Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
*	*	*	*	*	*	*	
Pritchardia viscosa ..	Loulu	U.S.A. (HI)	Arecaceae—Palm ...	E		NA	NA
*	*	*	*	*	*	*	
Schiedea helleri	None	U.S.A. (HI)	Caryophyllaceae—Pink.	E		NA	NA
*	*	*	*	*	*	*	
Schiedea membranacea.	None	U.S.A. (HI)	Caryophyllaceae—Pink.	E		NA	NA
*	*	*	*	*	*	*	
Viola kauaensis var. *wahiawaensis.*	Nani wai'ale'ale	U.S.A. (HI)	Violaceae—Violet ...	E		NA	.....
*	*	*	*	*	*	*	

Dated: September 6, 1995.

John G. Rogers,

Acting Director, Fish and Wildlife Service.

[FR Doc. 95–23637 Filed 9–22–95; 8:45 am]

BILLING CODE 4310–55–M

50 CFR Part 17

RIN 1018–AD25

Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for Thirteen Plants From the Island of Hawaii, State of Hawaii

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines endangered status pursuant to the Endangered Species Act of 1973, as amended (Act), for 13 plants: *Clermontia drepanomorpha* ('oha wai), *Cyanea platyphylla* (haha), *Hibiscadelphus giffardianus* (hau kuahiwi), *Hibiscadelphus hualalaiensis* (hau kuahiwi), *Melicope zahlbruckneri* (alani), *Neraudia ovata* (no common name (NCN)), *Phyllostegia racemosa* (kiponapona), *Phyllostegia velutina* (NCN), *Phyllostegia warshaueri* (NCN), *Pleomele hawaiiensis* (hala pepe), *Pritchardia schattaueri* (loulu), *Sicyos alba* ('anunu), and *Zanthoxylum dipetalum* var. *tomentosum* (a'e). All 13 taxa are endemic to the island of Hawaii, Hawaiian Islands. The 13 plant taxa and their habitats have been variously affected or are currently threatened by one or more of the following—competition for space, light, water, and nutrients by naturalized, introduced vegetation; habitat degradation by wild, feral, or domestic animals (cattle, pigs, goats, and sheep); agricultural and residential development and recreational activities; habitat loss and damage to plants from fires; predation by animals (cattle, pigs, goats, sheep, insects, and rats); and natural disasters such as volcanic activity. Due to the small number of existing individuals and their very narrow distributions, these 13 taxa and their populations are subject to an increased likelihood of extinction and/or reduced reproductive vigor from natural disasters. This proposal, if made final, would implement the Federal protection provisions provided by the Act for listed plants. Listing under the Act would also trigger listed status for these 13 taxa under State law.

DATES: Comments from all interested parties must be received by November 24, 1995. Public hearing requests must be received by November 9, 1995.

ADDRESSES: Comments and materials concerning this proposal should be sent to Robert P. Smith, Manager, Pacific Islands Ecoregion, U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, Room 6307, P.O. Box 50167, Honolulu, Hawaii 96850. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Robert P. Smith, Manager, Pacific Islands Ecoregion (see **ADDRESSES** section) (telephone: 808/541–2749; facsimile: 808/541–2756).

SUPPLEMENTARY INFORMATION:

Background

Clermontia drepanomorpha ('oha wai), *Cyanea platyphylla* (haha), *Hibiscadelphus giffardianus* (hau kuahiwi), *Hibiscadelphus hualalaiensis* (hau kuahiwi), *Melicope zahlbruckneri* (alani), *Neraudia ovata* (no common name (NCN)), *Phyllostegia racemosa* (kiponapona), *Phyllostegia velutina* (NCN), *Phyllostegia warshaueri* (NCN), *Pleomele hawaiiensis* (hala pepe), *Pritchardia schattaueri* (loulu), Sicyos alba ('anunu), and *Zanthoxylum dipetalum* var. *tomentosum* (a'e) all are endemic to the island of Hawaii, Hawaiian Islands.

The island of Hawaii is the southernmost, easternmost, and youngest of the eight major Hawaiian Islands. This largest island of the Hawaiian archipelago is comprised of 10,458 square kilometers (sq km) (4,038 sq miles (mi)), or two-thirds of the land area of the State of Hawaii, giving rise to its common name, the ''Big Island.''

The Hawaiian Islands are volcanic islands formed over a ''hot spot,'' a fixed area of pressurized molten rock deep within the Earth. As the Pacific Plate, a section of the Earth's surface many miles thick, has moved to the northwest, the islands of the chain have separated. Currently, this hot spot is centered under the southeast part of the island of Hawaii, which is one of the most active volcanic areas on Earth. Five large shield volcanoes make up the island of Hawaii: Mauna Kea at 4,205 meters (m) (13,796 feet (ft)) and Kohala at 1,670 m (5,480 ft), both extinct; Hualalai, at 2,521 m (8,271 ft), which is dormant and will probably erupt again; and Mauna Loa at 4,169 m (13,677 ft) and Kilauea at 1,248 m (4,093 ft), both of which are currently active and adding land area to the island. Compared to Kauai, which is the oldest of the main islands and was formed about 5.6 million years ago, Hawaii is very young, with fresh lava and land up to 0.5 million years old (Cuddihy and Stone 1990, Culliney 1988, Department of Geography 1983, Macdonald *et al.* 1983).

Because of the large size and range of elevation of the island, Hawaii has a

great diversity of climates. Windward (northeastern) slopes of Mauna Loa have rainfall up to 300 centimeters (cm) (118 inches (in)) per year in some areas. The leeward coast, shielded by the mountains from rain brought by trade winds, has areas classified as desert that receive as little as 20 cm (7.9 in) of rain annually. The summits of Mauna Loa and Mauna Kea experience snowfall each year, and Mauna Kea was glaciated during the last Ice Age (Culliney 1988, Department of Geography 1983, Macdonald *et al*. 1983, Wagner *et al*. 1990).

Plant communities on Hawaii include those in various stages of primary succession on the slopes of active and dormant volcanoes, ones in stages of secondary succession following disturbance, and relatively stable climax communities. On Hawaii, vegetation is found in all classifications—coastal, dryland, montane, subalpine, and alpine; dry, mesic, and wet; and herblands, grasslands, shrublands, forests, and mixed communities. The vegetation and land of the island of Hawaii have undergone much change through the island's history. Since it is an area of active volcanism, vegetated areas are periodically replaced with bare lava. Polynesian immigrants, first settling on Hawaii by 750 A.D., made extensive alterations to lowland areas for agriculture and habitation. European contact with Hawaii brought intentional and inadvertent introductions of alien plant and animal taxa. In 1960, 65 percent of the total land area of the island of Hawaii was used for grazing, and much land has also been converted to modern cropland (Cuddihy and Stone 1990, Gagne and Cuddihy 1990).

The 13 taxa included in this rule occur between 120 and 1,850 m (400 and 6,080 ft) in elevation in various portions of the island of Hawaii. Most of the proposed taxa exist as remnant plants persisting in grazed areas or in higher elevations which have only recently been heavily invaded by alien plant and animal taxa. The proposed taxa grow in a variety of vegetation communities (pioneer lava, shrublands, and forests), elevational zones (lowland and montane) and moisture regimes (dry, mesic, and wet). In lowland habitats, the proposed taxa are found in pioneer lava, shrubland, dry forest, mesic forest, and wet forest. In montane habitats, the proposed taxa are found in dry forest, mesic forest, and wet forest.

The lands on which these 13 plant taxa are found are owned by various private parties, the State of Hawaii (including conservation district lands, forest reserves, natural area reserves, and plant and wildlife sanctuaries), or are owned or managed by the Federal government (including a U.S. Fish and Wildlife Service refuge and a National Park).

Discussion of the 13 Taxa Included in This Proposed Rule

Joseph F. Rock (1913) named *Clermontia drepanomorpha* on the basis of specimens collected in the Kohala Mountains of the island of Hawaii in the early 1900s. This taxonomy has been upheld in the latest treatment of the genus (Lammers 1990).

Clermontia drepanomorpha, of the bellflower family (Campanulaceae), is a terrestrial or epiphytic (not rooted in the soil), branching tree 2.5 to 7 m (8.2 to 23 ft) tall. The stalked leaves are 10 to 27 cm (4 to 11 in) long and 1.5 to 4.5 cm (0.6 to 1.8 in) wide. Two to four flowers, each with a stalk 2 to 3.5 cm (0.8 to 1.4 in) long, are positioned at the end of a main flower stalk 5 to 12 cm (2 to 5 in) long. The calyx (fused sepals) and corolla (fused petals) are similar in size and appearance, and each forms a slightly curved, five-lobed tube 4 to 5.5 cm (1.6 to 2.2 in) long and 1.5 to 2 cm (0.6 to 0.8 in) wide which is blackish purple. The berries are orange and 2 to 3 cm (0.8 to 1.2 in) in diameter. This species is distinguished from others in this endemic Hawaiian genus by similar sepals and petals, the long drooping inflorescence, and large blackish purple flowers (Lammers 1990, Rock 1919).

