Map 10.

(*14*) Kauai H3 (84 ha; 206 ac):

(*i*) Unit consists of the following 9 boundary points and the intermediate coastline: 421100, 2432099; 421251, 2431804; 421178, 2431753; 421599, 2430981; 423896, 2430158; 423847, 2430037; 423847, 2430037; 420858, 2431995; 421100, 2432099.

(*ii*) **Note:** Map 10 follows:



(*15*) Kauai I (8,237 ha; 20,355 ac):

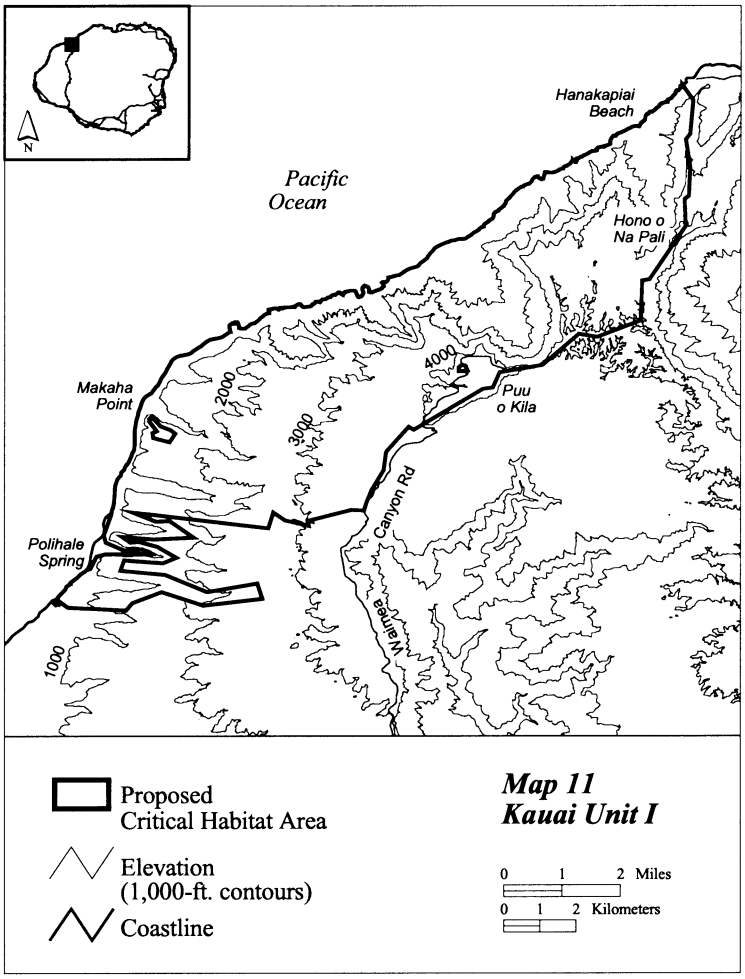
(*i*) Unit consists of the following 69 boundary points: 431369, 2447027; 431298, 2446522; 430955, 2445963; 430827, 2445619; 430759, 2445406; 430405, 2445422; 429208, 2445113; 429227, 2444972; 428580, 2445127; 428254, 2445343; 428120, 2444908; 424377, 2445349; 425013, 2445087; 425384, 2445106; 426057, 2444655; 424969, 2444599; 424087, 2444665; 424298, 2444527; 424541, 2444533; 425048, 2444395; 425576, 2444097; 425196, 2443945; 424131, 2444021; 424042, 2443733; 425270, 2443619; 426430, 2443155; 427818, 2443383; 427950, 2442970; 426322, 2442783; 425169, 2443141; 424357, 2442849; 424194, 2442643; 422571, 2442723; 422383, 2442876; 422340, 2442802; 422313, 2442829; 422253, 2442799; 422157, 2442895; 423103, 2443764; 423201, 2443796; 423371, 2444122; 423625, 2444198; 424851, 2444198; 424627, 2444336; 424140, 2444296; 423626, 2444520; 423573, 2444725; 423777, 2445276; 423805, 2445404; 439536, 2457157; 439833, 2456737; 439743, 2455809; 439623, 2455659; 439743, 2454910; 439713, 2454101; 439593, 2454011; 439623, 2453262; 438633, 2451794; 438423, 2451764; 438393, 2450655; 437193, 2450205; 436683, 2450295; 435693, 2449427; 434493, 2449217; 434313, 2448797; 434043, 2448767; 432136, 2447629; 432001, 2447726; 431369, 2447027.

(*ii*) Excluding two areas:

(*A*) Bounded by the following 11 points (22 ha; 55 ac): 424797, 2447905; 424876, 2447985; 424979, 2447908; 425131, 2447737; 425411, 2447634; 425540, 2447530; 425388, 2447289; 424938, 2447423; 424917, 2447544; 425029, 2447600; 424797, 2447905.

(*B*) Bounded by the following 11 points (3 ha, 8 ac): 433368, 2449292; 433367, 2449352; 433448, 2449426; 433546, 2449412; 433567, 2449398; 433589, 2449323; 433612, 2449262; 433588, 2449244; 433567, 2449260; 433369, 2449255; 433368, 2449292.

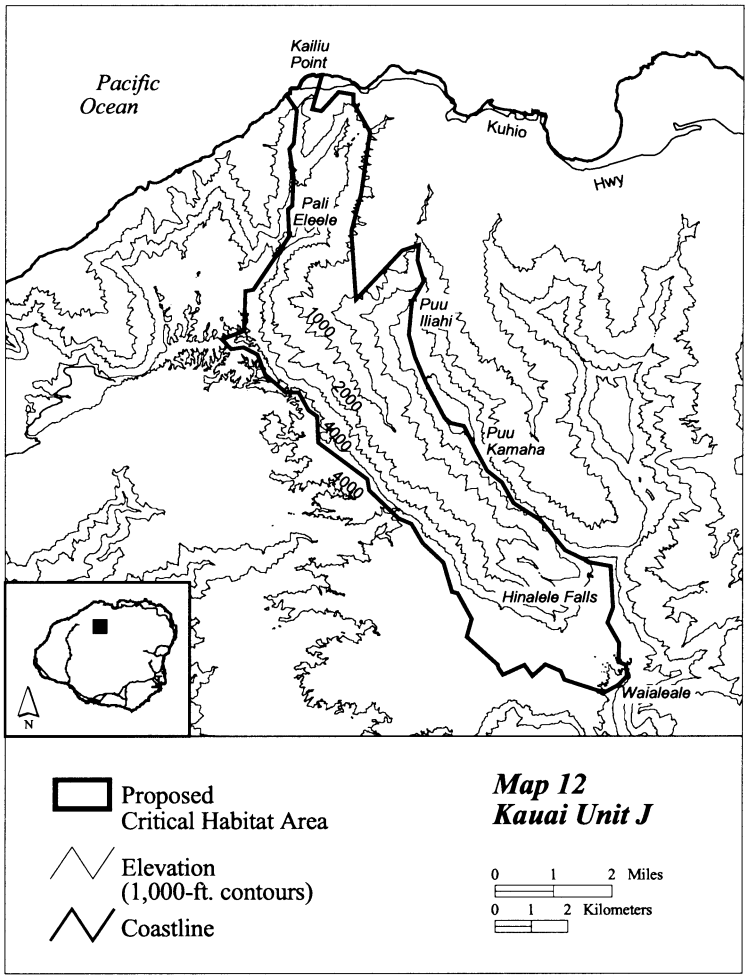
(*iii*) **Note:** Map 11 follows:



(*16*) Kauai J (5,536 ha; 13,681 ac):

(*i*) Unit consists of the following 78 boundary points: 445389, 2441352; 445395, 2441421; 444534, 2442190; 444669, 2442684; 444273, 2443397; 444123, 2443427; 443883, 2444237; 443313, 2444777; 443013, 2445316; 442653, 2445466; 441843, 2446246; 441783, 2446546; 440433, 2447566; 440403, 2448286; 440163, 2448466; 439893, 2448945; 439533, 2448945; 438963, 2449455; 438753, 2449995; 438363, 2450205; 438033, 2450145; 437779, 2450425; 438393, 2450655; 438423, 2451764; 438633, 2451794; 439623, 2453262; 439593, 2454011; 439713, 2454101; 439743, 2454910; 439623, 2455659; 439743, 2455809; 439833, 2456737; 439536, 2457157; 440525, 2457717; 440256, 2456761; 440510, 2456709; 440974, 2457238; 441381, 2457162; 441384, 2456934; 441835, 2456137; 441845, 2456118; 441608, 2454449; 441325, 2453390; 441466, 2451514; 442740, 2452877; 443187, 2453024; 443153, 2452602; 443329, 2452030; 443002, 2451449; 442929, 2450549; 443097, 2449921; 443398, 2449211; 443914, 2448260; 444078, 2448101; 444452, 2448023; 444805, 2447309; 445085, 2446779; 445494, 2446452; 445812, 2445884; 446570, 2445402; 447238, 2444584; 447943, 2444240; 448503, 2444146; 448563, 2443006; 448413, 2442586; 448725, 2442030; 448713, 2441507; 448923, 2441417; 448953, 2441117; 448694, 2440858; 448333, 2440649; 447224, 2441008; 447126, 2441246; 446698, 2441431; 446351, 2441108; 446122, 2441415; 445539, 2441150; 445389, 2441352.

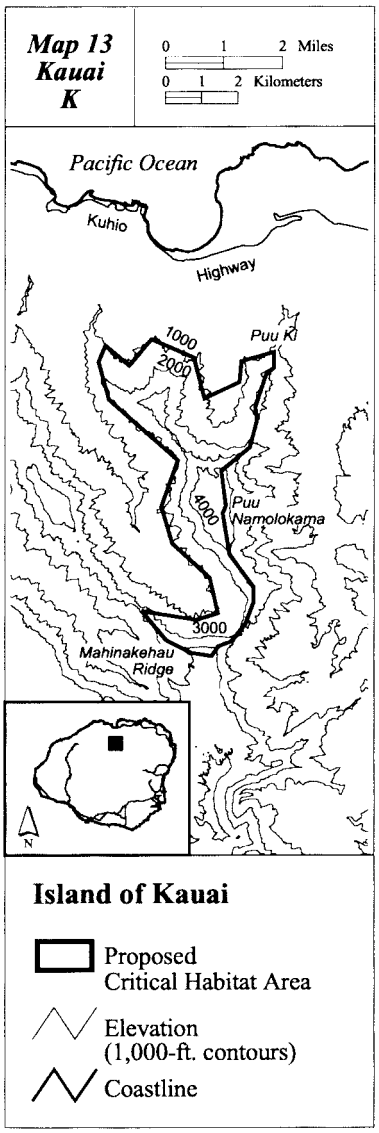
(*ii*) **Note:** Map 12 follows:


Kailiu Point
Pacific Ocean
Kuhio
Hwy
Pali Eleele
Puu Iliahi
1000
2000
3000
4000
Puu Kamaha
Hinalele Falls
Waialeale
N
Proposed Critical Habitat Area
Elevation (1,000-ft. contours)
Coastline
Map 12
Kauai Unit J
0 1 2 Miles
0 1 2 Kilometers

(*17*) Kauai K (1,752 ha; 4,330 ac):

(*i*) Unit consists of the following 36 boundary points: 446572, 2445400; 446733, 2445375; 448070, 2445147; 448658, 2445334; 448450, 2446319; 447413, 2447271; 447101, 2448274; 447568, 2449571; 445666, 2451248; 445376, 2452300; 445558, 2452748; 446226, 2452194; 446834, 2452923; 448013, 2452416; 448295, 2451280; 449257, 2451734; 449308, 2452305; 450213, 2452567; 450213, 2452118; 450003, 2451969; 449703, 2451040; 449733, 2450650; 449553, 2449931; 448773, 2449272; 448893, 2448312; 448803, 2448103; 448983, 2446963; 449643, 2446064; 449643, 2445644; 449433, 2445045; 449043, 2444565; 448683, 2444415; 448503, 2444146; 447943, 2444240; 447238, 2444584; 446572, 2445400.