Historically, *Clermontia drepanomorpha* was known from four populations in the Kohala Mountains on the island of Hawaii (Hawaii Heritage Program (HHP) 1993a1 to 1993a4, Rock 1913, Skottsberg 1944, Stemmermann and Jacobson 1987). Two populations of the species are known to be extant, on State-owned land in Forest Reserve and Puu o Umi Natural Area Reserve (NAR), with both populations bordering private ranch lands. The two known populations near Eke and along the Hamakua Ditch Trail are about 5.5 km (3.4 mi) apart. Thirteen to 20 individuals are known to exist (Corn 1983; HHP 1993a1, 1993a4; Hawaii Plant Conservation Center (HPCC) 1993a; Marie M. Bruegmann, U.S. Fish and Wildlife Service (USFWS), *in litt.*, 1994; Carolyn Corn, Hawaii Division of Forestry and Wildlife (DOFAW), *in litt.*, 1994).

This species typically grows in *Metrosideros polymorpha* ('ohi'a) and *Cibotium glaucum* (tree fern) dominated Montane Wet Forests, often epiphytically, at elevations between 1,170 and 1,570 m (3,850 and 5,150 ft) (Corn 1983; HHP 1993a1, 1993a4; HPCC 1993a). Associated taxa include *Cheirodendron trigynum* ('olapa), *Carex alligata*, *Melicope clusiifolia* (alani), *Styphelia tameiameiae* (pukiawe), *Astelia menziesii* (pa'iniu), *Rubus hawaiiensis* ('akala), *Cyanea pilosa* (haha), and *Coprosma* sp. (pilo) (HHP 1993a1, HPCC 1993a).

The major threats to *Clermontia drepanomorpha* are ditch improvements, competition from alien plant taxa such as *Rubus rosifolius* (thimbleberry), habitat disturbance by feral pigs (*Sus scrofa*), girdling of the stems by rats (*Rattus* spp.), and a risk of extinction from naturally occurring events (such as hurricanes) and/or reduced reproductive vigor due to the small number of existing populations and individuals (Bruegmann 1990, Center for Plant Conservation (CPC) 1990, HHP 1993a1, HPCC 1993a).

Asa Gray (1861) named *Delissea platyphylla* from a specimen collected by Horace Mann and W.T. Brigham in the Puna District of the island of Hawaii. Wilhelm Hillebrand (1888) transferred the species to *Cyanea*, creating *Cyanea platyphylla*. Harold St. John (1987a, St. John and Takeuchi 1987), believing there to be no generic distinction between *Cyanea* and *Delissea*, transferred the species back to the genus Delissea, the older of the two generic names. The current treatment of the family (Lammers 1990), however, maintains the separation of the two genera. The following taxa have been synonymized with *Cyanea platyphylla*: *C. bryanii*, *C. crispohirta*, *C. fernaldii*, *C. nolimetangere*, *C. pulchra*, and *C. rollandioides*.

However, some field biologists feel that *C. fernaldii*, represented by the Laupahoehoe populations, is a distinct entity that should be resurrected as a separate species (Frederick Warshauer, USFWS, pers. comm., 1994).

Cyanea platyphylla, of the bellflower family, is an unbranched palm-like shrub 1 to 3 m (3 to 10 ft) tall with stems that are covered with short, sharp, pale spines on the upper portions, especially as juveniles. This species has different leaves in the juvenile and adult plants. The juvenile leaves are 10.5 to 25 cm (4.1 to 10 in) long and 4 to 7.5 cm (1.6 to 3.0 in) wide, with prickles on leaves and stalks. Adult leaves are 34 to 87 cm (13 to 34 in) long and 7 to 22 cm (2.8 to 8.7 in) wide, and are only sparsely prickled. Six to 25 flowers are clustered on the end of a main stalk 20 to 90 cm (8 to 35 in) long, and each flower has a stalk 1 to 2.5 cm (0.4 to 1 in) long. The hypanthium is topped by five small, triangular calyx lobes. Petals, which are white or yellowish white with magenta stripes, are fused into a curved tube with five spreading lobes. The corolla is 4.2 to 5.4 cm (1.7 to 2.1 in) long and 5

to 10 millimeters (mm) (0.2 to 0.4 in) wide. Berries are pale orange, 8 to 10 mm (0.3 to 0.4 in) long, and 6 to 8 mm (0.2 to 0.3 in) wide. The species differs from others in this endemic Hawaiian genus by its juvenile and adult leaves, precocious flowering, and smaller flowers (Lammers 1990).

Cyanea platyphylla was historically known from the Kohala Mountains, Laupahoehoe in the Hamakua District, in the mountains above Hilo, Pahoa, Glenwood, Honaunau in South Kona, and the unknown location ''Kalanilehua'' (HHP 1991a1 to 1991a4, 1991a7, 1991a8, 1991a11, 1991a12, 1993b; Rock 1917, 1919, 1957; Skottsberg 1926; Wimmer 1943 and 1968). Only five mature individuals and two juveniles are known to still exist in one population in Laupahoehoe NAR (CPC 1989, 1990; Cuddihy *et al.* 1982; HHP 1991a6; HPCC 1991a; C. Corn, *in litt.*, 1994), which is owned and managed by the State of Hawaii. Two additional populations in Laupahoehoe NAR have not been seen since 1982 and could not be relocated in 1989, and a third population near the Saddle Road, last seen in 1977, has also probably been extirpated. The only remaining population of this species has been fenced by the NAR System to protect it from pig depredation (Cuddihy *et al.* 1982; HHP 1991a5, 1991a9, 1991a10; Linda Pratt, Hawaii Volcanoes National Park (HVNP), pers. comms., 1991 and 1994).

Cyanea platyphylla is typically found in *Metrosideros polymorpha* ('ohi'a)—*Acacia koa* (koa) Lowland and Montane Wet Forests at elevations between 120 and 915 m (390 and 3,000 ft) (Lammers 1990). Associated taxa include *Cibotium* sp. (tree fern), *Athyrium sandwichianum* (ho'i'o), *Antidesma* sp. (hame), *Clermontia* spp. ('oha wai), *Hedyotis* sp. (pilo), and *Cyrtandra* spp. (ha'iwale) (HHP 1991a6, HPCC 1991a).

The major known threats to *Cyanea platyphylla* are pigs; habitat-modifying introduced plant taxa, including *Psidium cattleianum* (strawberry guava), *Psidium guajava* (guava), *Passiflora ligularis* (sweet granadilla), and thimbleberry; and rats, which may eat the fruit (Cuddihy *et al.* 1982; HHP 1991a6, 1991a9; HPCC 1991a; M. Bruegmann, *in litt.*, 1994; L. Pratt, pers. comm., 1994). Another threat is the risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the single known population of few individuals.

Rock (Radlkofer and Rock 1911) named *Hibiscadelphus giffardianus* to honor W.M. Giffard, who first saw the taxon in 1911. This species was used as the type specimen to describe *Hibiscadelphus* as a new genus, meaning ''brother of *Hibiscus*'' (Bryan 1971). This taxonomy has been upheld in the latest treatment of the genus (Bates 1990).

Hibiscadelphus giffardianus, of the mallow family (Malvaceae), is a tree up to 7 m (23 ft) tall with the trunk up to 30 cm (12 in) in diameter and whitish bark. The leaf blades are heart-shaped and 10 to 30 cm (4 to 12 in) long with a broad tip, a notched base, and stalks nearly as long as the blades. Flowers are typically solitary in the axils of the leaves and have stalks 1.5 to 4 cm (0.6 to 1.6 in) long. Five to seven filament-like bracts are borne below each flower and the calyx is pouch-like. The overlapping petals form a curved bisymmetrical flower with the upper petals longer, typical of bird-pollinated flowers. The flowers are grayish green on the outside and dark magenta within, and 5 to 7 cm (2 to 3 in) long. The fruit is woody with star-shaped hairs. This species differs from others in this endemic Hawaiian genus by its flower color, flower size, and filamentous bracts (Baker and Allen 1976b, Bates 1990, Degener 1932a, Degener and Degener 1977, Radlkofer and Rock 1911).

Only one tree of *Hibiscadelphus giffardianus* has ever been known in the wild, from Kipuka Puaulu (or Bird Park) in HVNP. This tree died in 1930, but plants exist in cultivation from seeds originally collected by Giffard before the tree died (Degener 1932a). Cuttings from these cultivated trees have been planted back into the now fenced original habitat at Kipuka Puaulu and currently nine mature plants and two suckers are known to exist (Baker and Allen 1977; Bishop and Herbst 1973; HHP 1991b; HPCC 1991b1, 1991b2; M. Bruegmann, *in litt.*, 1994). Individuals planted in Kipuka Ki were later determined to be hybrids and were removed by Park personnel (Baker and Allen 1977, Mueller-Dombois and Lamoureux 1967). The cultivated plants in Kipuka Puaulu have spontaneously produced fertile hybrids with cultivated plants of *Hibiscadelphus hualalaiensis* that were also planted into Kipuka Puaulu and Kipuka Ki. Both the *Hibiscadelphus hualalaiensis* and the hybrids have been removed from the Park (Baker and Allen 1976a, 1977; Carr and Baker 1977). *Hibiscadelphus giffardianus* has been listed as endangered in the *IUCN Plant Red Data Book* (Lucas and Synge 1978).