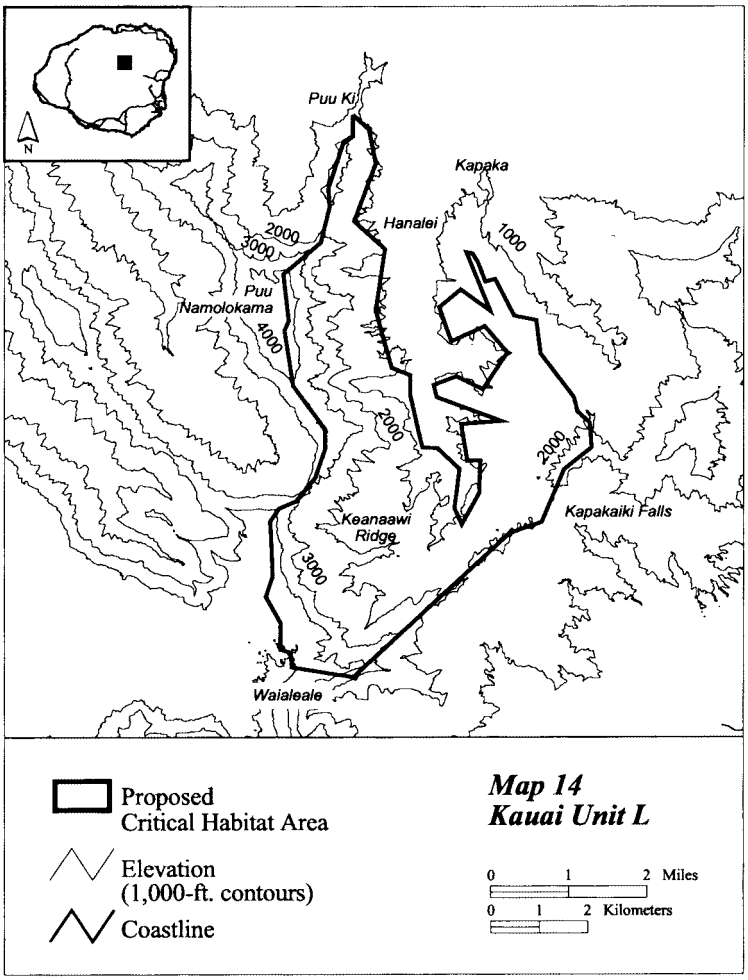
(*ii*) **Note:** Map 13 follows:



(*18*) Kauai L (3,407 ha; 8,418 ac):

(*i*) Unit consists of the following 67 boundary points: 450213, 2452567; 450542, 2452265; 450684, 2451568; 450241, 2450373; 450869, 2449790; 450678, 2448523; 451007, 2447330; 451389, 2447179; 451389, 2446751; 451639, 2445679; 451955, 2445659; 452403, 2445232; 452304, 2444416; 452455, 2444074; 452811, 2444732; 452837, 2445409; 452567, 2445396; 452446, 2446166; 453271, 2446225; 451942, 2446718; 451876, 2446968; 452347, 2447150; 452890, 2446882; 453396, 2447638; 452923, 2448184; 452240, 2447869; 451990, 2448589; 452433, 2448946; 453048, 2448507; 452547, 2449722; 452673, 2449704; 452793, 2449510; 452943, 2449120; 453147, 2449166; 453543, 2448400; 453993, 2448310; 454083, 2447621; 454773, 2446721; 454844, 2446408; 455103, 2446182; 455133, 2445672; 454563, 2445223; 454106, 2444132; 453446, 2443901; 450222, 2440919; 448953, 2441117; 448923, 2441417; 448713, 2441507; 448725, 2442030; 448413, 2442586; 448563, 2443006; 448503, 2444146; 448683, 2444415; 449043, 2444565; 449433, 2445045; 449643, 2445644; 449643, 2446064; 448983, 2446963; 448803, 2448103; 448893, 2448312; 448773, 2449272; 449553, 2449931; 449733, 2450650; 449703, 2451040; 450003, 2451969; 450213, 2452118; 450213, 2452567.

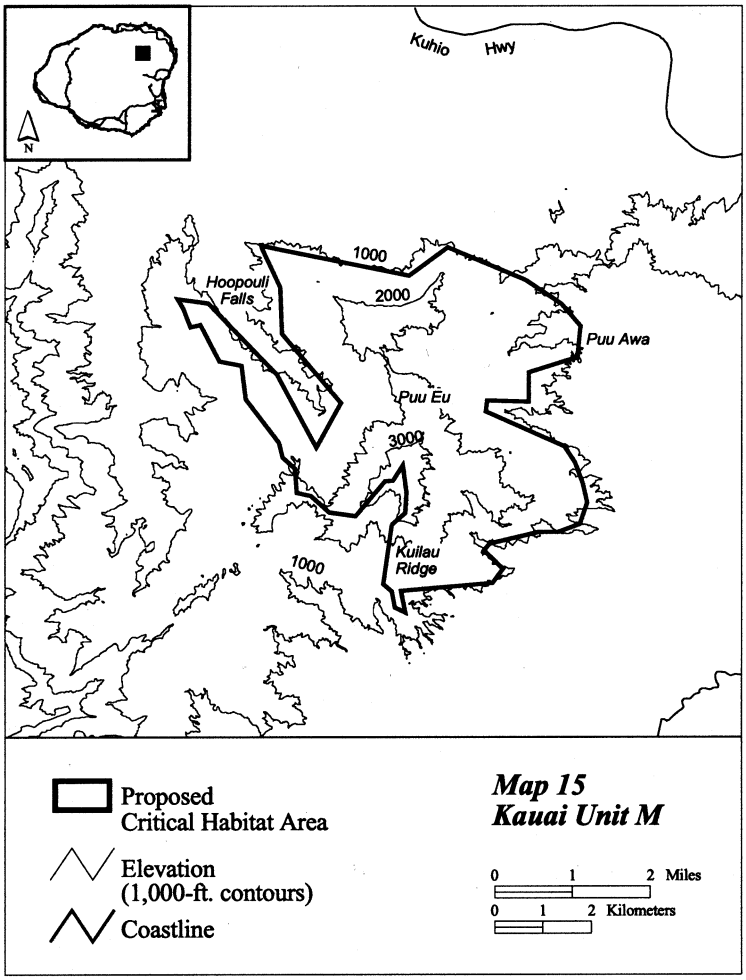
(*ii*) **Note:** Map 14 follows:



(*19*) Kauai M (3,302 ha; 8,160 ac):

(*i*) Unit consists of the following 59 boundary points: 457113, 2445012; 457383, 2445252; 457413, 2445671; 457330, 2446252; 457139, 2445925; 456963, 2445911; 456358, 2445200; 455806, 2445269; 455433, 2445612; 455133, 2445672; 455103, 2446182; 454844, 2446408; 454773, 2446721; 454083, 2447621; 453993, 2448310; 453543, 2448400; 453147, 2449166; 452943, 2449120; 452793, 2449510; 452673, 2449704; 453308, 2449613; 454728, 2448128; 455547, 2446621; 456055, 2447542; 454829, 2448978; 454794, 2449939; 454414, 2450755; 454419, 2450755; 454397, 2450801; 454803, 2450718; 457459, 2450181; 458261, 2450765; 459840, 2450099; 459883, 2450071; 460618, 2449594; 461011, 2449133; 460939, 2448483; 460823, 2448447; 459945, 2448170; 459945, 2447565; 459070, 2447590; 459050, 2447366; 460682, 2446642; 460893, 2446313; 461052, 2445865; 461142, 2445474; 460992, 2445024; 460551, 2444860; 460143, 2444860; 459129, 2444624; 459015, 2444484; 459403, 2444098; 459186, 2443804; 457304, 2443646; 457391, 2443201; 457173, 2443303; 457113, 2443633; 456930, 2443789; 457113, 2445012.

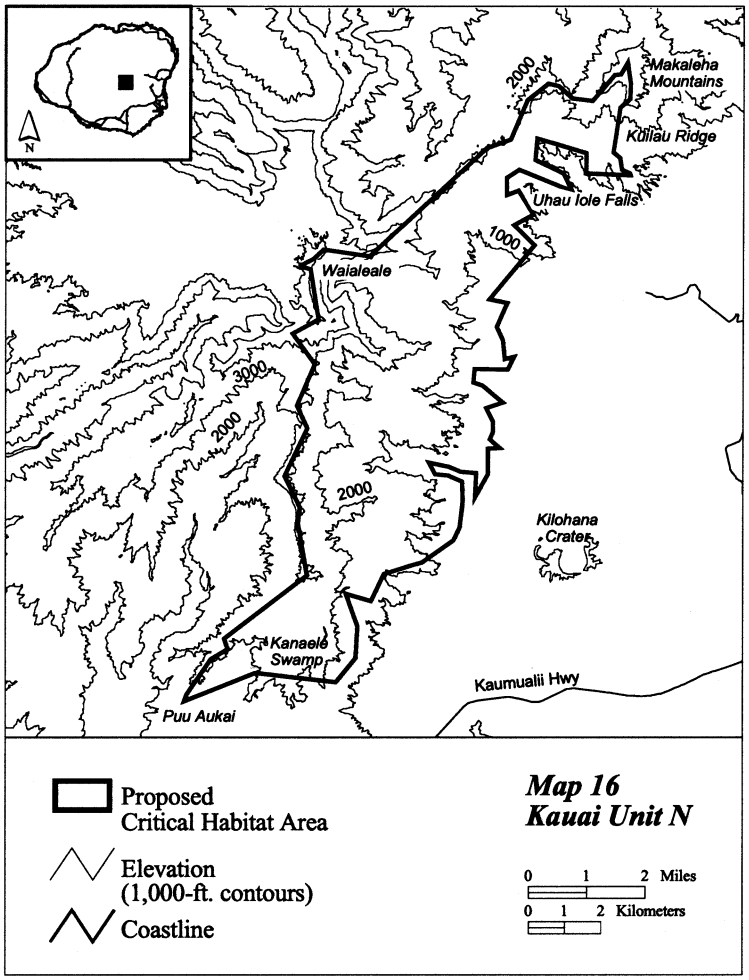
(*ii*) **Note:** Map 15 follows:



(*20*) Kauai N (6,599 ha; 16,307 ac):

(*i*) Unit consists of the following 93 boundary points: 448304, 2440658; 448694, 2440858; 448953, 2441117; 450222, 2440919; 453446, 2443901; 454106, 2444132; 454563, 2445223; 455133, 2445672; 455433, 2445612; 455806, 2445269; 456358, 2445200; 456963, 2445911; 457139, 2445925; 457330, 2446252; 457413, 2445671; 457383, 2445252; 457113, 2445012; 456930, 2443789; 457113, 2443633; 457173, 2443303; 457391, 2443201; 457391, 2443203; 457413, 2443151; 456187, 2443214; 456187, 2443771; 454827, 2444169; 454776, 2443575; 455563, 2443214; 455793, 2442722; 454346, 2443301; 454007, 2443091; 454007, 2442616; 454324, 2442737; 454726, 2442067; 454213, 2441785; 454761, 2441232; 453538, 2439738; 454020, 2439628; 453739, 2438982; 453910, 2438601; 453949, 2438081; 454213, 2438153; 454040, 2437796; 453121, 2437802; 453094, 2437443; 453351, 2437357; 453904, 2436874; 453443, 2436719; 453634, 2436351; 453634, 2436068; 453541, 2435864; 453817, 2435628; 453495, 2435607; 453498, 2434903; 453140, 2434258; 453166, 2434936; 452758, 2434969; 452436, 2435107; 451870, 2435213; 452047, 2434897; 452403, 2434857; 452791, 2434686; 452804, 2434147; 452722, 2433415; 452542, 2433070; 451682, 2432466; 451433, 2432389; 450631, 2432141; 450283, 2431389; 449586, 2431600; 449899, 2430693; 449848, 2429818; 449308, 2429151; 448109, 2429291; 447532, 2429359; 447101, 2429410; 445132, 2428625; 445203, 2428817; 445869, 2429806; 446327, 2430072; 446237, 2430356; 448515, 2432105; 448503, 2432172; 448267, 2433542; 448319, 2433974; 447886, 2434845; 448515, 2436159; 448226, 2436801; 448728, 2437943; 448103, 2438785; 448819, 2439175; 448608, 2440560; 448304, 2440658.

(*ii*) **Note:** Map 16 follows:



(*21*) Kauai O (9,462 ha; 23,382 ac):

(*i*) Unit consists of the following 112 boundary points: 431732, 2447115; 432759, 2446609; 432659, 2446240; 432948, 2446150; 433397, 2446440; 433257, 2446958; 433706, 2447138; 433746, 2447766; 433527, 2447856; 432918, 2447407; 432609, 2447647; 432320, 2447497; 432136, 2447629; 434043, 2448767; 434313, 2448797; 434493, 2449217; 435693, 2449427; 436683, 2450295; 437193, 2450205; 437779, 2450425; 438033, 2450145; 438363, 2450205; 438753, 2449995; 438963, 2449455; 439533, 2448945; 439893, 2448945; 440163, 2448466; 440403, 2448286; 440433, 2447566; 441783, 2446546; 441843, 2446246; 442653, 2445466; 443013, 2445316; 443313, 2444777; 443883, 2444237; 444123, 2443427; 444273, 2443397; 444669, 2442684; 444534, 2442190; 445395, 2441421; 445394, 2441346; 445365, 2441385; 444417, 2440969; 444062, 2441230; 443700, 2441108; 442976, 2441356; 442451, 2441191; 441892, 2441565; 441645, 2441557; 440236, 2440690; 440053, 2440443; 439019, 2440382; 438851, 2440177; 438403, 2440161; 438371, 2440418; 438028, 2440409; 437996, 2440301; 437460, 2439694; 437359, 2439476; 437201, 2439467; 437026, 2439616; 436101, 2439350; 435269, 2440031; 435665, 2440354; 436455, 2440433; 436408, 2440716; 436547, 2440821; 436843, 2440742; 436494, 2441058; 436158, 2440696; 435346, 2440541; 435078, 2440832; 434002, 2440921; 434077, 2442149; 433931, 2442137; 433683, 2441844; 433347, 2441698; 433378, 2441400; 433086, 2441406; 432762, 2442447; 432421, 2443974; 432044, 2444251; 431123, 2443581; 430966, 2442944; 431612, 2442073; 429503, 2441778; 429077, 2442068; 428753, 2443380; 428890, 2444606; 428578, 2445127; 429227, 2444972; 429378, 2443867; 430155, 2443777; 430205, 2444275; 430564, 2444465; 431153, 2445133; 431083, 2445402; 430991, 2445457; 430977, 2445767; 431060, 2445963; 431278, 2446215; 431483, 2446536; 431491, 2446759; 431622, 2446390; 431522, 2446121; 431622, 2445871; 431312, 2445542; 431632, 2445303; 432001, 2445941; 431961, 2446460; 431624, 2446959; 431732, 2447115.

(*ii*) Excluding the area bounded by the following 12 points (109 ha; 270 ac): 434647, 2444577; 435769, 2444203; 435794, 2444068; 435447, 2443848; 435263, 2443927; 434786, 2443298; 434344, 2443435; 434216, 2443741; 434411, 2443957; 434416, 2444196; 434314, 2444351; 434647, 2444577.

(*iii*) **Note:** Map 17 follows:

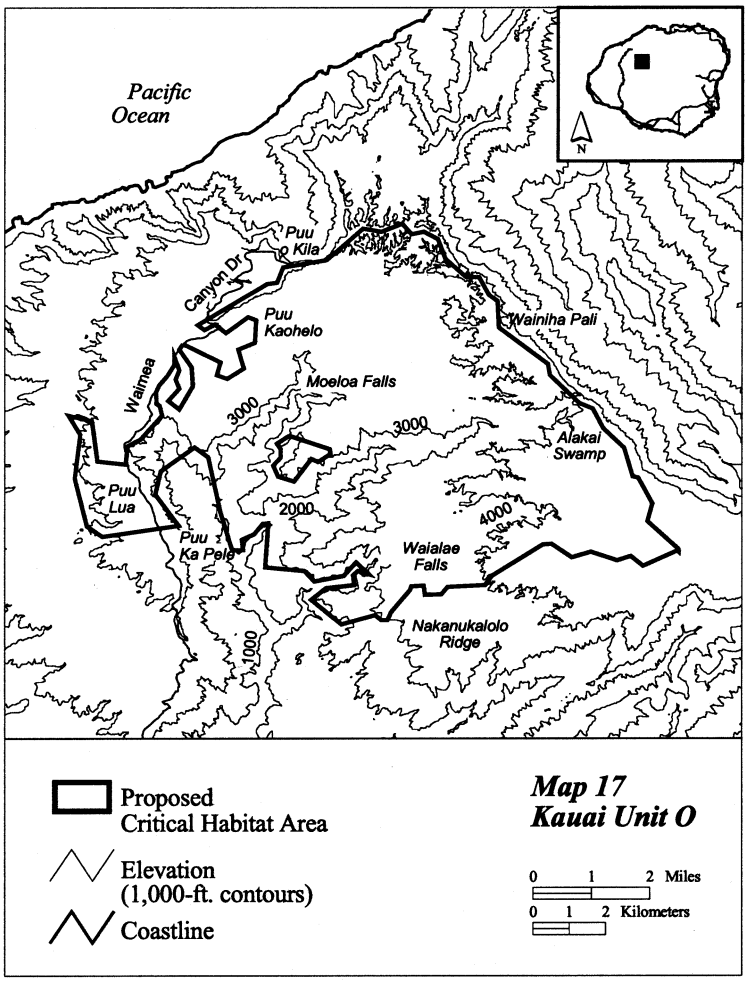


TABLE (A)(1)(I)(A).—PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI

Unit name	Species occupied	Species unoccupied
Kauai A	*Ischaemum byrone*	*Centaurium sebaeoides*
Kauai B	*Hibiscus clayi, Munroidendron racemosum*	
Kauai C	*Brighamia insignis, Lobelia niihauensis*	
Kauai D		*Sesbania tomentosa*
Kauai E	*Brighamia insignis, Delissea rhytidosperma, Isodendrion longifolium, Lipochaeta micrantha, Munroidendron racemosum, Peucedanum sandwicense, Pteralyxia kauaiensis, Schiedea nuttallii.*	*Melicope haupuensis, Myrsine linearifolia*
Kauai F	*Schiedea spergulina* var. *leiopoda*	
Kauai G	*Lipochaeta waimeaensis, Spermolepis hawaiiensis*	*Schiedea spergulina* var. *spergulina*
Kauai H	*Panicum niihauense, Sesbania tomentosa*	
Kauai I	*Adenophorus periens, Alectryon macrococcus, Alsinidendron lychnoides, Bonamia menziesii, Brighamia insignis, Centaurium sebaeoides, Chamaesyce halemanui, Cyperus trachysanthos, Delissea rhytidosperma, Delissea rivularis, Delissea undulata, Diellia pallida, Dubautia latifolia, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Hedyotis cookiana, Hedyotis st.-johnii, Hibiscadelphus woodii, Hibiscus waimeae* ssp. *hannerae, Isodendrion laurifolium, Isodendrion longifolium, Kokia kauaiensis, Lipochaeta fauriei, Lobelia, niihauensis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia,.*	*Ctenitis squamigera, Cyanea recta, Cyanea remyi, Cyrtandra limahuliensis, Diplazium molokaiense, Hesperomannia lydgatei, Ischaemum byrone, Labordia lydgatei, Panicum niihauense, Platanthera holochila, Sesbania tomentosa*

TABLE (A)(1)(I)(A).—PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR KAUAI—Continued

Unit name	Species occupied	Species unoccupied
Kauai J	*Adenophorus periens, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Hesperomannia lydgatei, Hibiscus waimeae* ssp. *hannerae, Isodendrion longifolium, Labordia lydgatei, Lobelia niihauensis, Myrsine linearifolia, Peucedanum sandwicense, Plantago princeps, Schiedea membranacea*.	*Alsinidendron lychnoides, Bonamia menziesii, Brighamia insignis, Delissea rivularis, Delissea undulata, Euphorbia haeleeleana, Exocarpos luteolus, Munroidendron racemosum, Phyllostegia wawrana, Platanthera holochila, Remya montgomeryi, Schiedea kauaiensis*
Kauai K	*Adenophorus periens, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Hesperomannia lydgatei, Isodendrion longifolium, Labordia lydgatei, Myrsine linearifolia, Plantago princeps*.	*Alsinidendron lychnoides, Bonamia menziesii, Schiedea membranacea*
Kauai L	*Plantago princeps*	*Adenophorus periens, Bonamia menziesii, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Hesperomannia lydgatei, Isodendrion longifolium, Labordia lydgatei, Lysimachia filifolia, Myrsine linearifolia, Platanthera holochila*
Kauai M	*Adenophorus periens, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyrtandra cyaneoides, Cyrtandra limahuliensis, Labordia lydgatei, Phyllostegia wawrana*.	*Bonamia menziesii*
Kauai N	*Adenophorus periens, Bonamia menziesii, Cyanea asarifolia, Cyanea recta, Cyanea remyi, Cyrtandra limahuliensis, Dubautia pauciflorula, Exocarpos luteolus, Isodendrion longifolium, Labordia lydgatei, Labordia tinifolia* var. *wahiawaensis, Lysimachia filifolia, Myrsine linearifolia, Plantago princeps, Viola helenae, Viola kauaiensis* var. *wahiawaensis*.	*Cyanea undulata, Cyrtandra cyaneoides, Delissea rivularis, Hesperomannia lydgatei, Phelgmariurus nutans, Phyllostegia wawrana, Platanthera holochila*
Kauai O	*Alectryon macrococcus, Alsinidendron lychnoides, Alsinidendron viscosum, Bonamia menziesii, Chamaesyce halemanui, Diellia erecta, Diellia pallida, Dubautia latifolia, Euphorbia haeleeleana, Exocarpos luteolus, Flueggea neowawraea, Gouania meyenii, Isodendrion laurifolium, Kokia kauaiensis, Lipochaeta fauriei, Lipochaeta micrantha, Lobelia niihauensis, Melicope haupuensis, Melicope knudsenii, Melicope pallida, Munroidendron racemosum, Myrsine linearifolia, Nothocestrum peltatum, Peucedanum sandwicense, Phyllostegia knudsenii, Phyllostegia waimeae, Phyllostegia wawrana, Platanthera holochila, Poa sandvicensis, Poa siphonoglossa, Pteralyxia*.	*Adenophorus periens, Cyanea recta, Delissea rivularis, Diplazium molokaiensis, Isodendrion longifolium, Mariscus pennatiformis, Plantago princeps, Poa mannii, Schiedea kauense, Stenogyne campanulata*

(B) *Niihau*. Critical habitat units with multiple species are described below. Coordinates are in UTM Zone4 with units in meters using North American Datum of 1983 (NAD83).

(*1*) Niihau A (282 ha; 697 ac):

(*i*) Unit consists of the following 35 boundary points: 384729, 2427553; 384573, 2427962; 384698, 2428162; 384929, 2428330; 385085, 2428326; 385229, 2428448; 385276, 2428623; 385229, 2428846; 385014, 2428881; 384889, 2428830; 384737, 2428958; 384796, 2429103; 384952, 2429173; 385026, 2429146; 385136, 2429275; 385284, 2429244; 385335, 2429178; 385710, 2429377; 385795, 2429261; 385710, 2429120; 386002, 2428917; 386022, 2428707; 386780, 2428559; 386959, 2428247; 387475, 2427909; 387322, 2427686; 386416, 2427981; 386362, 2427840; 386256, 2427750; 386010, 2427731; 386042, 2427438; 385897, 2427457; 385678, 2427367; 385116, 2427542; 384729, 2427553.

(*ii*) **Note:** Map 18 follows:

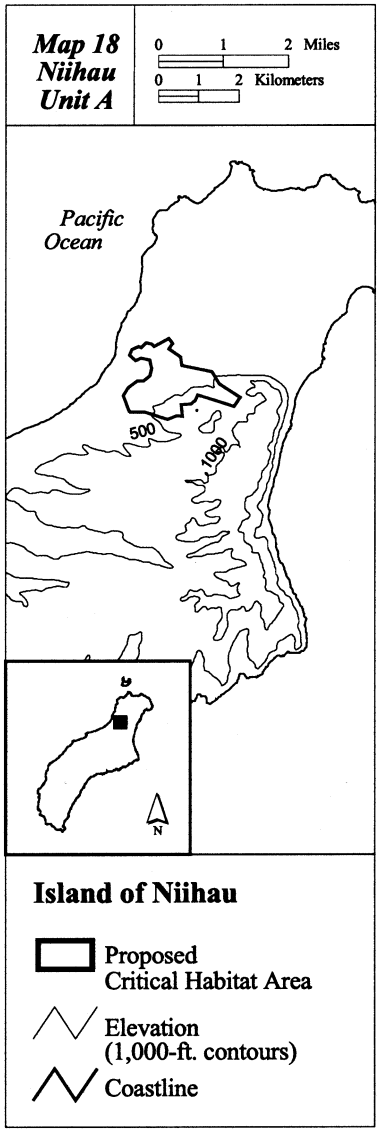


TABLE (A)(1)(I)(B). PROTECTED SPECIES WITHIN EACH CRITICAL HABITAT UNIT FOR NIIHAU

Unit name	Species occupied	Species unoccupied
Niihau A	*Brighamia insignis, Cyperus trachysanthos*.	

(ii) *Hawaiian plants—Constituent elements.*

(A) *Flowering plants.*

Family Apiaceae: *Peucedanum sandwicense* (makou)

Kauai E, I, J, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Peucedanum sandwicense* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Cliff habitats in mixed shrub coastal dry cliff communities or diverse mesic forest and containing one or more of the following associated native plant species: *Acacia koa, Artemisia australis, Brighamia insignis, Bidens* spp., *Carex meyenii, Chamaesyce celastroides, Diospyros* spp., *Dodonaea viscosa, Eragrostis variabilis, Hibiscus kokio, Lobelia niihauensis, Metrosideros polymorpha, Panicum lineale, Psydrax odoratum, Psychotria* spp., or *Wilkesia* spp.; and

(2) Elevations between 0 and 1,232 m (0 and 4,041 ft).

Family Apiaceae: *Spermolepis hawaiiensis* (NCN)

Kauai G and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Spermolepis hawaiiensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) *Metrosideros polymorpha* forests or *Dodonaea viscosa* lowland dry shrubland containing one or more of the following associated plant species: *Bidens sandvicensis, Doryopteris* spp., *Eragrostis variabilis, Erythrina sandwicensis, Lipochaeta* spp., *Schiedea spergulina*, or *Sida fallax*; and

(2) Elevations of about 56 and 725 m (184 and 2,377 ft).

Family Apocynaceae: *Pteralyxia kauaiensis* (kaulu)

Kauai E, I and O, identified in the legal descriptions in (a)(1)(i)(A),

constitute critical habitat for *Pteralyxia kauaiensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Diverse mesic or *Diospyros sandwicensis* mixed mesic forests with *Pisonia* spp. containing one or more of the following associated plant species: *Acacia koa, Alectryon macrococcus, Alphitonia ponderosa, Antidesma platyphyllum* var. *hillebrandii, Bobea brevipes, Carex* spp., *Charpentiera elliptica, Claoxylon sandwicense, Cyanea* spp., *Dianella sandwicensis, Diospyros* spp., *Dodonaea viscosa, Diplazium sandwichianum, Euphorbia haeleeleana, Freycinetia arborea, Gahnia* spp., *Gardenia remyi, Hedyotis terminalis, Hibiscus kokio, Kokia kauaiensis, Metrosideros polymorpha, Myrsine lanaiensis, Neraudia* spp., *Nesoluma polynesicum, Nestegis sandwicensis, Peperomia* spp., *Pleomele aurea, Pipturus* spp., *Pisonia sandwicensis, Poa sandvicensis, Pouteria sandvicensis, Psychotria* spp., *Psydrax odoratum, Pritchardia* spp., *Rauvolfia sandwicensis, Santalum freycinetianum* var. *pyrularium, Schiedea* spp., *Styphelia tameiameiae, Syzygium sandwicensis, Tetraplasandra* spp., *Xylosma hawaiiense*, or *Zanthoxylum dipetalum*; and

(2) Elevations between 915 and 1,007 m (3,002 and 3,305 ft).