This taxon grows in mixed Montane Mesic Forest at elevations between 1,200 and 1,310 m (3,900 and 4,300 ft) (Bates 1990; HHP 1991b; HPCC 1991b1, 1991b2). Associated taxa include 'ohi'a, koa, *Sapindus saponaria* (a'e), ho'i'o, *Coprosma* sp. (pilo), *Pipturus albidus* (mamaki), *Psychotria* sp. (kopiko), *Nestegis sandwicensis* (olopua), *Melicope* sp. (alani), *Dodonaea viscosa* ('a'ali'i), *Myoporum sandwicense* (naio), and introduced grasses (HHP 1991b; HPCC 1991b1, 1991b2).

The major threats to *Hibiscadelphus giffardianus* are bark, flower, and fruit feeding by roof rats (*Rattus rattus*); leaf damage in the form of stippling and yellowing by *Sophonia rufofascia* (two-spotted leafhopper) and yellowing by the native plant bug *Hyalopeplus pellucidus*; competition from the alien grasses *Ehrharta stipoides* (meadow ricegrass), *Paspalum conjugatum* (Hilo grass), and *Paspalum dilatatum* (Dallis grass); habitat change from volcanic activity; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing cultivated individuals, all from a single parent (Baker and Allen 1978; M. Bruegmann, *in litt.*, 1994; L. Pratt, pers. comm., 1994). Cattle (*Bos taurus*) were known in the area before it became a National Park and probably had a large influence on the habitat (Anonymous 1920, Rock 1913, St. John 1981).

Rock (Radlkofer and Rock 1911) named *Hibiscadelphus hualalaiensis* after Hualalai, the volcano on which the plant was found in 1909 (Rock 1913). This taxonomy has been upheld in the latest treatment of the genus (Bates 1990).

Hibiscadelphus hualalaiensis, of the mallow family, is a tree 5 to 7 m (16 to 23 ft) tall with the trunk up to 30 cm (12 in) in diameter and whitish bark. The leaf blades are heart-shaped and 10 to 15 cm (4 to 6 in) long with a broad tip, a notched base, stellate hairs, and stalks 4 to 10 cm (1.5 to 4 in) long. One or two flowers are borne in the axils of the leaves and have stalks 1.5 to 14 cm (0.6 to 5.5 in) long. Five toothlike bracts are borne below each flower and the calyx is tubular or pouch-like. The overlapping petals form a curved bisymmetrical flower with longer upper petals, typical of bird-pollinated flowers. The flowers are greenish yellow on the outside and yellowish green, fading to purplish within, and 2 to 5.5 cm (0.8 to 2.2 in) long. The fruit is woody and the seeds have a dense covering of hairs. The species differs from others in this endemic Hawaiian genus by its flower color, smaller flower size, and toothlike bracts (Baker and Allen 1976b, Bates 1990, Degener 1932b, Radlkofer and Rock 1911).

Hibiscadelphus hualalaiensis was historically known from three populations, located in the Puu Waawaa region of Hualalai, on the island of

Hawaii (HHP 1993c1 to 1993c3; HPCC 1990a, 1991c, 1992a). The last known wild tree was in Puu Waawaa I Plant Sanctuary, owned and managed by the Department of Land and Natural Resources, State of Hawaii. This tree died in 1992, but 12 cultivated trees have been planted within the fenced sanctuary (HHP 1993c2; M. Bruegmann, *in litt.,* 1994; Joel Lau, HHP, *in litt.,* 1991). In addition, approximately ten cultivated plants can be found near the State's Kokia Sanctuary in Kaupulehu (HPCC 1990a; Steven Bergfeld, DOFAW, pers. comm., 1994). Cultivated individuals were planted in Kipuka Puaulu in HVNP, but were removed to prevent further hybridization with the *Hibiscadelphus giffardianus* plants that are native to the kipuka (Baker and Allen 1977, 1978).

This species grows in mixed Dry to Mesic Forest remnants on lava fields, at elevations between 915 and 1,020 m (3,000 and 3,350 ft) (Bates 1990; HHP 1993c3; HPCC 1991c, 1992a). Associated taxa include 'ohi'a, *Diospyros sandwicensis* (lama), *Sophora chrysophylla* (mamane), naio, *Pouteria sandwicensis* ('ala'a), *Charpentiera* sp. (papala), *Nothocestrum* sp. ('aiea), *Claoxylon sandwicense* (po'ola), and *Pennisetum clandestinum* (Kikuyu grass) (HHP 1993c3; HPCC 1991c, 1992a; J. Lau, *in litt.*, 1991).

The major threats to *Hibiscadelphus hualalaiensis* are fire; cattle, pigs, and sheep (*Ovis aries*) that may get through the fence; flower and seed feeding by roof rats; competition from alien plants such as Kikuyu grass and *Lantana camara* (lantana); ranching activities; habitat change from volcanic activity; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of known cultivated individuals from a single parent (Anonymous 1920; Baker and Allen 1978; HHP 1993c3; HPCC 1991c, 1992a; M. Bruegmann, *in litt.,* 1994).

Based on a specimen he collected in 1911 in Kipuka Puaulu, on the island of Hawaii, Rock (1913) described *Pelea zahlbruckneri,* in honor of Dr. A. Zahlbruckner, director of the Botanical Museum in Vienna. *Pelea* has since been submerged into *Melicope,* creating the combination *Melicope zahlbruckneri* (Stone *et al.* 1990).

Melicope zahlbruckneri, of the citrus family (Rutaceae), is a medium-sized tree 10 to 12 m (33 to 40 ft) tall. New growth is covered with yellowish brown, fine, short, curly hairs. The opposite, stalked, elliptically oblong leaves are 6 to 24 cm (2.4 to 9.5 in) long and 4 to 12.5 cm (1.6 to 4.9 in) wide, with well defined lateral veins. Clusters of two to five flowers have main flowering stalks 15 to 20 cm (5.9 to 7.9 in) long and each flower has a stalk about 0.4 cm (0.2 in) long. Female flowers consist of four sepals about 1.5 mm (0.05 in) long, four petals about 3 mm (0.1 in) long, an eight-lobed nectary disk, eight reduced and nonfunctional stamens, and a hairless four-celled ovary. Male flowers consist of four sepals 3.5 mm (0.01 in) long, four petals about 6 mm (0.2 in) long, and eight functional stamens in two whorls equal to or longer than the petals. The fruit is squarish, 12 to 14 mm (0.4 to 0.5 in) long, and up to 30 mm (1.2 in) wide. *Melicope zahlbruckneri* is distinguished from other species of the genus by its branching habit, large leaves, and very large, squarish capsules (Rock 1913, Stone 1969, Stone *et al.* 1990).

Historically, *Melicope zahlbruckneri* was known only from the island of Hawaii near Glenwood, in Kipuka Puaulu, and at Moaula in Kau (Degener 1930, HHP 1991c1 to 1991c3, HPCC 1991d, Rock 1913, Stone 1969, Stone *et al.* 1990). Today, the species is known to be extant only in Kipuka Puaulu, on land owned by HVNP, with 30 to 35 individuals remaining (HHP 1991c2; HPCC 1991d; L. Pratt, pers. comm., 1994). The species is reproducing at this fenced site, and juvenile plants are present (L. Pratt, pers. comm., 1994). This species is found in koa- and 'ohi'a-dominated Montane Mesic Forest at elevations between 1,195 and 1,300 m (3,920 and 4,265 ft) (HHP 1991c2, HPCC 1991d, Stone *et al.* 1990). Associated taxa include pilo, a'e, mamaki, kopiko, olopua, naio, *Pisonia* sp. (papala), several species of *Melicope* (alani), ho'i'o, 'a'ali'i, and the introduced grasses, meadow ricegrass, Hilo grass, and Dallis grass (HHP 1991c2; HPCC 1991d; M. Bruegmann, *in litt.,* 1994; L. Pratt, pers. comm., 1994).

The major threats to *Melicope zahlbruckneri* are the two-spotted leafhopper; competition from the introduced grasses meadow ricegrass, Hilo grass, and Dallis grass; habitat change due to volcanic activity; potential fruit damage by rats; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of individuals in the one remaining population (HPCC 1991d; M. Bruegmann, *in litt.*, 1994; L. Pratt, pers. comm., 1994).

Neraudia pyrifolia was named by Charles Gaudichaud-Beaupré from material he collected in the early 1800s on the island of Hawaii (Cowan 1949). This name was determined to be invalidly published, lacking an adequate description. Gaudichaud-Beaupré named *Neraudia ovata* from an additional specimen, and this has been maintained in the current taxonomic treatment for the species. H.A. Weddell considered this taxon a variety of *Neraudia melastomifolia,* but this has not been upheld by other taxonomists. S.L. Endlicher and E.G. Steudel placed this species in the genus *Boehmeria,* but the current taxonomic treatment maintains *Neraudia* as an endemic Hawaiian genus. Harold St. John named a new species, *Neraudia cookii,* from a collection by David Nelson on Cook's 1779 voyage to Hawaii (St. John 1976). That specimen is considered to be *Neraudia ovata* in the current taxonomic treatment (Cowan 1949, Wagner *et al.* 1990).

Neraudia ovata, of the nettle family (Urticaceae), is a sprawling or rarely erect shrub with stems 1 to 3 m (3 to 10 ft) long, and branches bearing short, somewhat erect hairs. The alternate, thin, stalked leaves are smooth-margined, grayish on the undersurface, 5 to 14 cm (2 to 5.5 in) long and 2 to 6.5 cm (0.8 to 2.6 in) wide, and have spreading, curved, nearly translucent hairs. Male and female flowers are found on separate plants. Male flowers have extremely short stalks and a densely hairy calyx. Female flowers have no stalks and a densely hairy, boat-shaped calyx. The fruit is an achene (a dry one-seeded fruit that does not open at maturity). This species is distinguished from others in this endemic Hawaiian genus by the density, length, and posture of the hairs on the lower leaf surface; smooth leaf margin; and the boat-shaped calyx of the female flower (Cowan 1949, Wagner *et al.* 1990).

Historically, *Neraudia ovata* was found on the island of Hawaii on the Kona coast from North Kona and Kau (Cowan 1949; HHP 1991d1 to 1991d3, 1993d1 to 1993d7; Hillebrand 1888; St. John 1976 and 1981; Skottsberg 1944). Only one extant population of two individuals is known from privately owned land in Kaloko, North Kona (Nishida 1993; Warshauer and Gerrish 1993; M. Bruegmann, *in litt.,* 1994). An additional population at Kipuka Kalawamauna, on the boundary of the U.S. Army's Pohakuloa Training Area, was last seen in 1980 and is assumed to be extirpated (HHP 1993d4, 1993d5).

Neraudia ovata grows in open 'ohi'a- and mamane-dominated Lowland and Montane Dry Forests at elevations of 115 m (380 ft) at Kaloko and 1,325 and 1,460 m (4,350 to 4,800 ft) at Kipuka Kalawamauna (HHP 1993d4, 1993d5; Nishida 1993; M. Bruegmann, *in litt.,* 1994). Associated taxa include *Reynoldsia sandwicensis* ('ohe), naio,

Cocculus triloba (huehue), and *Schinus terebinthifolius* (Christmas berry), as well as the federally endangered *Nothocestrum breviflorum* (ai'ae), proposed endangered *Pleomele hawaiiensis* (hala pepe), and other species of concern, including *Capparis sandwichiana* (pua pilo), *Fimbristylis hawaiiensis*, and *Bidens micrantha* ssp. *ctenophylla* (ko'oko'olau) (Nishida 1993; Warshauer and Gerrish 1993; M. Bruegmann, *in litt.*, 1994).

The major threats to *Neraudia ovata* are competition from alien plants such as Christmas berry, *Leucaena leucocephala* (koa haole), and *Pennisetum setaceum* (fountain grass); habitat change due to volcanic activity; residential development; insects such as spiralling whitefly (*Aleurodicus dispersus*); and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing individuals in the one remaining population (Nishida 1993; M. Bruegmann, *in litt.*, 1994).

From a specimen collected by James Macrae on Mauna Kea, on the island of Hawaii, Bentham named *Phyllostegia racemosa* in 1830 (Sherff 1935). The current treatment of the genus includes E.E. Sherff's (1935) *Phyllostegia racemosa* var. *bryanii* with *Phyllostegia mannii*, rather than with this species (Wagner *et al.* 1990).

Phyllostegia racemosa, of the mint family (Lamiaceae), is a climbing vine with many-branched, square stems and spicy-smelling leaves. Leaves are opposite, moderately covered with short, soft hairs, dotted with small glands, 3.4 to 6 cm (1.3 to 2.4 in) long, and 1.4 to 4.3 cm (0.6 to 1.7 in) wide, with shallow, rounded teeth. The leaf stalks are densely covered with short hairs. Flower clusters, densely covered with short soft hairs, are comprised of 6 to 12 flowers with individual flower stalks 1 to 3 mm (0.04 to 0.12 in) long and leaflike bracts. The green bell-shaped calyx is about 3.5 to 5 mm (0.1 to 0.2 in) long, covered with glands, and has triangular lobes. The white corolla is two-lipped, with a tube about 7 to 10 mm (0.3 to 0.4 in) long, upper lip 2 to 2.5 mm (0.08 to 0.1) long, and lower lip 4 to 5 mm (0.16 to 0.2 in) long. Fruits are divided into four nutlets about 1.5 to 2 mm (0.06 to 0.08 in) long. This species is distinguished from others in this genus by its leaf shape, lack of a main stalk to the flower clusters, and calyx teeth that are rounded and shallow (Hillebrand 1888, Sherff 1935, Wagner *et al.* 1990).

Historically, *Phyllostegia racemosa* was found only on the island of Hawaii in the Hakalau and Saddle Road areas of Mauna Kea and the Kulani/Keauhou and Kipuka Ahiu areas of Mauna Loa (Clarke *et al.* 1983; HHP 1990a1, 1991a2, 1991e1 to 1991e4; Pratt and Cuddihy 1990; Sherff 1935, 1951; Jack Jeffrey, USFWS, *in litt.*, 1993; Jaan Lepson, University of Hawaii (UH), *in litt.*, 1990). Today, three populations of the species are known to occur on private and State lands in the Kulani/Keauhou area and on Federal land managed as the Hakalau National Wildlife Refuge. Together, these three populations comprise 25 to 45 individuals (HHP 1991e1, 1991e4; HPCC 1991d; J. Jeffrey, *in litt.*, 1993; J. Lepson, *in litt.*, 1993; J. Jeffrey, pers. comm., 1994).

Phyllostegia racemosa is typically found epiphytically in disturbed koa-, 'ohi'a-, and tree fern-dominated Montane Mesic or Wet Forests at elevations between 1,400 and 1,850 m (4,650 to 6,070 ft) (Clarke *et al.* 1983; HHP 1991e1, 1991e4; HPCC 1991e; Wagner *et al.* 1990; J. Jeffrey, *in litt.*, 1993). Associated taxa include *Vaccinium calycinum* (ohelo), *Rubus hawaiiensis* (akala), and *Dryopteris wallichiana*.

The major threats to *Phyllostegia racemosa* are habitat disturbance by feral pigs and cattle; logging; competition from alien plant taxa such as *Passiflora mollissima* (banana poka), Kikuyu grass, *Anthoxanthum odoratum* (sweet vernalgrass), and *Paspalum urvillei* (Vasey grass); habitat change due to volcanic activity; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing populations and individuals (Clarke *et al.* 1983; HHP 1991e1, 1991e4; HPCC 1991e; Pratt and Cuddihy 1990).

Based on a specimen collected on Mauna Kea by the U.S. Exploring Expedition in 1840, Sherff described a new variety of *Phyllostegia macrophylla*, variety *velutina*, named for its velvety leaves and stems (Sherff 1935). St. John (1987b) determined that this entity was sufficiently different to constitute a separate species, *Phyllostegia velutina*, which has been maintained in the current treatment of the genus (Wagner *et al.* 1990).

Phyllostegia velutina, of the mint family, is a climbing vine with dense, backward-pointing hairs on the leaves and square stems. The hairs are silky on the opposite, narrow, toothed leaves, which are 9.2 to 17.5 cm (3.6 to 6.9 in) long and 2.5 to 5 cm (1 to 2 in) wide. Six to 10 flowers are borne in an unbranched inflorescence with conspicuous leaflike bracts. The green bell-shaped calyx is 6 to 7 mm (0.2 to 0.3 in) long, densely covered with upward-pointing hairs, and has triangular lobes. The white corolla is densely covered with upward-pointing hairs and is two-lipped, with a slightly curved tube about 12 mm (0.4 in) long, upper lip 5 to 7 mm (0.2 to 0.3 in) long, and lower lip 4 to 5 mm (0.1 to 0.2 in) long. Fruits are divided into four nutlets about 4 to 5 mm (0.1 to 0.2 in) long. This species is distinguished from others in this genus by its silky hairs, lack of a main stalk to the flower clusters, and calyx teeth that are narrow and sharply pointed (Sherff 1935, Wagner *et al.* 1990).