Family Araliaceae: *Munroidendron racemosum* (NCN)

Kauai B, E, I, and O identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Munroidendron racemosum* on Kauai. Within these units the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Steep exposed cliffs or ridge slopes in coastal or lowland mesic forest and containing one or more of the following associated plant species: *Bobea brevipes, Brighamia insignis, Canavalia napaliensis, Diospyros sandwicensis, Diospyros hillebrandii, Nestegis sandwicensis, Pisonia sandwicensis, Pisonia umbellifera, Pleomele aurea, Pouteria sandvicensis, Psychotria* spp., *Psydrax odoratum, Rauvolfia sandwicensis, Schiedea* spp., *Sida fallax*, or *Tetraplasandra* spp; and

(2) Elevations between 6 and 979 m (19 and 3,213 ft).

Family Asteraceae: *Dubautia latifolia* (naenae)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Dubautia latifolia* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Gentle or steep slopes on well drained soil in semi-open or closed, diverse montane mesic forest dominated by *Acacia koa* and/or *Metrosideros polymorpha* and containing one or more of the following native plant species: *Alphitonia ponderosa, Antidesma* spp., *Bobea* spp., *Claoxylon sandwicense, Coprosma waimeae, Cyrtandra* spp., *Dicranopteris linearis, Diplazium sandwichianum, Dodonaea viscosa, Elaeocarpus bifidus, Hedyotis terminalis, Ilex anomala, Melicope anisata, Nestegis sandwicensis, Pleomele* spp., *Pouteria sandvicensis, Psychotria mariniana, Scaevola* spp., or *Xylosma* spp.; and

(2) Elevations between 544 and 1,277 m (1,786 and 4,189 ft).

Family Asteraceae: *Dubautia pauciflorula* (naenae)

Kauai N, identified in the legal description in (a)(1)(i)(A), description above, constitutes critical habitat for *Dubautia pauciflorula* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are habitat components that provide:

(1) *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest within stream drainages containing one or more of the following associated native plant species: *Antidesma platyphyllum, Broussaisia arguta, Cheirodendron* spp., *Dubautia laxa, Embelia pacifica, Hesperomannia lydgatei, Labordia waialealae, Melicope* spp., *Nothoperanema rubiginosa, Pritchardia* spp., *Psychotria* spp., *Sadleria* spp., *Scaevola mollis, Syzygium sandwicensis*, or *Tetraplasandra* spp.; and

(2) Elevations between 564 and 1,093 m (1,849 and 3,587 ft).

Family Asteraceae: *Hesperomannia lydgatei* (NCN)

Kauai I, J, K, L, and N, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Hesperomannia lydgatei* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Stream banks and forested slopes in rich brown soil and silty clay in *Metrosideros polymorpha* or *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest and containing one or more of the following associated native plant species: *Adenophorus periens, Antidesma* spp., *Broussaisia arguta, Cheirodendron* spp., *Cyanea* spp., *Dubautia knudsenii, Dubautia laxa, Dubautia pauciflorula, Dubautia raillardioides, Elaphoglossum* spp., *Freycinetia arborea, Hedyotis terminalis, Labordia lydgatei, Machaerina angustifolia, Peperomia spp., Pritchardia* spp., *Psychotria hexandra*, or *Syzygium sandwicensis*; and

(2) Elevations between 405 and 1,570 m (1,329 and 5,151 ft).

Family Asteraceae: *Lipochaeta fauriei* (nehe)

Kauai I, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Lipochaeta fauriei* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Moderate shade to full sun on the sides of steep gulches in diverse lowland mesic forests and containing one or more of the following native species: *Acacia koa*, *Carex meyenii*, *Carex wahuensis*, *Dicranopteris linearis*, *Diospyros* spp., *Dodonaea viscosa*, *Euphorbia haeleeleana*, *Hibiscus waimeae*, *Kokia kauaiensis*, *Myrsine lanaiensis*, *Nestegis sandwicensis*, *Pleomele aurea*, *Psychotria greenwelliae*, *Psychotria mariniana*, or *Sapindus oahuensis*; and

(2) Elevations between 437 and 947 m (1,432 and 3,108 ft).

Family Asteraceae: *Lipochaeta micrantha* (nehe)

Kauai E and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Lipochaeta micrantha* on Kauai. Within these units the currently known primary constituent elements of critical habitat for *Lipochaeta micrantha* are the habitat components provided by:

(1) Cliffs, ridges, stream banks, or slopes in mesic to wet mixed communities and containing one or more of the following associated native plant species: *Acacia koa*, *Artemisia australis*, *Antidesma* spp., *Bidens sandvicensis*, *Bobea* spp., *Chamaesyce celastroides* var. *hanapepensis*, *Diospyros* spp., *Dodonaea viscosa*, *Eragrostis grandis*, *Eragrostis variabilis*, *Hibiscus kokio*, *Lepidium bidentatum*, *Lobelia niihauensis*, *Melicope* spp., *Metrosideros polymorpha*, *Neraudia kauaiensis*, *Nototrichium* spp. *Plectranthus parviflorus*, *Pleomele aurea*, *Psydrax odoratum*, *Pipturus* spp., *Rumex* spp., *Sida fallax*, or *Xylosma hawaiiense*; and

(2) Elevations between 35 and 1,362 m (115 and 4,468 ft).

Family Asteraceae: *Lipochaeta waimeaensis* (nehe)

Kauai G, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Lipochaeta waimeaensis* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Precipitous, shrub-covered gulches in diverse lowland forest and containing one or more of the following associated native plant species: *Artemisia australis, Chamaesyce celastroides, Dodonaea viscosa, Lipochaeta connata, Santalum ellipticum, Schiedea spergulina*, or *Panicum* spp; and

(*2*) Elevations between 44 and 460 m (145 and 1,509 ft).

Family Asteraceae: *Remya kauaiensis* (NCN)

Kauai I, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Remya kauaiensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Steep, north or northeast facing slopes in *Acacia koa-Metrosideros polymorpha* lowland mesic forest and containing one or more of the following associated native plant species: *Chamaesyce* spp., *Claoxylon sandwicense, Dianella sandwicensis, Diospyros* spp., *Dodonaea viscosa, Hedyotis terminalis, Melicope* spp., *Nestegis sandwicensis, Pouteria sandvicensis, Psychotria* spp., *Schiedea* spp., *Tetraplasandra* spp.; and

(*2*) Elevations between 560 and 1,247 m (1,836 and 4,090 ft).

Family Asteraceae: *Remya montgomeryi* (NCN)

Kauai I, J, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Remya montgomeryi* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) steep, north or northeast-facing slopes or cliffs in transitional wet or *Metrosideros polymorpha* dominated mixed mesic forest and containing one or more of the following associated native plant species: *Artemisia australis*, *Bobea* spp., *Boehmeria grandis*, *Cheirodendron* spp., *Claoxylon sandwicense*, *Cyrtandra* spp., *Dubautia* spp., *Ilex anomala*, *Lepidium serra*, *Lysimachia* spp., *Myrsine linearifolia*, *Nototrichium* spp., *Pleomele aurea*, *Poa mannii*, *Sadleria* spp., *Scaevola* spp., *Stenogyne campanulata*, *Tetraplasandra* spp., or *Zanthoxylum dipetalum*; and

(*2*) Elevations between 336 and 1,345 m (1,102 and 4,411 ft).

Family Asteraceae: *Wilkesia hobdyi* (dwarf iliau)

Kauai I, identified in the legal description in (a)(1)(i)(A), constitute critical habitat for *Wilkesia hobdyi* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Coastal dry cliffs or very dry ridges containing one or more of the following associated native plant species: *Artemisia australis*, *Dodonaea viscosa*, *Eragrostis variabilis*, *Hibiscus kokio* ssp. *saint johnianus*, *Lipochaeta connata*, *Lobelia niihauensis*, *Myoporum sandwicense*, *Peperomia blanda*, *Peperomia leptostachya*, *Peperomia tetraphylla*, *Peucedanum sandwicense*, *Psydrax odoratum*, *Sida fallax*, *Waltheria indica*, or *Wilkesia gymnoxiphium*; and

(*2*) Elevations between 12 and 685 m (40 and 2,246 ft).

Family Campanulaceae: *Brighamia insignis* ('o'lulu)

Kauai C, E, I, and J, identified in the legal descriptions in (a)(1)(i)(A), and Niihau A, identified in the legal descriptions in (a)(1)(i)(B), constitute critical habitat for *Brighamia insignis* on Kauai and Niihau. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Rocky ledges with little soil or steep sea cliffs in lowland dry grasslands or shrublands with annual rainfall that is usually less than 170 cm (65 in.) and containing one or more of the following native plant species: *Artemisia australis*, *Chamaesyce celastroides*, *Eragrostis variabilis*, *Heteropogon contortus*, *Hibiscus kokio*, *Hibiscus kokio* ssp. *saintjohnianus*, *Lepidium serra*, *Lipochaeta succulenta*, *Munroidendron racemosum*, or *Sida fallax*; and

(*2*) Elevations between 0 and 748 m (0 and 2,453 ft).

Family Campanulaceae: *Cyanea asarifolia* (haha)

Kauai M and N, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Cyanea asarifolia* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Pockets of soil on sheer wet rock cliffs and waterfalls in lowland wet forests and containing one or more of the following native plant species: ferns, *Bidens* spp., *Dubautia plantaginea*, *Hedyotis centranthoides*, *Hedyotis elatior*, *Lysimachia filifolia*, *Machaerina angustifolia*, *Metrosideros polymorpha*, or *Panicum lineale*; and

(*2*) Elevations between 182 and 1212 m (597 and 3,976 ft).

Family Campanulaceae: *Cyanea recta* (haha)

Kauai I, J, K, L, M, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Cyanea recta* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Gulches or slopes in lowland wet or mesic *Metrosideros polymorpha* forest or shrubland and containing one or more of the following native plant species: *Dicranopteris linearis*, *Psychotria* spp., *Antidesma* spp., *Cheirodendron platyphyllum*, *Cibotium* spp., or *Diplazium* spp.; and

(*2*) Elevations between 234 and 1,406 m (768 and 4,613 ft).

Family Campanulaceae: *Cyanea remyi* (haha)

Kauai I, J, K, L, M, and N, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for Cyanea remyi on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Tight drainages and seepy stream banks in lowland wet forest or shrubland and containing one or more of the following native plant species: various grammitid and filmy ferns, *Adenophorus* spp., *Antidesma* spp., *Cheirodendron* spp., *Cyrtandra* spp., *Diplazium sandwichianum*, *Eragrostis grandis*, *Bidens* spp., *Broussaisia arguta*, *Metrosideros polymorpha*, *Freycinetia arborea*, *Hedyotis terminalis*, *Machaerina angustifolia*, *Perrottetia sandwicensis*, *Pipturus* spp., *Psychotria hexandra*, *Syzygium sandwicensis*, *Thelypteris* spp., *Touchardia* spp., or *Urera glabra*; and

(*2*) Elevations between 215 and 1,167 m (704 and 3,829 ft).

Family Campanulaceae: *Cyanea undulata* (haha)

Kauai N, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Cyanea undulata* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Tight drainages and seepy stream banks in *Metrosideros polymorpha* dry to montane wet forest or shrubland and containing one or more of the following associated native species: various

grammitid and filmy ferns, *Adenophorus* spp., *Antidesma* spp., *Broussaisia arguta*, *Cheirodendron* spp., *Diplazium sandwichianum*, *Dryopteris glabra*, *Eragrostis grandis*, *Bidens* spp., *Freycinetia arborea*, *Machaerina angustifolia*, *Mariscus* spp., *Melicope feddei*, *Perrottetia sandwicensis*, *Pipturus* spp., *Psychotria mariniana*, *Psychotria hexandra*, *Sadleria pallida*, *Sadleria squarrosa*, *Smilax melastomifolia*, *Sphenomeris chinensis*, *Syzygium sandwicensis*, or *Thelypteris* spp.; and

(*2*) Elevations between 145 and 1,066 m (476 and 3,497 ft).

Family Campanulaceae: *Delissea rhytidosperma* (no common name)

Kauai E, and I, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Delissea rhytidosperma* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Well-drained soils with medium or fine-textured subsoil in *Diospyros* diverse lowland mesic or diverse *Metrosideros polymorpha-Acacia koa* forests and containing one or more of the following native species: grammitid ferns, *Adenophorus oligadenus*, *Cyanea* spp., *Dianella sandwicensis*, *Diospyros sandwicensis*, *Dodonaea viscosa*, *Doodia kunthiana*, *Euphorbia haeleeleana*, *Hedyotis* spp., *Microlepia strigosa*, *Nestegis sandwicensis*, *Psychotria hobdyi*, *Pisonia* spp., *Pteralyxia* spp., or *Styphelia tameiameiae*; and

(*2*) Elevations between 167 and 895 m (547 and 2,935 ft).

Family Campanulaceae: *Delissea rivularis* (oha)

Kauai I, J, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitutes critical habitat for *Delissea rivularis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Steep slopes near streams in *Metrosideros polymorpha-Cheirodendron trigynum* montane wet or mesic forest and containing one or more of the following native plant species: *Boehmeria grandis*, *Broussaisia arguta*, *Carex* spp., *Coprosma* spp., *Dubautia knudsenii*, *Diplazium sandwichianum*, *Hedyotis foggiana*, *Ilex anomala*, *Machaerina angustifolia*, *Melicope clusiifolia*, *Melicope anisata*, *Pipturus* spp., *Psychotria hexandra*, or *Sadleria* spp.; and

(*2*) Elevations between 722 and 1,306 m (2,370 and 4,286 ft).