Historically, *Phyllostegia velutina* occurred on the island of Hawaii on the southern slopes of Hualalai and the eastern, western, and southern slopes of Mauna Loa (Clarke *et al.* 1983, HHP 1991f1 to 1991f4, Sherff 1935, Wagner *et al.* 1990). Two extant populations are known to occur at Puu Waawaa on a State-owned wildlife sanctuary and at Kulani/Keauhou on a State-owned correctional facility and adjacent privately owned land (Clarke *et al.* 1983; HHP 1991f1; HPCC 1990b, 1991f, 1992b; M. Bruegmann, *in litt.*, 1994; Jon Giffin, DOFAW, pers. comm., 1994). Approximately 25 to 50 plants are known from these two populations (HHP 1991f1; HPCC 1990b, 1991f, 1992b; M. Bruegmann, *in litt.*, 1994). A third population has been reported from the general area of Waiea Tract in South Kona, but the exact location and current status of this population are unknown (HHP 1991f2).

Phyllostegia velutina typically grows in 'ohi'a- and koa-dominated Montane Mesic and Wet Forests at elevations between 1,490 and 1,800 m (4,900 and 6,000 ft) (Clarke *et al.* 1983; HHP 1991f1; HPCC 1990b, 1991f, 1992b; Wagner *et al.* 1990). Associated taxa include tree ferns, *Cheirodendron trigynum* ('olapa), 'ohelo, pilo, *Dryopteris wallichiana*, akala, mamaki, ho'i'o, *Myrsine* sp. (kolea), and *Ilex anomala* (kawa'u).

Threats to *Phyllostegia velutina* are habitat damage by cattle, feral pigs and sheep; prison facility expansion, road clearing, and logging; competition from alien plants such as Kikuyu grass, *Rubus ellipticus* (yellow Himalayan raspberry), Vasey grass, and fountain grass; fire; habitat change due to volcanic activity; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing populations and individuals (HHP 1991f1; HPCC 1990b, 1991f, 1992b; M. Bruegmann, *in litt.*, 1994).

Phyllostegia ambigua var. *longipes* was first collected by J.M. Lydgate and named by Hillebrand (1888). The type

locality was suggested to be ''probably East Maui'' (Hillebrand 1888), but this is assumed to be in error, since Rock's field notes indicate that he and Lydgate were in the Kohala Mountains at the time of that collection (Cuddihy 1982, Wagner *et al.* 1990). E.E. Sherff did not consider *Phyllostegia ambigua* different from *Phyllostegia brevidens*, and created the combination *Phyllostegia brevidens* var. *longipes* (Sherff 1935). Based on newly collected material, St. John considered this variety sufficiently different to warrant designation as the species *Phyllostegia warshaueri* (St. John 1987b). The current treatment has maintained this species (Wagner *et al.* 1990).

Phyllostegia warshaueri, of the mint family, is either a sprawling or climbing vine with end branches turning up, covered with upward-pointing fine, short hairs on the square stems which are about 1 to 3 m (3.3 to 10 ft) long. The opposite, nearly hairless, toothed leaves are 9.5 to 20 cm (3.7 to 7.9 in) long and 2 to 6.6 cm (0.8 to 2.6 in) wide. Six to 14 flowers are borne in an unbranched inflorescence up to 20 cm (7.9 in) long with a main stalk 25 to 40 mm (1.0 to 1.6 in) long and conspicuous leaflike bracts. The green, hairless, cone-shaped calyx is 6 to 8 mm (0.2 to 0.3 in) long and has triangular lobes. The corolla is white with a dark rose upper lip, sparsely hairy, and has a tube about 18 to 20 mm (0.7 to 0.8 in) long, upper lip about 6 mm (0.2 in) long, and lower lip 12 to 15 mm (0.5 to 0.6) long. Fruits are divided into four nutlets about 6 to 7 mm (0.2 to 0.3 in) long. This species is distinguished from others in this genus by its long main stalk to the flower clusters, toothed leaves, and the distribution of hairs (Sherff 1935, Wagner *et al.* 1990).

Historically, *Phyllostegia warshaueri* was found only on the island of Hawaii, in the Hamakua region on the northern slopes of Mauna Kea and in the Kohala Mountains (Clarke *et al.* 1981; Cuddihy 1982; HHP 1991g1 to 1991g3, 1993e). The only known individual occurs near the Hamakua Ditch Trail in the Kohala Mountains, on privately owned land (HPCC 1992c; M. Bruegmann, *in litt.*, 1994). This species grows in 'ohi'a Montane Wet Forest in which koa or olapa may codominate, at elevations between 730 and 1,150 m (2,400 and 3,770 ft) (Clarke *et al.* 1981; Cuddihy *et al.* 1982; HHP 1991g1, 1991g2; HPCC 1992c; Wagner *et al.* 1990). Associated taxa include *Sadleria* sp. ('amau), tree ferns, *Broussaisia arguta* (kanawao), mamaki, *Dubautia plantaginea* (na'ena'e), 'oha wai, ho'i'o, *Machaerina angustifolia* ('uki'uki), *Cyanea pilosa* (haha), and other species of *Cyanea* (HPCC 1992c).

The major threats to *Phyllostegia warshaueri* are habitat destruction by pigs; competition from alien plant taxa such as thimbleberry, strawberry guava, *Setaria palmifolia* (palmgrass), *Juncus planifolius*, and *Tibouchina herbacea* (glorybush); ditch improvements; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing individuals in the one remaining population (HPCC 1992c; M. Bruegmann, *in litt.*, 1994).

Otto and Isabelle Degener named *Pleomele hawaiiensis* from a specimen collected in 1977, which was first validly published in 1980 (Degener and Degener 1980). Some experts considered this genus to be part of the larger genus *Dracaena*, but this combination has not been upheld. St. John (1985) distinguished two separate species, *Pleomele haupukehuensis* and *P. konaensis*, which the current treatment includes in *Pleomele hawaiiensis* (Wagner *et al.* 1990).

Pleomele hawaiiensis, of the agave family (Agavaceae), is a branching tree, 5 to 6 m (16 to 20 ft) tall, with leaves spirally clustered at the tips of branches and leaving large brown leaf scars as they fall off. The leaves measure 23 to 38 cm (9 to 15 in) long and 1.4 to 2.7 cm (0.6 to 1 in) wide. Flowers are numerous in terminal clusters with a main stalk 6 to 13 cm (2 to 5 in) long and individual flower stalks 5 to 12 mm (0.2 to 0.5 in) long. The three sepals and three petals of the flower are similar and pale yellow, 33 to 43 mm (1.3 to 1.7 in) long, with a constricted base. The fruit is a red berry about 10 to 13 mm (0.4 to 0.5 in) long. This species differs from other Hawaiian species in this genus by its pale yellow flowers, the size of the flowers, the length of the constricted base of the flower, and the width of the leaves (Degener and Degener 1930, St. John 1985, Wagner *et al.* 1990).

Historically, *Pleomele hawaiiensis* was found only on the island of Hawaii ranging from Hualalai to Kau (Degener and Degener 1980; HHP 1991h1 to 1991h8, 1993f1 to 1993f4; HPCC 1991g, 1992d, 1993b; St. John 1985; Tunison *et al.* 1991; Wagner *et al.* 1990). Six to eight populations are currently known—one to three in the Puu Waawaa region of Hualalai on State-leased and private land; two in the Kaloko/Kaloao area on private land; two in the Kapua/Kahuku area on private land; and one on Holei Pali within HVNP. These populations total 250 to 300 individuals (Char 1987; HHP 1991h1, 1991h2, 1991h4, 1991h5, 1993f3, 1993f4; HPCC 1991g, 1992d, 1993b; Nagata 1984; Nishida 1993; Tunison *et al.* 1991; M. Bruegmann, *in litt.*, 1994; Samuel Gon III, HHP, *in litt.*, 1992; J. Lau, *in litts.*, 1990 and 1993; L. Pratt, *in litt.*, 1994; Clyde Imada, Bishop Museum, pers. comm., 1994). The only populations that are successfully reproducing are at Kaloko and Holei Pali (M. Bruegmann, *in litt.*, 1994).

Pleomele hawaiiensis typically grows on open aa lava in diverse Lowland Dry Forests at elevations between 300 and 800 m (1,000 and 2,700 ft) (HHP 1991h1, 1991h2, 1991h4, 1991h5, 1993f3, 1993f4; HPCC 1991g, 1992d, 1993b; Wagner *et al.* 1990; S. Gon, *in litt.*, 1992; J. Lau, *in litts.*, 1990 and 1993). Associated taxa include 'ohi'a, lama, mamane, *Sydrax odoratum* (alahe'e), huehue, naio, olopua, *Nototrichium sandwicense* (kulu'i), *Sida fallax* ('ilima), *Erythrina sandwicensis* (wiliwili), *Santalum* sp. ('iliahi), *Osteomeles anthyllidifolia* ('ulei), and fountain grass as a dominant ground cover, as well as three federally endangered species (*Caesalpinia kavaiensis* (uhiuhi), *Colubrina oppositifolia* (kauila), and *Nothocestrum breviflorum* (ai'ae)), proposed endangered *Neraudia ovata*, and other species of concern, including *Capparis sandwichiana* (pua pilo) and *Bidens micrantha* ssp. *ctenophylla* (ko'oko'olau) (Char 1987; HHP 1991h2, 1991h4 to 1991h6; HPCC 1991g, 1992d, 1993b; M. Bruegmann, *in litt.*, 1994; S. Gon, *in litt.*, 1992; J. Lau, *in litts.*, 1990 and 1993).

The major threats to *Pleomele hawaiiensis* are habitat conversion associated with residential and recreational development; habitat destruction by cattle, pigs, sheep, and goats (*Capra hircus*); fire (which destroyed a large portion of one Puu Waawaa population in 1986); competition from alien plant taxa such as fountain grass, koa haole, Christmas berry, and lantana; habitat change due to volcanic activity; and the lack of reproduction in all but two populations (Char 1987; HHP 1991h2, 1991h4, 1991h5; HPCC 1991g, 1992d, 1993b; Nagata 1984; M. Bruegmann, *in litt.*, 1994; J. Lau, *in litt.*, 1990; C. Imada, pers. comm., 1994).

Donald Hodel (1985) described *Pritchardia schattaueri* based on a specimen collected from plants discovered by George Schattauer in 1957 (M. Bruegmann, *in litt.*, 1994).

Pritchardia schattaueri, of the palm family (Arecaceae), is a large palm 30 to 40 m (100 to 130 ft) tall with a gray, longitudinally grooved trunk 30 cm (12 in) in diameter. Leaves form a spherical crown and are sometimes persistent after death. Leaves are fan-shaped, glossy green with small brown scales on

the lower surface, up to 3.6 m (11.8 ft) long and 1.7 m (5.6 ft) wide. Flowers are on two- to four-branched inflorescences with a main stalk 1.2 to 1.75 m (3.9 to 5.7 ft) long and individual branches 1 to 1.4 m (3.2 to 4.6 ft) long. The five bracts are lance-shaped, the lowest one 60 cm (2 ft) long, and the uppermost one 20 to 30 cm (9 to 12 in) long. The calyx is green, shading to yellow-green at the tip, three-toothed, 6 mm (0.2 in) long, and 4 mm (0.1 in) wide. Fruits are round or pear-shaped, black with brown spots when mature, 3 to 5 cm (1.2 to 2 in) long, and 3 to 4 cm (1.2 to 1.6 in) wide. This species differs from its closest relative, *Pritchardia beccariana,* by its slender inflorescence branches, more deeply divided leaves, and pendulous rather than stiff tips of the leaf blade segments (Hodel 1985, Read and Hodel 1990).

Pritchardia schattaueri is known from 12 individuals in 3 locations in South Kona on the island of Hawaii, on privately owned land. Ten individuals are known from a forest partially cleared for pasture in Hoomau. Two other individuals are found singly at the edge of a macadamia nut farm and in an area owned by a development company. Ten seedlings have been planted near the macadamia farm individual (HHP 1991i1 to 1991i3; HPCC 1992e1, 1992e2; Hodel 1980, 1985; M. Bruegmann, *in litt.*, 1994).

Pritchardia schattaueri grows in 'ohi'a-dominated Lowland Mesic Forest, at elevations between 600 and 800 m (1,970 to 2,600 ft) (HHP 1991i1 to 1991i3; HPCC 1992e1, 1992e2; Hodel 1985; Read and Hodel 1990). Associated taxa include 'ohi'a, olopua, papala, tree ferns, kolea, and *Pittosporum* sp. (ho'awa) (HHP 1991i2; HPCC 1992e1; M. Bruegmann, *in litt.*, 1994).

The major threats to *Pritchardia schattaueri* are grazing and trampling by cattle and feral pigs; competition from alien plant taxa such as strawberry guava, common guava, Kikuyu grass, Christmas berry, and thimbleberry; seed predation by rats; residential and commercial development; habitat change due to volcanic activity; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing populations and individuals and the lack of successful regeneration (HHP 1991i1 to 1991i3; HPCC 1992e1, 1992e2; Hodel 1980, 1985; M. Bruegmann, *in litt.*, 1994).

First collected by the U.S. Exploring Expedition of 1840 and 1841, and considered a new but unnamed variety of *Sicyos cucumerinus* by Gray in 1854, *Sarx alba* was named by St. John in 1978, creating *Sarx* as a new genus (St. John 1978, Telford 1990). Ian Telford returned this entity to the genus *Sicyos,* maintaining the species as *Sicyos alba* (Telford 1989).

Sicyos alba, of the gourd family (Cucurbitaceae), is an annual vine up to 20 m (65 ft) long, minutely hairy, and black-spotted. Leaves are pale, broadly heart-shaped, shallowly to deeply three- to five-lobed, 7 to 11 cm (2.8 to 4.3 in) long, and 9 to 12 cm (3.5 to 4.7 in) wide. Male and female flowers are borne in separate flower clusters on the same plant. Male flower clusters have main stalks 2.5 to 3.7 cm (1 to 1.5 in) long and individual flower stalks 2 to 4 mm (0.08 to 0.1 in) long. The male flowers are white, five-lobed, dotted with glands, and 2 to 2.5 mm (0.08 to 0.09 in) long. The female flower clusters have two to eight flowers, a main stalk 1 to 3.5 cm (0.4 to 1.4 in) long, and no stalks on the individual flowers. The flowers are white and four-lobed, with the lobes 1.7 to 2 mm (0.07 to 0.08 in) long. The fruit is white, fleshy, oblong, 29 to 32 mm (1.1 to 1.3 in) long, and 10 to 11 mm (about 0.4 in) wide. This species can be distinguished from its nearest relative, *Sicyos cucumerinus,* by its white fruit without bristles and ten or fewer female flowers per cluster (St. John 1978, Telford 1990).

Historically, *Sicyos alba* was found only on the island of Hawaii, from Mauna Kea, Kilauea, and the Puu Makaala area (HHP 1991j1 to 1991j4, St. John 1978). Today, the two known populations are restricted to Puu Makaala NAR and Olaa Forest Reserve, both on Stated-owned land in the Puna District (HHP 1991j1; HPCC 1991h, 1993c). The number of individuals fluctuates from year to year because this species is an annual. At last report, only one individual was growing at Puu Makaala NAR, but about 20 individuals are known from the Olaa population (HPCC 1993c; M. Bruegmann, *in litt.*, 1994; Steve Perlman, National Tropical Botanical Garden, pers. comm., 1994).

Sicyos alba typically grows in 'ohi'a- and tree fern-dominated Montane Wet Forests, at elevations between 975 and 1,130 m (3,200 to 3,720 ft) (HHP 1991j1; HPCC 1991h, 1993c; Telford 1990). Associated taxa include tree ferns, kawa'u, kanawao, ha'iwale, *Stenogyne* sp., kopiko, *Perrottetia sandwicensis* (olomea), olapa, ho'i'o, and *Cyanea tritomantha* (haha) (HHP 1991j1; HPCC 1991h, 1993c; M. Bruegmann, *in litt.*, 1994).

The major threats to *Sicyos alba* are habitat damage by feral pigs; trail clearing; competition from alien plant taxa such as banana poka, palmgrass, strawberry guava, and yellow Himalayan raspberry; habitat change due to volcanic activity; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing individuals (HHP 1991j1; HPCC 1991h, 1993c).

Horace Mann described *Zanthoxylum dipetalum* in 1867, and Rock named a new variety *Zanthoxylum dipetalum* var. *tomentosum,* based on a specimen he collected at Puu Waawaa on Hualalai, on the island of Hawaii, in 1909 (Rock 1913). The specific epithet refers to the dense covering of soft hairs on the undersurface of the leaflets. Some authors have placed Hawaiian taxa in the genus *Fagara,* resulting in *F. dipetala* var. *tomentosa* (Stone *et al.* 1990). However, *Zanthoxylum dipetalum* var. *tomentosum* is maintained in the current treatment of the Hawaiian species (Stone *et al.* 1990).

Zanthoxylum dipetalum var. *tomentosum,* of the citrus family, is a thornless tree 4 to 15 m (13 to 49 ft) tall with a trunk up to 30 cm (12 in) in diameter. It has alternate leaves comprised of three to seven leathery, elliptical, gland-dotted, smooth-edged leaflets usually 6 to 36 cm (2.4 to 12 in) long and 2.5 to 13.5 cm (1 to 5.3 in) wide. The undersurface of the leaflets is densely covered with fine, short hairs, and the lowest pair of leaflets is often strongly reduced. The stalks of the side leaflets have one joint each, and the stalk of the terminal leaflet has two joints. Flowers are usually either male or female, and usually only one sex is found on a single tree. Clusters of 5 to 15 flowers, 9 to 18 mm (0.4 to 0.7 in) long, have a main flower stalk 10 to 40 mm (0.4 to 1.6 in) long and individual flower stalks 3 to 8 mm (0.1 to 0.3 in) long. Each flower has four broadly triangular sepals about 1 to 1.5 mm (0.04 to 0.06 in) long and two or four yellowish white petals, sometimes tinged with red, 6 to 10 mm (0.2 to 0.4 in) long. The fruit is an oval follicle (dry fruit that opens along one side) 15 to 33 mm (0.6 to 1.3 in) long, containing one black seed about 10 to 26 mm (0.4 to 1 in) long. This variety is distinguished from *Zanthoxylum dipetalum* var. *dipetalum* by the hairs on the undersurface of the leaflets. It is distinguished from other Hawaiian species of the genus by its reduced lower leaflets, the presence of only one joint on some of the leaflet stalks, and the large seeds (Rock 1913, Stone *et al.* 1990).