Family Campanulaceae: *Delissea undulata* (NCN)

Kauai I and J, identified in the legal descriptions in (a)(1)(i)(A), constitutes critical habitat for *Delissea undulata* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Dry or open *Acacia koa-Metrosideros polymorpha* mesic forests or *Alphitonia ponderosa* montane forest containing one or more of the following native plant species: *Diospyros sandwicensis*, *Dodonaea viscosa*, *Doodia kunthiana*, *Eragrostis variabilis*, *Euphorbia haeleeleana*, *Kokia kauaiensis*, *Microlepia strigosa*, *Panicum* spp., *Pleomele aurea*, *Psychotria mariniana*, *P. greenwelliae*, *Santalum ellipticum*; and

(*2*) Elevations between 139 and 1,006m (456 and 3,299 ft).

Family Campanulaceae: *Lobelia niihauensis* (NCN)

Kauai C, I, J, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Lobelia niihauensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Exposed mesic mixed shrubland or coastal dry cliffs containing one or more of the following associated native plant species: *Artemisia australis*, *Bidens sandvicensis*, *Chamaesyce celastroides*, *Charpentiera* spp., *Eragrostis variabilis*, *Hibiscus kokio* ssp. *saint -johnianus*, *Lipochaeta connata* var. *acris*, *Lythrum* spp., *Nototrichium* spp., *Plectranthus parviflorus*, *Schiedea apokremnos*, or *Wilkesia hobdyi*; and

(*2*) Elevations between 11 and 887 m (37 and 2,911 ft).

Family Caryophyllaceae: *Alsinidendron lychnoides* (kuawawaenohu)

Kauai I, J, K and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Alsinidendron lychnoides* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) steep riparian clay or silty soil banks in montane wet forests dominated by *Metrosideros polymorpha* and *Cheirodendron* spp., or by *Metrosideros polymorpha* and *Dicranopteris linearis* and containing one or more of the following native plant species: *Asplenium* spp., *Astelia* spp., *Broussaisia arguta*, *Carex* spp., *Cyrtandra* spp., *Diplazium sandwichianum*, *Elaphoglossum* spp., *Hedyotis terminalis*, *Machaerina* spp., *Peperomia* spp., or *Vaccinium* spp.; and

(*2*) Elevations between 878 and 1,344 m (2,715 and 4,408 ft).

Family Caryophyllaceae: *Alsinidendron viscosum* (NCN)

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Alsinidendron viscosum* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) steep slopes in *Acacia koa-Metrosideros polymorpha* lowland, montane mesic forest and containing one or more of the following native plant species: *Alyxia oliviformis*, *Asplenium polydon*, *Bidens cosmoides*, *Bobea* spp., *Carex meyenii*, *Carex wahuensis*, *Coprosma* spp., *Dryopteris unidentata*, *Dryopteris glabra*, *Dodonaea viscosa*, *Dubautia laevigata*, *Dianella sandwicensis*, *Dryopteris wallichiana*, *Doodia kunthiana*, *Gahnia* spp., *Ilex anomala*, *Melicope* spp., *Panicum nephelophilum*, *Pteridium aquilinum* var. *decompositum*, *Pleomele* spp., *Psychotria* spp., *Schiedea stellarioides*, or *Vaccinium dentatum*; and

(*2*) Elevations between 754 and 1,224 m (2,474 and 4,016 ft).

Family Caryophyllaceae: *Schiedea apokremnos* (maolioli)

Kauai I, identified in the legal description in (a)(1)(i)(A), constitute critical habitat for *Schiedea apokremnos* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Crevices of near-vertical basalt coastal cliff faces in sparse dry coastal cliff shrub vegetation and containing one or more of the following associated native plant species: *Artemisia australis, Bidens* spp., *Carex meyenii, Chamaesyce celastroides, Eragrostis variabilis, Lepidium serra, Lipochaeta connata, Lobelia niihauensis, Myoporum sandwicense, Peperomia* spp., *Pleomele aurea, Psydrax odoratum,* or *Wilkesia* spp.; and

(*2*) Elevations between 12 and 391 m (40 and 1,283 ft).

Family Caryophyllaceae: *Schiedea helleri* (NCN)

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Schiedea helleri* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Ridges and steep cliffs in closed *Metrosideros polymorpha-Dicranopteris linearis* montane wet forest, *M. polymorpha-Cheirodendron* spp. montane wet forest, or *Acacia koa-M. polymorpha* montane mesic forest and containing one or more of the following associated native plant species: *Broussaisia arguta, Cheirodendron* spp., *Cibotium* spp., *Cyanea* spp., *Dianella sandwicensis, Dubautia* spp., *Elaeocarpus bifidus, Hedyotis terminalis, Melicope* spp., *Myrsine* spp., *Poa sandvicensis, Scaevola procera, Syzygium sandwicensis,* or *Viola wailenalenae;* and

(*2*) Elevations between 941 and 1,223 m (3,088 and 4,011 ft).

Family Caryophyllaceae: *Schiedea kauaiensis* (NCN)

Kauai I, J, and O, identified in the legal descriptions in (a)(1)(i)(A), constitutes critical habitat for *Schiedea kauaiensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Steep slopes in diverse mesic to wet *Acacia koa-Metrosideros polymorpha* forest and containing one or more of the following associated plant species: *Alphitonia ponderosa, Cryptocarya mannii, Diospyros* spp., *Dodonaea viscosa, Euphorbia haeleeleana, Exocarpos luteolus, Microlepia strigosa, Nestegis sandwicensis, Pisonia* spp., *Peucedanum sandwicense, Psychotria* spp., *Psydrax odoratum,* or *Styphelia tameiameiae;* and

(*2*) Elevations between 192 and 4,232 m (631 and 4,232 ft).

Family Caryophyllaceae: *Schiedea membranacea* (NCN)

Kauai I, J, K, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Schiedea membranacea* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Cliffs or cliff bases of mesic or wet habitats, in lowland, or montane shrubland, or forest communities dominated by *Acacia koa, Pipturus* spp. and *Metrosideros polymorpha* or Urticaceae shrubland on talus slopes and containing one or more of the following associated native plant species: *Alphitonia ponderosa, Alyxia oliviformis, Asplenium* spp., *Athyrium sandwicensis, Bobea brevipes, Boehmeria grandis, Cyrtandra* spp., *Diplazium sandwichianum, Dodonaea viscosa, Eragrostis variabilis, Hedyotis terminalis, Hibiscus waimeae, Joinvillea ascendens* ssp. *ascendens, Labordia helleri, Lepidium serra, Lysimachia kalalauensis, Machaerina angustifolia, Mariscus pennatiformis, Melicope* spp., *Myrsine* spp., *Perrottetia sandwicensis, Pisonia* spp., *Pleomele aurea, Poa mannii, Poa sandvicensis Pouteria sandvicensis, Psychotria* spp., *Psydrax odoratum, Remya kauaiensis, Sadleria cyatheoides, Scaevola procera, Thelypteris cyatheoides, Thelypteris sandwicensis,* or *Touchardia latifolia;* and

(*2*) Elevations between 423 and 1,205 m (1,386 and 3,953 ft).

Family Caryophyllaceae: *Schiedea nuttallii* (NCN)

Kauai E, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Schiedea nuttallii* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Cliffs in lowland diverse mesic forest dominated by *Metrosideros polymorpha* and containing one or more of the following associated native plant species: *Antidesma platyphyllum* var. *hillebrandii, Bidens valida, Chamaesyce celastroides, Eragrostis variabilis, Hedyotis acuminata, Hedyotis fluviatilis, Heteropogon contortus, Lepidium* spp., *Lobelia niihauensis, Psychotria* spp., *Perrottetia sandwicensis,* or *Pisonia* spp.; and

(*2*) Elevations between 33 and 702 m (120 and 2,303 ft).

Family Caryophyllaceae: *Schiedea spergulina* var. *leiopoda* (NCN)

Kauai F, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Schiedea spergulina* var. *leiopoda* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Bare rock outcrops or sparsely vegetated portions of rocky cliff faces or cliff bases in diverse lowland dry to mesic forests and containing one or more of the following native plant species: *Acacia koa, Artemisia australis, Bidens sandvicensis, Carex meyenii, Chamaesyce celastroides, Dianella sandwicensis, Doryopteris* spp., *Eragrostis variabilis, Erythrina sandwicensis, Gahnia* spp., *Heliotropium* spp., *Lepidium serra, Lipochaeta connata, Microlepia strigosa, Nestegis sandwicensis, Nototrichium sandwicense, Panicum lineale, Panicum violascens, Peucedanum sandwicense,* or *Wilkesia gymnoxiphium;* and

(*2*) Elevations between 21 and 87 m (69 and 284 ft).

Family Caryophyllaceae: *Schiedea spergulina* var. *spergulina* (NCN)

Kauai G, I, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Schiedea spergulina* var. *spergulina* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Bare rock outcrops or sparsely vegetated portions of rocky cliff faces or cliff bases in diverse lowland dry to mesic forests and containing one or more of the following associated plant species: *Acacia koa, Artemisia australis, Bidens sandvicensis, Carex meyenii, Chamaesyce celastroides, Dianella sandwicensis, Doryopteris* spp., *Eragrostis variabilis, Erythrina sandwicensis, Gahnia* spp., *Heliotropium* spp., *Lepidium serra, Lipochaeta connata, Microlepia strigosa, Nestegis sandwicensis, Nototrichium sandwicense, Panicum lineale, Panicum violascens, Peucedanum sandwicense,* or *Wilkesia gymnoxiphium;* and

(*2*) Elevations between 145 and 829 m (474 and 2,718 ft).

Family Caryophyllaceae: *Schiedea stellarioides* (laulihilihi (=maolioli))

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Schiedea stellarioides* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Steep slopes in closed *Acacia koa-Metrosideros polymorpha* lowland or montane mesic forest or shrubland and containing one or more of the following native plant species: *Alsinidendron viscosum, Artemisia australis, Bidens cosmoides, Chenopodium* spp., *Dianella sandwicensis, Dodonaea viscosa, Mariscus* spp., *Melicope* spp., *Nototrichium sandwicense, Pipturus* spp., *Styphelia tameiameiae, Syzygium sandwicensis,* or *Zanthoxylum dipetalum;* and

(*2*) Elevations between 476 and 1,216 m (1,561 and 3,990 ft).

Family Convolvulaceae: *Bonamia menziesii* (NCN)

Kauai I, J, K, L, M, N and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Bonamia menziesii* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Dry, mesic, or wet *Metrosideros polymorpha-Cheirodendron-Dicranopteris* forest and containing one

or more of the following native plant species: *Antidesma platyphyllum, Alphitonia ponderosa, Acacia koa, Cyanea* spp., *Cyrtandra pickeringii, Cyrtandra limahuliensis, Dianella sandwicensis, Diospyros sandwicensis, Dodonaea viscosa, Dubautia knudsenii, Hedyotis terminalis, Isodendrion longifolium, Labordia hirta, Melicope anisata, Melicope barbigera, Myoporum sandwicense, Nestegis sandwicensis, Pisonia* spp., *Pittosporum* spp., *Pouteria sandvicensis, Psychotria mariniana, Psychotria hexandra, Psydrax odoratum, Sapindus oahuensis, Scaevola procera,* or *Syzygium sandwicensis;* and

(*2*) Elevations between 351 and 1,416 m (1,151 and 4,644 ft).

Family Cyperaceae: *Cyperus trachysanthos* (puukaa)

Kauai I, identified in the legal description in (a)(1)(i)(A), and Niihau A, identified in the legal description in (a)(1)(i)(B), constitute critical habitat for *Cyperus trachysanthos* on Kauai and Niihau. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Wet sites (mud flats, wet clay soil, or wet cliff seeps) on seepy flats or talus slopes and containing the native plant species *Hibiscus tiliaceus;* and

(*2*) Elevations between 0 and 234 m (0 and 767 ft).

Family Cyperaceae: *Mariscus pennatiformis* (NCN)

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Mariscus pennatiformis* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Open sites in *Metrosideros polymorpha—Acacia koa* mixed mesic forest and containing one or more of the following associated native plant species: *Antidesma platyphyllum* var. *hillebrandii, Alsinidendron viscosum, Carex alligata, Cyperus laevigatus, Dianella sandwicensis, Diospyros hillebrandii, Diospyros sandwicensis, Dodonaea viscosa, Myrsine linearifolia, Nestegis sandwicensis, Panicum nephelophilum, Poa sandvicensis, Psydrax odoratum, Schiedea stellarioides, Styphelia tameiameiae,* or endemic ferns; and

(*2*) Elevations between 544 and 1,104 m (1,785 and 3,621 ft).

Family Euphorbiaceae: *Chamaesyce halemanui* (NCN)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Chamaesyce halemanui* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Steep slopes of gulches in mesic *Acacia koa* forests and containing one or more of the following native plant species: *Asplenium* spp., *Alphitonia ponderosa, Antidesma platyphyllum, Bobea brevipes, Carex meyenii, Carex wahuensis, Cheirodendron trigynum, Coprosma* spp., *Diospyros sandwicensis, Dodonaea viscosa, Elaeocarpus bifidus, Hedyotis terminalis, Kokia kauaiensis, Metrosideros polymorpha, Melicope haupuensis, Microlepia strigosa, Panicum nephelophilum, Pisonia* spp., *Pittosporum* spp., *Pleomele aurea, Psychotria mariniana, Psychotria greenwelliae, Pouteria sandvicensis, Santalum freycinetianum,* or *Styphelia tameiameiae;* and

(*2*) Elevations between 556 and 1,202 m (1,825 and 3,944 ft).