Only one population of *Zanthoxylum dipetalum* var. *tomentosum* has ever been known, located at Puu Waawaa on Hualalai, on the island of Hawaii (HHP 1993g, Rock 1913, Stone *et al.* 1990). Approximately 24 individuals are now

known, scattered through the area (HHP 1993g; HPCC 1991i, 1993d; M. Bruegmann, *in litt.*, 1994; J. Giffin, *in litt.*, 1992; J. Lau, *in litt.*, 1992).

Zanthoxylum dipetalum var. *tomentosum* grows in degraded 'ohi'a-dominated Montane Mesic Forest, often on aa lava, at elevations between 915 and 1,040 m (3,000 and 3,400 ft) (M. Bruegmann, *in litt.*, 1994). Associated species include mamane, lama, 'ala'a, 'iliahi, 'ohe, kolea, and kopiko (HHP 1993g; HPCC 1993d).

Threats to *Zanthoxylum dipetalum* var. *tomentosum* include browsing, trampling, and habitat disturbance by cattle, feral pigs, and sheep; competition from alien plant species such as Kikuyu grass, fountain grass, lantana, koa haole, and *Grevillea robusta* (silk oak); habitat change due to volcanic activity; and fire (HHP 1993g; HPCC 1993d; M. Bruegmann, *in litt.*, 1994; J. Lau, *in litt.*, 1992). In addition, the species is threatened by a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing individuals in only one population.

Previous Federal Action

Federal action on these plants began as a result of section 12 of the Endangered Species Act (16 U.S.C. 1533), 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, *Clermontia drepanomorpha, Cyanea platyphylla (as C. bryanii), Hibiscadelphus giffardianus, Hibiscadelphus hualalaiensis, Melicope zahlbruckneri* (as *Pelea zahlbruckneri*), and *Neraudia ovata* were considered to be endangered. *Zanthoxylum dipetalum* var. *tomentosum* was considered to be threatened. On July 1, 1975, the Service published a notice in the Federal Register (40 FR 27823) of its 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 giving notice of its intention to review the status of the plant species named therein. As a result of that review, on June 16, 1976, the Service 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 species, including all of the above species considered to be endangered. 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 two years old be withdrawn. A one-year grace period was given to proposals already over two years old. On December 10, 1979, the Service 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. The Service 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), and September 30, 1993 (58 FR 51144). All of the taxa in this proposal (including synonymous taxa) have at one time or another been considered either Category 1 or Category 2 candidates for Federal listing. Category 1 species are those for which the Service has on file substantial information on biological vulnerability and threats to support preparation of listing proposals. Category 2 species are those for which listing as endangered or threatened is possibly appropriate, but for which sufficient data on biological vulnerability and threats are not currently available to support proposed rules. *Hibiscadelphus giffardianus* and *Hibiscadelphus hualalaiensis* were considered Category 1 candidates on all five notices of review; *Clermontia drepanomorpha*, *Neraudia ovata*, and *Pleomele hawaiiensis* (including the synonym *Dracaena hawaiiensis*) were considered Category 1 species in the 1980, 1983, and 1985 notices and Category 2 species in the 1990 and 1993 notices. *Cyanea platyphylla* (as *Cyanea bryanii* and *Cyanea fernaldii*) was considered a Category 1 species in the 1980, 1983, and 1985 notices, but was removed from consideration as a candidate in 1990 when *C. bryanii* and *C. fernaldii* were synonymized. The resulting taxon, *Cyanea platyphylla*, was thought to be more common than previous records indicated. Current information indicates that removing this taxon from consideration for listing was inappropriate. *Melicope zahlbruckneri* appeared as a Category 1 candidate in the 1985 notice (as *Pelea zahlbruckneri*). This taxon was transferred into the genus *Melicope* and its status was changed to Category 2 in the 1990 notice. *Pritchardia schattaueri* was considered a Category 2 species in the 1985, 1990, and 1993 notices. *Phyllostegia racemosa*, *Phyllostegia velutina*, *Phyllostegia warshaueri*, *Sicyos alba*, and *Zanthoxylum dipetalum* var. *tomentosum* all first appeared in the 1990 notice, and again in 1993, as Category 2 species.

Section 4(b)(3)(B) of the Act requires the Secretary to make findings on petitions that present substantial information indicating the petitioned action may be warranted within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. On October 13, 1983, the Service found that the petitioned listing of these taxa was warranted, but precluded by other pending listing actions, in accordance with section 4(b)(3)(B)(iii) of the Act; notification of this finding was published on January 20, 1984 (49 FR 2485). Such a finding requires the Service to consider the petition as having been resubmitted, pursuant to section 4(b)(3)(C)(i) of the Act. The finding was reviewed in October of 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, and 1993. Publication of the present proposed rule constitutes the final such finding for these taxa.

Summary of Factors Affecting the Species

Section 4 of the Endangered Species Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act set forth the procedures for adding species to the Federal lists. A species may be determined to be an endangered species due to one or more of the five factors described in section 4(a)(1). The threats facing these 13 taxa are summarized in Table 1.

TABLE 1.—SUMMARY OF THREATS

Species	Alien mammals					Disease/insects	Alien plants	Fire	Natural disasters	Human impacts	Limited numbers*
	Cattle	Pigs	Rats	Sheep	Goats						
Clermontia drepanomorpha		X	X				X			X	X1,3
Cyanea platyphylla		P	P				X				X1,2
Hibiscadelphus giffardianus			X			X	X	X	X		X1,3,4
Hibiscadelphus hualalaiensis	P	P	X	X			X	X	X	X	X1,3,4
Melicope zahlbruckneri			P			X	X		X		X1,3
Neraudia ovata						X	X		X	X	X1,2
Phyllostegia racemosa	X	X					X		X	X	X1,3
Phyllostegia velutina	X	X		X			X	X	X	X	X1,3
Phyllostegia warshaueri		X					X			X	X1,2
Pleomele hawaiiensis	X	X		X	X		X	X	X	X	
Pritchardia schattaueri	X	X	X			P	X		X	X	X1,3
Sicyos alba		X					X		X	X	X1,2
Zanthoxylum dipetalum var. *tomentosum*	X	X		X			X	X	X	X	X1,3

Key: X = Immediate and significant threat. P = Potential threat. * = No more than 100 known individuals and/or no more than 5 known populations. 1 = No more than 5 known populations. 2 = No more than 10 known individuals. 3 = No more than 100 known individuals. 4 = All original wild populations extinct; planted individuals only.

These factors and their application to *Clermontia drepanomorpha* Rock ('oha wai), *Cyanea platyphylla* (A. Gray) Hillbr. (haha), *Hibiscadelphus giffardianus* Rock (hau kuahiwi), *Hibiscadelphus hualalaiensis* Rock (hau kuahiwi), *Melicope zahlbruckneri* Rock (alani), *Neraudia ovata* Gaud. (no common name (NCN)), *Phyllostegia racemosa* Benth. (kiponapona), *Phyllostegia velutina* (Sherff) St. John (NCN), *Phyllostegia warshaueri* St. John (NCN), *Pleomele hawaiiensis* Degener and I. Degener (hala pepe), *Pritchardia schattaueri* Hodel (loulu), *Sicyos alba* (St. John) Telford ('anunu), and *Zanthoxylum dipetalum* var. *tomentosum* Rock (a'e) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The habitats of the plants included in this proposed rule have undergone extreme alteration because of past and present land management practices, including deliberate alien animal and plant introductions; agricultural, commercial, and urban development; and recreational use. Natural disturbances such as volcanic activity also destroy habitat and can have a significant effect on small populations of plants. Competition with alien plants as well as destruction of plants and modification of habitat by introduced animals are the primary threats facing all of taxa being proposed. (See Table 1.).

Beginning with Captain James Cook in 1792, early European explorers introduced livestock, which became feral, increased in number and range, and caused significant changes to the natural environment of Hawaii. The 1848 provision for land sales to individuals allowed large-scale agricultural and ranching ventures to begin. So much land was cleared for these enterprises that climatic conditions began to change, and the amount and distribution of rainfall were altered (Wenkam 1969). Plantation owners supported reforestation programs which resulted in many alien trees being introduced in the hope that watersheds could be conserved.