Family Euphorbiaceae: *Euphorbia haeleeleana* (akoko)

Kauai I, J, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Euphorbia haeleeleana* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Lowland mixed mesic or dry *Diospyros* forest that is often co-dominated by *Metrosideros polymorpha* and *Alphitonia ponderosa* and containing one or more of the following native plant species: *Acacia koaia, Antidesma platyphyllum, Claoxylon sandwicense, Carex meyenii, Carex wahuensis, Diplazium sandwichianum, Dodonaea viscosa, Erythrina sandwicensis, Kokia kauaiensis, Pleomele aurea, Psychotria mariniana, P. greenwelliae, Pteralyxia sandwicensis, Rauvolfia sandwicensis, Reynoldsia sandwicensis, Sapindus oahuensis, Tetraplasandra kauaiensis, Pouteria sandvicensis, Pisonia sandwicensis,* or *Xylosma* spp.; and

(*2*) Elevations between 284 and 1,178 m (931 and 3,866 ft).

Family Euphorbiaceae: *Flueggea neowawraea* (mēhamehame)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Flueggea neowawraea* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Dry or mesic forests containing one or more of the following native plant species: *Alectryon macrococcus, Antidesma pulvinatum, A. platyphyllum, Bidens sandvicensis, Bobea timonioides, Caesalpinia kavaiensis, Charpentiera* spp., *Diospyros* spp., *Diplazium sandwichianum, Freycinetia arborea, Hibiscus* spp., *Isodendrion laurifolium, Kokia kauaiensis, Melicope* spp., *Metrosideros polymorpha, Munroidendron racemosum, Myrsine lanaiensis, Nesoluma polynesicum, Nestegis sandwicensis, Tetraplasandra* spp., *Pittosporum* spp., *Pouteria sandvicensis, Pritchardia minor, Psychotria* spp., *Psydrax odoratum, Pteralyxia kauaiensis, Rauvolfia sandwicensis, Streblus pendulinus, Tetraplasandra* spp., *Xylosma hawaiiense,* or *Xylosma crenatum;* and

(*2*) Elevations between 210 and 1,178 m (689 and 3,865 ft).

Family Fabaceae: *Sesbania tomentosa* (ohai)

Kauai D, H, and I, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Sesbania tomentosa* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Sandy beaches, dunes, or pond margins in coastal dry shrublands or mixed coastal dry cliffs, and containing one or more of the following associated native plant species: *Chamaesyce celastroides, Dodonaea viscosa, Heteropogon contortus, Myoporum sandwicense, Nama sandwicensis, Scaevola sericea, Sida fallax, Sporobolus virginicus,* or *Vitex rotundifolia;* and

(*2*) Elevations between 0 and 212 m (0 and 694 ft).

Family Flacourtiaceae: *Xylosma crenatum* (NCN)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Xylosma crenatum* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Diverse *Acacia koa-Metrosideros polymorpha* montane mesic forest, or *Metrosideros polymorpha-Dicranopteris linearis* montane wet forest, or *Acacia koa-Metrosideros polymorpha* montane wet forest, and containing one or more of the following associated native plant species: *Athyrium sandwicensis, Cheirodendron* spp., *Claoxylon sandwicense, Coprosma* spp., *Cyanea hirta, Diplazium sandwichianum, Dubautia knudsenii, Hedyotis* spp., *Ilex anomala, Lobelia yuccoides, Myrsine* spp., *Nestegis sandwicensis, Perrottetia sandwicensis, Pleomele aurea, Poa sandvicensis, Pouteria sandvicensis,*

Psychotria spp., *Scaevola procera, Streblus pendulinus, Tetraplasandra* spp., *Touchardia latifolia,* or *Zanthoxylum dipetalum;* and

(*2*) Elevations between 936 and 1,284 m (3,070 and 4,212 ft).

Family Gentianaceae: *Centaurium sebaeoides* (awiwi)

Kauai A and I, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Centaurium sebaeoides* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Volcanic or clay soils or on cliffs in arid coastal areas and containing one or more of the following native plant species: *Artemisia* spp., *Bidens* spp., *Chamaesyce celastroides, Dodonaea viscosa, Fimbristylis cymosa, Heteropogon contortus, Jacquemontia ovalifolia, Lipochaeta succulenta, Lipochaeta heterophylla, Lipochaeta integrifolia, Lycium sandwicense, Lysimachia mauritiana, Mariscus phleoides, Panicum fauriei, P. torridum, Scaevola sericea, Sida fallax,* or *Wikstroemia uva-ursi;* and

(*2*) Elevations between 0 and 147 m (0 and 483 ft).

Family Gesneriaceae: *Cyrtandra cyaneoides* (mapele)

Kauai J, K, L, M and N, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Cyrtandra cyaneoides* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Talus rubble on steep slopes or cliffs with water seeps running below, near streams or waterfalls in lowland or montane wet forest or shrubland dominated by *Metrosideros polymorpha* or a mixture of *Metrosideros polymorpha, Cheirodendron* spp., and *Dicranopteris linearis* and containing one or more of the following native species: *Bidens* spp., *Boehmeria grandis, Cyanea* spp., *Cyrtandra longifolia, Cyrtandra kauaiensis, Cyrtandra limahuliensis, Coprosma* spp., *Diplazium sandwichianum, Freycinetia arborea, Gunnera* spp., *Hedyotis terminalis, Hedyotis tryblium, Machaerina* spp., *Melicope clusiifolia, Melicope puberula, Perrottetia sandwicensis, Pipturus* spp., *Psychotria* spp., *Pritchardia* spp., or *Stenogyne purpurea;* and

(2) Elevations between 157 and 1,406 m (514 and 4,614 ft).

Family Gesneriaceae: *Cyrtandra limahuliensis* (haiwale)

Kauai I, J, K, L, M, and N, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Cyrtandra limahuliensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Stream banks in lowland wet forests containing one or more of the following native plant species: *Antidesma* spp., *Boehmeria grandis, Bidens* spp., *Charpentiera* spp., *Cibotium glaucum, Cyanea* spp., *Cyrtandra kealiae, Dicranopteris linearis, Diplazium sandwichianum, Dubautia* spp., *Eugenia* spp., *Gunnera kauaiensis, Hedyotis terminalis, Hibiscus waimeae, Metrosideros polymorpha, Perrottetia sandwicensis, Pisonia* spp., *Pipturus* spp., *Pritchardia* spp., *Psychotria* spp., *Touchardia latifolia,* or *Urera glabra;* and

(2) Elevations between 208 and 1,594 m (681 and 5,228 ft).

Family Lamiaceae: *Phyllostegia knudsenii* (NCN)

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Phyllostegia knudsenii* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) *Metrosideros polymorpha* lowland mesic or wet forest containing one or more of the following associated native plant species: *Bobea timonioides, Claoxylon sandwicense, Cryptocarya mannii, Cyrtandra kauaiensis, Cyrtandra paludosa, Diospyros sandwicensis, Elaeocarpus bifidus, Ilex anomala, Myrsine linearifolia, Perrottetia sandwicensis, Pittosporum kauaiense, Pouteria sandvicensis, Pritchardia minor, Selaginella arbuscula, Tetraplasandra oahuensis,* or *Zanthoxylum dipetalum;* and

(2) Elevations between 399 and 1,059 m (1,309 and 3,475 ft).

Family Lamiaceae: *Phyllostegia waimeae* (no common name)

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Phyllostegia waimeae* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) *Acacia koa-Metrosideros polymorpha* dominated wet or mixed mesic forest with *Cheirodendron* spp. or *Dicranopteris linearis* as co-dominants and containing one or more of the following associated native plant species: *Broussaisia arguta, Claoxylon sandwicense, Diplazium sandwichianum, Dubautia knudsenii, Elaphoglossum* spp., *Gunnera* spp., *Hedyotis* spp., *Myrsine lanaiensis, Pleomele aurea, Psychotria* spp., *Sadleria* spp., *Scaevola procera, Syzygium sandwicensis,* or *Vaccinium* spp.; and

(2) Elevations between 655 and 1,224 m (2,149 and 4,016 ft).

Family Lamiaceae: *Phyllostegia wawrana* (no common name)

Kauai I, J, M, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Phyllostegia wawrana* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) *Acacia koa-Metrosideros polymorpha-Cheirodendron mixed* mesic forest containing one or more of the following associated native plant species: *Alectryon* spp., *Asplenium polypodon, Athyrium microphyllum, Carex* spp., *Claoxylon sandwicense, Cyanea fissa, Delissea rivularis, Dianella sandwicensis, Diplazium sandwichianum, Dodonaea viscosa, Doodia kunthiana, Dryopteris wallichiana, Dubautia knudsenii, Dubautia laevigata, Hedyotis tryblium, Machaerina angustifolia, Panicum nephelophilum, Peperomia macraeana, Perrottetia sandwicensis, Poa sandvicensis, Pleomele aurea, Pteridium decompositum, Sadleria pallida, Schiedea stellarioides, Scaevola procera, Syzygium sandwicensis, Touchardia latifolia, or Vaccinium dentatum;* and

(2) Elevations between 398 and 1,284 m (1,306 and 4,212 ft).

Family Lamiaceae: *Stenogyne campanulata* (NCN)

Kauai I, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Stenogyne campanulata* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Rock faces of nearly vertical, north-facing cliffs in diverse lowland or montane mesic forest and containing one or more of the following associated native plant species: *Lepidium serra, Lobelia niihauensis, Lysimachia* spp., *Metrosideros polymorpha, Melicope pallida, Neraudia kauaiensis, Nototrichium divaricatum, Poa mannii, Remya montgomeryi,* or *Wilkesia gymnoxiphium;* and

(*2*) Elevations between 335 and 1,290 (1,100 and 4,232 ft).

Family Loganiaceae: *Labordia lydgatei* (kamakahala)

Kauai I, J, K, L, M, and N, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Labordia lydgatei* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest containing one or more of the following associated native plant species: *Antidesma platyphyllum* var. *hillebrandii, Cyanea* spp., *Cyrtandra* spp., *Dubautia knudsenii, Hedyotis terminalis, Ilex anomala, Labordia hirtella, Psychotria* spp., or *Syzygium sandwicensis;* and

(*2*) Elevations between 182 and 1,140 m (597 and 3,740 ft).

Family Loganiaceae: *Labordia tinifolia* var. *wahiawaensis* (kamakahala)

Kauai N, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Labordia tinifolia* var. *wahiawaensis* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Streambanks in lowland wet forests dominated by *Metrosideros polymorpha* and containing one or more of the following associated species: *Antidesma platyphyllum, Athyrium microphyllum, Cheirodendron* spp., *Cyrtandra* spp., *Dicranopteris linearis, Hedyotis terminalis,* or *Psychotria* spp.; and

(*2*) Elevations between 458 and 1,006 m (1,502 and 3,301 ft).

Family Malvaceae: *Hibiscadelphus woodii* (hau kuahiwi)

Kauai I, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Hibiscadelphus woodii* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Basalt talus or cliff walls in *Metrosideros polymorpha* montane mesic forest and containing one or more of the following associated native plant species: *Artemisia australis, Bidens sandvicensis, Carex meyenii, Chamaesyce celastroides* var. *hanapepensis, Dubautia* spp., *Hedyotis* spp., *Lepidium serra, Lipochaeta* spp., *Lobelia niihauensis, Lysimachia glutinosa, Melicope pallida, Myrsine* spp., *Nototrichium* spp., *Panicum lineale, Poa mannii,* or *Stenogyne campanulata;* and

(*2*) Elevations between 219 and 1,197 m (717 and 3,926 ft).

Family Malvaceae: *Hibiscus clayi* (Clay's hibiscus)

Kauai B, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Hibiscus clayi* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Slopes in *Acacia koa* or *Diospyros* spp.-*Pisonia* spp.-*Metrosideros polymorpha* lowland dry or mesic forest and containing one or more of the following associated native plant species: *Artemisia australis, Bidens* spp., *Cyanea hardyi, Hedyotis acuminata, Gahnia* spp., *Munroidendron racemosum, Pandanus tectorius, Panicum tenuifolium, Pleomele aurea, Pipturus* spp., *Psychotria* spp., or *Psydrax odoratum;* and

(*2*) elevations between nine and 380 m (29 and 1,245 ft).

Family Malvaceae: *Hibiscus waimeae* ssp. *hannerae* (kokio keokeo)

Kauai I and J, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Hibiscus waimeae* ssp. *hannerae* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) *Metrosideros polymorpha-Dicranopteris linearis* or *Pisonia* spp.-*Charpentiera elliptica* lowland wet or mesic forest and containing one or more of the following associated native plant species: *Antidesma* spp., *Psychotria* spp., *Pipturus* spp., *Bidens* spp., *Bobea* spp., *Sadleria* spp., *Cyrtandra* spp., *Cyanea* spp., *Cibotium* spp., *Perrottetia sandwicensis,* or *Syzygium sandwicensis;* and

(*2*) Elevations between 174 and 1,154 m (570 and 3,787 ft).

Family Malvaceae: *Kokia kauaiensis* (kokio)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Kokia kauaiensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Diverse mesic forest containing one or more of the following associated native plant species: *Acacia koa, Alyxia oliviformis, Antidesma* spp., *Bobea* spp., *Chamaesyce celastroides, Claoxylon sandwicense, Dicranopteris linearis, Diellia pallida, Diospyros hillebrandii, Diospyros sandwicensis, Dodonaea viscosa, Flueggea neowawraea, Hibiscus* spp., *Hedyotis* spp., *Isodendrion laurifolium, Lipochaeta fauriei, Melicope* spp., *Metrosideros polymorpha, Nestegis sandwicensis, Nototrichium* spp., *Pisonia* spp., *Pleomele aurea, Pouteria sandvicensis, Psydrax odoratum, Pteralyxia kauaiensis, Rauvolfia sandwicensis, Santalum freycinetianum* var. *pyrularium, Streblus pendulinus, Syzygium sandwicensis, Tetraplasandra* spp., or *Xylosma* spp.; and

(*2*) Elevations between 216 and 1,037 m (707 and 3,402 ft).

Family Myrsinaceae: *Myrsine linearifolia* (kōlea)

Kauai E, I, J, K, L, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Myrsine linearifolia* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Diverse mesic or wet lowland or montane *Metrosideros polymorpha* forest, with *Cheirodendron* spp., or *Dicranopteris linearis* as co-dominant species, and containing one or more of the following associated native plant species: *Bobea brevipes, Cryptocarya mannii, Dubautia* spp., *Eurya sandwicensis, Freycinetia arborea, Hedyotis terminalis, Lysimachia glutinosa, Machaerina angustifolia, Melicope* spp., *Myrsine* spp., *Nothocestrum* spp., *Psychotria* spp., *Sadleria pallida, Syzygium sandwicensis,* or native ferns; and

(*2*) Elevations between 106 and 1,380 m (346 and 4,526 ft).

Family Orchidaceae: *Platanthera holochila* (NCN)

Kauai I, J, L, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Platanthera holochila* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Montane *Metrosideros polymorpha-Dicranopteris linearis* wet forest or *M. polymorpha* mixed bog and containing one or more of the following associated native plant species: mosses, grammitid ferns, *Carex montis-eeka, Cibotium* spp., *Clermontia fauriei, Coprosma elliptica, Dichanthelium* spp., *Lobelia kauaensis, Machaerina angustifolia, Myrsine denticulata, Oreobolus furcatus, Rhynchospora laxa, Styphelia tameiameiae,* or *Vaccinium* spp., or *Viola kauaensis;* and

(*2*) Elevations between 803 and 1,563 m (2,635 and 5,128 ft).

Family Plantaginaceae: *Plantago princeps* (laukahi kuahiwi)

Kauai I, J, K, L, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Plantago princeps* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Windswept areas near waterfalls in *Metrosideros polymorpha-Cheirodendron montane* wet forest with riparian vegetation or *Metrosideros polymorpha* lowland to montane transitional wet forest on cliffs and ridges, growing on basalt rocky outcrops and containing one or more of the following associated native plant species: *Antidesma platyphyllum* var. *hillebrandii, Bidens forbesii, Bobea elatior, Boehmeria grandis, Cyrtandra* spp., *Diplazium sandwichianum, Freycinetia arborea, Gunnera* spp., *Hedyotis elatior, Huperzia* spp. *Hedyotis centranthoides, Isachne pallens, Machaerina angustifolia, Perrottetia sandwicensis, Pilea peploides, Pipturus* spp., *Sadleria cyatheoides,* or *Tetraplasandra* spp. or *Bidens sandvicensis, Carex meyenii, Carex wahuensis, Charpentiera elliptica, Hedyotis* spp., *Lipochaeta connata, Lysimachia glutinosa, Lysimachia kalalauensis, Melicope* spp., *Myrsine linearifolia, Poa mannii,* or *Wilkesia gymnoxiphium;* and

(*2*) Elevations between 347 and 1,598 m (1,139 and 5,244 ft).

Family Poaceae: *Ischaemum byrone* (Hilo ischaemum)

Kauai A and I, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Ischaemum byrone* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Coastal shrubland, occurring near the ocean among rocks and seepy cliffs and containing one or more of the following associated native plant species: *Bidens* spp., *Chamaesyce celastroides, Fimbristylis cymosa, Lipochaeta succulenta, Lysimachia mauritiana,* or *Scaevola sericea,* and

(*2*) Elevations between 0 and 297 m (0 and 975 ft).

Family Poaceae: *Panicum niihauense* (lau ehu)

Kauai H and I, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Panicum niihauense* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Sand dunes in coastal shrubland and containing one or more of the following associated native plant species: *Cassytha filiformis, Chamaesyce celastroides, Dodonaea viscosa, Nama sandwicensis, Ophioglossum pendulum* ssp. *falcatum, Scaevola sericea, Sida fallax, Vitex rotundifolia,* or *Sporobolus virginicus;* and

(*2*) Elevations between 0 and 103 m (0 and 337 ft).

Family Poaceae: *Poa mannii* (Mann's bluegrass)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Poa mannii* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by: (*1*) Cliffs or rock faces in lowland or montane mesic *Metrosideros polymorpha* or *Acacia koa-Metrosideros polymorpha* forest and containing one or more of the following associated native plant species: *Antidesma platyphyllum, Artemisia australis, Bidens cosmoides, Bidens sandvicensis, Carex meyenii, C. wahuensis, Chamaesyce celastroides* var. *hanapepensis, Dodonaea viscosa, Diospyros sandwicensis, Eragrostis variabilis, Hedyotis terminalis, Lobelia niihauensis, Lobelia yuccoides, Luzula hawaiiensis, Mariscus phloides, Melicope anisata, M. barbigera, M. pallida, Nototrichium* spp., *Panicum lineale, Pleomele aurea, Pouteria sandvicensis, Psychotria mariniana, P. greenwelliae, Schiedea lydgatei* var. *attenuata, Schiedea membranacea,* or *Wilkesia gymnoxiphium;* and

(*2*) Elevations between 327 and 1,222 m (1,072 and 4,009 ft).

Family Poaceae: *Poa sandvicensis* (Hawaiian bluegrass)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Poa sandvicensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Wet, shaded, gentle to steep slopes, ridges, and rock ledges of stream banks in semi-open to closed, wet, diverse *Acacia koa—Metrosideros polymorpha* montane forest and containing one or more of the following associated native species: *Alyxia oliviformis, Bidens sandvicensis, Cheirodendron* spp., *Claoxylon sandwicense, Coprosma* spp., *Dianella sandwicensis, Dicranopteris linearis, Dodonaea viscosa, Dubautia* spp., *Hedyotis* spp., *Melicope* spp., *Peperomia* spp., *Psychotria* spp., *Scaevola procera, Schiedea stellarioides,* or *Syzygium sandwicensis;* and

(*2*) Elevations between 498 and 1,290 m (1,635 and 4,232 ft).

Family Poaceae: *Poa siphonoglossa* (NCN)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Poa siphonoglossa* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Shady banks on steep slopes in mesic *Metrosideros polymorpha-Acacia koa* forests and containing one or more of the following associated native plant species: *Acacia koa, Alphitonia ponderosa, Alyxia oliviformis, Bobea brevipes, Carex meyenii, Carex wahuensis, Coprosma waimeae, Dianella sandwicensis, Dodonaea viscosa, Dubautia* spp., *Hedyotis* spp., *Lobelia yuccoides, Melicope* spp., *Microlepia strigosa, Myrsine* spp., *Panicum nephelophilum, Poa sandvicensis, Psychotria* spp., *Scaevola procera, Styphelia tameiameiae, Tetraplasandra kauaiensis, Vaccinium* spp., *Wilkesia gymnoxiphium, Xylosma* spp., or *Zanthoxylum dipetalum;* and

(*2*) Elevations between 498 and 1,290 m (1,635 and 4,232 ft).

Family Primulaceae: *Lysimachia filifolia* (no common name)

Kauai L and N, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Lysimachia filifolia* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Mossy banks at the base of cliff faces within the spray zone of waterfalls or along streams in lowland wet forests and containing one or more of the following associated native plant species: mosses, ferns, liverworts, *Antidesma platyphyllum, Bidens valida, Bobea elatior, Cyanea asarifolia, Chamaesyce remyi* var *kauaiensis, Dubautia plantaginea* ssp. *magnifolia, Eragrostis variabilis, Metrosideros polymorpha, Machaerina angustifolia, Melicope* spp., or *Panicum lineale;* and

(*2*) Elevations between 177 and 1,088 m (581 and 3,568 ft).

Family Rhamnaceae: *Gouania meyenii* (NCN)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Gouania meyenii* on Kauai. Within these units, the currently known primary constituent elements of

critical habitat are the habitat components provided by:

(*1*) Rocky ledges, cliff faces, and ridge-tops in dry shrubland or *Metrosideros polymorpha* lowland diverse mesic forest and containing one or more of the following native plant species: *Bidens* spp., *Carex meyenii, Chamaesyce* spp., *Dodonaea viscosa, Diospyros sandwicensis, Diospyros* spp., *Eragrostis variabilis, Euphorbia haeleeleana, Festuca* spp., *Hedyotis* spp., *Hibiscadelphus* spp., *Lysimachia* spp., *Melicope pallida, Neraudia kauaiensis, Nestegis sandwicensis, Nototrichium divaricatum, Panicum lineale, Poa mannii, Psychotria* spp., *Senna gaudichaudii,* or *Wilkesia gymnoxiphium;* and

(*2*) Elevations between 375 and 3,867 m (1,231 and 3,867 ft).

Family Rubiaceae: *Hedyotis cookiana* (awiwi)

Kauai I, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Hedyotis cookiana* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) streambeds or steep cliffs close to water sources in relict *Metrosideros polymorpha* low mesic and low wet forest communities containing one or more of the following associated native plant species: *Boehmeria grandis, Chamaesyce celastroides* var. *hanapepensis, Hibiscus kokio* ssp. *saintjohnianus, Machaerina angustifolia, Nototrichium sandwicense, Pleomele aurea, Pipturus kauaiensis, Pouteria sandvicensis, Psydrax odoratum,* or *Rauvolfia sandwicensis;* and

(*2*) Elevations between 120 and 553 m (392 and 1,814 ft).

Family Rubiaceae: *Hedyotis st.-johnii* (Na Pali beach hedyotis)

Kauai I, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Hedyotis st.-johnii* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Crevices of north-facing, near-vertical coastal cliff faces within the spray zone in sparse dry coastal shrubland and containing one or more of the following native plant species: *Artemisia australis, Bidens* spp., *Capparis sandwichiana, Chamaesyce celastroides, Eragrostis variabilis, Heteropogon contortus, Lipochaeta connata, Lycium sandwicense, Myoporum sandwicense, Nototrichium sandwicense,* or *Schiedea apokremnos;* and

(*2*) Elevations between 0 and 187 m (0 and 613 ft).

Family Rutaceae: *Melicope haupuensis* (alani)

Kauai E, I, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Melicope haupuensis* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(1) Moist talus slopes in *Metrosideros polymorpha* dominated lowland mesic forests or *Metrosideros polymorpha-Acacia koa* montane mesic forest and containing one or more of the following associated native plant species: *Antidesma platyphyllum* var. *hillebrandii, Bobea brevipes, Cheirodendron trigynum, Claoxylon sandwicense, Cryptocarya mannii, Dianella sandwicensis, Diospyros hillebrandii, Diospyros sandwicensis, Dodonaea viscosa, Elaeocarpus bifidus, Hedyotis terminalis, Melicope anisata, M. barbigera, M. ovata, Pleomele aurea, Pouteria sandvicensis, Pritchardia minor, Psychotria mariniana, P. greenwelliae, Tetraplasandra waimeae,* or *Zanthoxylum dipetalum;* and

(2) Elevations between 111 and 1,142 m (364 and 3,745 ft).

Family Rutaceae: *Melicope knudsenii* (alani)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Melicope knudsenii* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Forested flats with brown granular soil in lowland dry to montane mesic forests and containing one or more of the following associated native plant species: *Alectryon macrococcus, Antidesma platyphylla, Bobea brevipes, Carex meyenii, Cryptocarya mannii, Diospyros sandwicensis, Diplazium sandwichianum, Dodonaea viscosa, Euphorbia haeleeleana, Gahnia beecheyi, Hedyotis* spp., *Hibiscus waimeae, Isodendrion laurifolium, Metrosideros polymorpha, Melicope* spp., *Myrsine lanaiensis, Nestegis sandwicensis, Panicum nephelophilum, Peucedanum sandwicense, Pisonia sandwicensis, Pittosporum kauaiensis, Pleomele aurea, Pouteria sandvicensis, Pritchardia minor, Psychotria hobdyi, Psydrax odoratum, Rauvolfia sandwicensis, Remya kauaiensis, Scaevola procera, Styphelia tameiameiae,* or *Xylosma hawaiiense;* and

(*2*) Elevations between 344 and 1,064 m (1,128 and 3,492 ft).

Family Rutaceae: *Melicope pallida* (alani)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Melicope pallida* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Steep rock faces in lowland to montane mesic to wet forests or shrubland and containing one or more of the following associated native plant species: *Abutilon sandwicense, Alyxia oliviformis, Artemisia australis, Boehmeria grandis, Carex meyenii, Chamaesyce celastroides* var *hanapepensis, Coprosma waimeae, Coprosma kauaensis, Dodonaea viscosa, Dryopteris* spp., *Hedyotis terminalis, Lepidium serra, Melicope* spp., *Metrosideros polymorpha, Nototrichium* spp., *Pipturus albidus, Pleomele aurea, Poa mannii, Psychotria mariniana, Pritchardia minor, Sapindus oahuensis, Schiedea membranacea, Tetraplasandra waialealae,* or *Xylosma hawaiiense;* and

(*2*) Elevations between 359 and 1,081 m (1,179 and 3,546 ft).

Family Rutaceae: *Zanthoxylum hawaiiense* (ae)

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Zanthoxylum hawaiiense* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Lowland dry or mesic forests dominated by *Metrosideros polymorpha* or *Diospyros sandwicensis,* and containing one or more of the following associated plant species: *Antidesma platyphyllum, Alectryon macrococcus, Charpentiera elliptica, Dodonaea viscosa, Melicope* spp., *Myrsine lanaiensis, Pisonia* spp., *Pleomele aurea, Streblus pendulinus,* or *Zanthoxylum dipetalum;* and

(*2*) Elevations between 464 and 887 m (1,522 and 2,911 ft).

Family Santalaceae: *Exocarpos luteolus* (heau)

Kauai I, J, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Exocarpos luteolus* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Wet places bordering swamps or bogs; open, or dry ridges in lowland or montane mesic *Acacia koa-Metrosideros polymorpha* dominated forest

communities with *Dicranopteris* and containing one or more of the following native plant species: *Acacia koa, Cheirodendron trigynum, Pouteria sandvicensis, Dodonaea viscosa, Pleomele aurea, Psychotria mariniana, Psychotria greenwelliae, Bobea brevipes, Hedyotis terminalis, Elaeocarpus bifidus, Melicope haupuensis, Dubautia laevigata, Dianella sandwicensis, Poa sandvicensis, Schiedea stellarioides, Peperomia macraeana, Claoxylon sandwicense, Santalum freycinetianum, Styphelia tameiameiae,* or *Dicranopteris linearis;* and

(*2*) Elevations between 361 and 1,466 m (1,183 and 4,808 ft).

Family Sapindaceae: *Alectryon macrococcus* (mahoe)

Kauai I, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Alectryon macrococcus* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) dry slopes or gulches in *Diospyros* spp.-*Metrosideros polymorpha* lowland mesic forest, *Metrosideros polymorpha* mixed mesic forest, or *Diospyros* spp. mixed mesic forest, containing one or more of the following native plant species: *Acacia koa, Alyxia oliviformis, Antidesma* spp., *Bobea timonioides, Caesalpinia kavaiensis, Canavalia* spp., *Carex meyenii, Carex wahuensis, Doodia kunthiana, Hibiscus waimeae, Kokia kauaiensis, Melicope knudsenii, Microlepia strigosa, Munroidendron racemosum, Myrsine lanaiensis, Nesoluma polynesicum, Nestegis sandwicensis, Pisonia* spp., *Pleomele* spp., *Pouteria sandvicensis, Psychotria* spp., *Psydrax odoratum, Pteralyxia* spp., *Rauvolfia sandwicensis, Streblus pendulinus, Tetraplasandra* spp., *Xylosma* spp., or *Zanthoxylum* spp.; and

(*2*) Elevations between 341 and 954 m (1,120 and 3,129 ft).

Family Solanaceae: *Nothocestrum peltatum* (aiea)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Nothocestrum peltatum* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Rich soil on steep slopes in mesic or wet forest dominated by *Acacia koa* or a mixture of *Acacia koa* and *Metrosideros polymorpha* and containing one or more of the following associated native plant species: *Alphitonia ponderosa, Antidesma* spp., *Bobea brevipes, Broussaisia arguta, Cheirodendron trigynum, Claoxylon sandwicense, Coprosma* spp., *Cryptocarya mannii, Dianella sandwicensis, Dicranopteris linearis, Diplazium sandwichianum, Dodonaea viscosa, Elaeocarpus bifidus, Hedyotis terminalis, Ilex anomala, Melicope anisata, M. barbigera, M. haupuensis, Perrottetia sandwicensis, Pleomele aurea, Pouteria sandvicensis, Psychotria mariniana, P. greenwelliae, Tetraplasandra kauaiensis,* or *Xylosma* spp.; and

(*2*) elevations between 725 and 1,290 m (2,378 and 4,232 ft).

Family Solanaceae: *Solanum sandwicense* (aiakeaakua, ppolo)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Solanum sandwicense* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Forest canopies in diverse lowland or montane *Acacia koa* or *Acacia koa-Metrosideros polymorpha* mesic forests or occasionally in wet forests and containing one or more of the following associated plant species: *Alphitonia ponderosa, Athyrium sandwicensis, Bidens* spp., *Carex meyenii, Coprosma* spp., *Cryptocarya mannii, Dianella sandwicensis, Dicranopteris linearis, Dubautia* spp., *Hedyotis* spp., *Ilex anomala, Melicope* spp., *Poa* spp., *Pouteria sandvicensis, Psychotria* spp., *Syzygium sandwicensis,* or *Xylosma hawaiiense;* and

(*2*) Elevations between 445 and 1,290 m (1,460 and 4,232 ft).

Family Violaceae: *Isodendrion laurifolium* (aupaka)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Isodendrion laurifolium* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Diverse mesic forest, dominated by *Metrosideros polymorpha, Acacia koa* or *Diospyros* spp. and containing one or more of the following associated native plant species: *Alphitonia ponderosa, Antidesma* spp., *Claoxylon sandwicense, Dodonaea viscosa, Dubautia* spp., *Elaeocarpus bifidus, Euphorbia haeleeleana, Hedyotis terminalis, Kokia kauaiensis, Melicope anisata, Melicope barbigera, Melicope ovata, Melicope peduncularis, Myrsine lanaiensis, Nestegis sandwicensis, Pisonia* spp., *Pittosporum glabrum, Pleomele aurea, Pouteria sandvicensis, Psydrax odoratum, Streblus pendulinus,* or *Xylosma hawaiiense;* and

(*2*) Elevations between 376 and 1,163 m (1,233 and 3,817 ft).

Family Violaceae: *Isodendrion longifolium* (aupaka)

Kauai E, I, J, K, L, N, and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Isodendrion longifolium* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Steep slopes and some flats in certain undisturbed areas, gulches, or stream banks in mesic or wet *Metrosideros polymorpha-Acacia koa* forests and containing one or more of the following native species: *Antidesma* spp., *Bidens* spp., *Bobea brevipes, Cheirodendron* spp., *Cibotium* spp., *Cyanea hardyi, Cyrtandra* spp., *Dicranopteris linearis, Diospyros* spp., *Eugenia* spp., *Hedyotis* spp., *Ilex anomala, Melicope* spp., *Nestegis sandwicensis, Peperomia* spp., *Perrottetia sandwicensis, Pipturus* spp., *Pittosporum* spp., *Pritchardia* spp., *Psychotria* spp., *Psydrax odoratum,* or *Syzygium* spp.; and

(*2*) Elevations between 38 and 1,541 m (125 and 5,057 ft).

Family Violaceae: *Viola helenae* (NCN)

Kauai N, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Viola helenae* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Stream drainage banks or adjacent valley bottoms in light to moderate shade in *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest or *Metrosideros polymorpha-Cheirodendron* wet forest and containing one or more of the following native plant species: *Antidesma platyphyllum* var. *hillebrandii, Broussaisia arguta, Dicranopteris linearis, Diplazium sandwichianum, Dubautia* spp., *Freycinetia arborea, Hesperomannia lydgatei, Melicope* spp., or *Pritchardia* spp.; and

(*2*) Elevations between 522 and 1,006 m (1,712 and 3,301 ft).

Family Violaceae: *Viola kauaiensis* var. *wahiawaensis* (nani waialeale)

Kauai N, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Viola kauaiensis* var. *wahiawaensis* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) *Machaerina angustifolia-Rhynchospora rugosa* lowland bog or mixed wet shrubland and adjacent *Metrosideros polymorpha* wet forest containing one or more of the following native plant species: *Antidesma platyphyllum* var. *hillebrandii, Bidens forbesii, Chamaesyce remyi, Chamaesyce sparsiflora, Coprosma grayana, Cyanea fissa, Dicranopteris linearis, Diplopterygium pinnatum, Dubautia imbricata, Dubautia raillardioides, Gahnia vitiensis, Lobelia kauaensis, Machaerina angustifolia, Machaerina mariscoides, Melicope spp., Psychotria wawrae, Sadleria pallida, Scaevola gaudichaudii, Sphenomeris chinensis, Styphelia tameiameiae, Syzygium sandwicensis, Tetraplasandra oahuensis,* or *Vaccinium dentatum;* and

(*2*) Elevations between 394 and 1,006 (1,291 and 3,301 ft).

(B) *Ferns and allies.*

Family Aspleniaceae: *Diellia erecta* (no common name)

Kauai O, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Diellia erecta* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Brown granular soil with leaf litter and occasional terrestrial moss on north facing slopes in deep shade, or on steep slopes or gulch bottoms in *Metrosideros polymorpha-Dicranopteris linearis* wet forest or *Metrosideros polymorpha* mixed mesic forest with *Acacia koa* and *Acacia koaia* as codominants and containing one or more of the following native plant species: *Asplenium aethiopicum, Asplenium contiguum, Asplenium macraei, Coprosma* spp., *Dodonaea viscosa, Dryopteris fusco-atra, Dryopteris unidentata, Hedyotis terminalis, Melicope* spp., *Microlepia strigosa, Myrsine* spp., *Nestegis sandwicensis, Psychotria* spp., *Styphelia tameiameiae, Syzygium sandwicensis,* and *Wikstroemia* spp.; and

(*2*) Elevations between 655 and 1,224 m (2,149 and 4,016 ft).

Family Aspleniaceae: *Diellia pallida* (no common name)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Diellia pallida* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Bare granular soil with dry to mesophytic leaf litter with pH of 6.9 to 7.9. on steep, talus slopes in lowland mesic forests and containing one or more of the following native plant species: *Acacia koa, Alectryon macrococcus, Alphitonia ponderosa, Alyxia oliviformis, Antidesma platyphyllum, Asplenium* spp., *Carex meyenii, Diospyros hillebrandii, Diospyros sandwicensis, Doodia kunthiana, Hedyotis knudsenii, Metrosideros polymorpha, Microlepia strigosa, Myrsine lanaiensis, Nestegis sandwicensis, Psychotria mariniana, Psydrax odoratum, Pteralyxia kauaiensis, Rauvolfia sandwicensis, Styphelia tameiameiae, Tetraplasandra kauaiensis, Wilkesia gymnoxiphium,* or *Zanthoxylum dipetalum;* and

(*2*) Elevations between 445 and 1,028 m (1,460 and 3,371 ft).

Family Aspleniaceae: *Diplazium molokaiense* (NCN)

Kauai I and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Diplazium molokaiense* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Brown soil with basalt outcrops near water falls in lowland or montane mesic *Metrosideros polymorpha-Acacia koa* forest; and

(*2*) Elevations between 476 and 1,284 m (1,562 and 4,212 ft).

Family Aspleniaceae: *Ctenitis squamigera* (pauoa)

Kauai I, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Ctenitis squamigera* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Rock faces in gulches in the understory of *Metrosideros polymorpha-Diospyros* spp. mesic forest and diverse mesic forest and containing one or more of the following native plant species: *Myrsine* spp., *Psychotria* spp., or *Xylosma* spp.; and

(*2*) Elevations between 568 and 1,069 m (1,863 and 3,507 ft).

Family Grammitidaceae: *Adenophorus periens* (pendant kihi fern)

Kauai I, J, K, L, M, N and O, identified in the legal descriptions in (a)(1)(i)(A), constitute critical habitat for *Adenophorus periens* on Kauai. Within these units, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) *Metrosideros polymorpha* trunks, in riparian banks of stream systems in well-developed, closed canopy that provides deep shade or high humidity in *Metrosideros polymorpha-Cibotium glaucum* lowland wet forests, open *Metrosideros polymorpha* montane wet forest, or *Metrosideros polymorpha-Dicranopteris linearis* lowland wet forest and containing one or more of the following native plant species: *Antidesma platyphyllum, Athyrium sandwicensis, Broussaisia* spp., *Cheirodendron trigynum, Cyanea* spp., *Cyrtandra* spp., *Dicranopteris linearis Freycinetia arborea, Hedyotis terminalis, Labordia hirtella, Machaerina angustifolia, Psychotria* spp., *Psychotria hexandra, Syzygium sandwicensis,* or *Tetraplasandra oahuensis;* and

(*2*) Elevations between 107 and 1,594 m (351 and 5,228 ft).

Family Lycopodiaceae: *Phlegmariurus nutans* (wawaeiole)

Kauai N, identified in the legal description in (a)(1)(i)(A), constitutes critical habitat for *Phlegmariurus nutans* on Kauai. Within this unit, the currently known primary constituent elements of critical habitat are the habitat components provided by:

(*1*) Tree trunks, usually on open ridges and slopes in *Metrosideros polymorpha/Dicranopteris linearis* wet forests and occasionally mesic forests and containing one or more of the following associated native plant species: *Antidesma platyphyllum, Broussaisia arguta, Cibotium chamissoi, Cheirodendron fauriei, Diploterygiun pinnatum, Hedyotis terminalis, Hibiscus kokio* ssp. *kokio, Melicope waialealae, Scaevola gaudichaudii, Syzygium sandwicensis, Perrottetia sandwicensis, Psychotria hexandra, P. mariniana,* or *P.* wawrae; and

(2) Elevations between 601 and 1,594 m (1,971 and 5,228 ft).

Dated: January 7, 2002.

Joseph E. Doddridge,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 02–687 Filed 1–25–02; 8:45 am]

BILLING CODE 4310–55–P