Past and present activities of introduced alien mammals are the primary factors in altering and degrading vegetation and habitats on the island of Hawaii where populations of the proposed species occur. Feral ungulates trample and eat native vegetation and disturb and open areas. This causes erosion and allows the entry of alien plant taxa (Cuddihy and Stone 1990, Wagner *et al.* 1990). Eleven taxa in this proposal are directly threatened by habitat degradation resulting from introduced ungulates: six taxa are threatened by cattle, one taxon by goats, ten by pigs, and four by sheep.

Cattle (*Bos taurus*), the wild progenitor of which was native to Europe, northern Africa, and southwestern Asia, were introduced to the Hawaiian Islands in 1793. Large feral herds developed as a result of restrictions on killing cattle decreed by King Kamehameha I. While small cattle ranches were developed on Kauai, Oahu, and West Maui, very large ranches of tens of thousands of acres were created on East Maui and Hawaii. Much of the land used in these private enterprises was leased from the State or was privately owned and considered Forest Reserve and/or Conservation District land. Feral cattle can presently be found on the island of Hawaii, and ranching is still a major commercial activity there. Hunting of feral cattle is no longer allowed in Hawaii (Hawaii Department of Land and Natural Resources (DLNR) 1985). Cattle eat native vegetation, trample roots and seedlings, cause erosion, create disturbed areas into which alien plants invade, and spread seeds of alien plants in their feces and on their bodies. The forest in areas grazed by cattle becomes degraded to grassland pasture, and plant cover is reduced for many years following removal of cattle from an area. Several alien grasses and legumes purposely introduced for cattle forage have become noxious weeds (Cuddihy and Stone 1990, Tomich 1986).

The habitats of many of the plants being proposed were degraded in the past by feral cattle, and this has had effects which still persist. Some taxa in this proposed rule that are still directly affected by cattle include: *Phyllostegia racemosa, Phyllostegia velutina, Pleomele hawaiiensis, Pritchardia schattaueri,* and *Zanthoxylum dipetalum* var. *tomentosum*. The *Hibiscadelphus hualalaiensis* site is currently fenced to exclude cattle and pigs, but these alien mammals constitute a potential threat to this taxon if the fencing is not monitored and maintained (HHP 1991i2, 1993g; HPCC 1991e, 1991i, 1992d, 1992e1, 1993b, 1993d; Hodel 1980, 1985; Pratt and Cuddihy 1990; M. Bruegmann, *in litt.*, 1994; J. Jeffrey, pers. comm., 1994).

Pigs (*Sus scrofa*) are originally native to Europe, northern Africa, Asia Minor,

and Asia. European pigs, introduced to Hawaii by Captain James Cook in 1778, became feral and invaded forested areas, especially wet and mesic forests and dry areas at high elevations. They are currently present on Kauai, Oahu, Molokai, Maui, and Hawaii and inhabit rain forests and grasslands. Pig hunting is allowed on all islands either year-round or during certain months, depending on the area (Hawaii DLNR n.d., 1985). While rooting in the ground in search of the invertebrates and plant material they eat, feral pigs disturb and destroy vegetative cover, trample plants and seedlings, and threaten forest regeneration by damaging seeds and seedlings. They disturb soil substrates and cause erosion, especially on slopes. Alien plant seeds are dispersed in their hooves and coats as well as through their digestive tracts, and the disturbed soil is fertilized by their feces, helping establish these plants (Cuddihy and Stone 1990, Smith 1985, Stone 1985, Tomich 1986, Wagner *et al.* 1990). Feral pigs pose an immediate threat to one or more populations of the following proposed taxa: *Clermontia drepanomorpha, Phyllostegia racemosa, Phyllostegia velutina, Phyllostegia warshaueri, Pleomele hawaiiensis, Pritchardia schattaueri, Sicyos alba,* and *Zanthoxylum dipetalum* var. *tomentosum*. The *Cyanea platyphylla* population is currently fenced to exclude pigs and the *Hibiscadelphus hualalaiensis* site to exclude pigs and cattle, but these alien mammals still pose a potential threat to these taxa if fencing is not monitored and maintained (Clarke *et al.* 1983; HHP 1991e1, 1991e4, 1991j1; HPCC 1990b, 1991a, 1991f, 1991h, 1992a to 1992d, 1993a, 1993c; Pratt and Cuddihy 1990; M. Bruegmann, *in litt.*, 1994; J. Jeffrey and L. Pratt, pers. comms., 1994).

Goats (*Capra hircus*), originally native to the Middle East and India, were successfully introduced to the Hawaiian Islands in 1792, and currently there are populations on Kauai, Oahu, Molokai, Maui, and Hawaii. On Hawaii, goats damage low-elevation dry forest, montane parkland, subalpine woodlands, and alpine grasslands. Goats are managed in Hawaii as a game animal, but many herds populate inaccessible areas where hunting has little effect on their numbers. Goat hunting is allowed year-round or during certain months, depending on the area (Hawaii DLNR n.d., 1985). Goats browse on introduced grasses and native plants, especially in drier and more open ecosystems. They also trample roots and seedlings, cause erosion, and promote the invasion of alien plants. They are able to forage in extremely rugged terrain and have a high reproductive capacity (Cuddihy and Stone 1990, Culliney 1988, Tomich 1986). *Pleomele hawaiiensis* is currently threatened by goats (Char 1987, HPCC 1993b).

Sheep (*Ovis aries*) have become established on the island of Hawaii (Tomich 1986) since their introduction almost 200 years ago (Cuddihy and Stone 1990). Sheep roam the upper elevation dry forests of Hualalai (above 1,000 m (3,300 ft)), causing damage similar to that of goats (Stone 1985). Sheep have decimated vast areas of native forest and shrubland on Mauna Kea and continue to do so as a managed game species. Sheep threaten the habitat of the following proposed plant species: *Hibiscadelphus hualalaiensis, Phyllostegia velutina, Pleomele hawaiiensis,* and *Zanthoxylum dipetalum* var. *tomentosum* (Cuddihy and Stone 1990; Stone 1985; M. Bruegmann, *in litt.*, 1994).

Land development for housing and commercial activities threatens *Neraudia ovata, Pleomele hawaiiensis,* and *Pritchardia schattaueri* since individuals of these species grow on private land that may be developed (Char 1987; HHP 1991j1; HPCC 1992e2; Nagata 1984; M. Bruegmann, *in litt.*, 1994). In addition, the populations of *Phyllostegia velutina* within the Kulani Correctional Facility are potentially threatened by expansion of the prison facilities (M. Bruegmann, *in litt.*, 1994).

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* Unrestricted collecting for scientific or horticultural purposes and excessive visits by individuals interested in seeing rare plants are potential threats to all of the proposed taxa. This is a threat to *Pleomele hawaiiensis* because little regeneration is occurring in the wild. The other 12 taxa in this proposed rule are also threatened by overcollection, since each taxon comprises 1 to 3 populations and 100 or fewer known individuals, or exist only as cultivated individuals. Any collection of whole plants or reproductive parts of any of these species could cause an adverse impact on the gene pool and threaten the survival of the species.

C. *Disease or predation.* Pigs, cattle, goats, or sheep have been reported in areas where populations of most of the proposed taxa occur. As the taxa are not known to be unpalatable to these ungulates, predation is a probable threat where those animals have been reported, potentially affecting the following taxa: *Clermontia drepanomorpha, Cyanea platyphylla, Hibiscadelphus hualalaiensis, Neraudia ovata, Phyllostegia racemosa, Phyllostegia velutina, Phyllostegia warshaueri, Pleomele hawaiiensis, Pritchardia schattaueri, Sicyos alba,* and *Zanthoxylum dipetalum* var. *tomentosum*. The lack of seedling production or survival in two of the taxa (*Pleomele hawaiiensis* and *Pritchardia schattaueri*) and the occurrence of some populations or taxa only in areas inaccessible to ungulates seem to indicate the effect that browsing mammals, especially cattle and goats, have had in restricting the distribution of these plants.

Of the four species of rodents which have been introduced to the Hawaiian Islands, the species with the greatest impact on the native flora and fauna is probably *Rattus rattus* (roof or black rat), which now occurs on all the main Hawaiian Islands around human habitations, in cultivated fields, and in dry to wet forests. Roof rats, and to a lesser extent *Mus musculus* (house mouse), *R. exulans* (Polynesian rat), and *R. norvegicus* (Norway rat), eat the fruits of some native plants, especially those with large, fleshy fruits. Many native Hawaiian plants produce their fruit over an extended period of time, and this produces a prolonged food supply which supports rodent populations (Cuddihy and Stone 1990). Rats damage fruit of *Pritchardia schattaueri* and fruits, flowers, and bark of *Hibiscadelphus giffardianus* and *Hibiscadelphus hualalaiensis* (Baker and Allen 1978; HPCC 1992e2; M. Bruegmann, *in litt.*, 1994; L. Pratt, pers. comm., 1994). Rats probably feed on the fruits of *Cyanea platyphylla* (M. Bruegmann, *in litt.*, 1994). Girdling by rats has been observed for *Clermontia drepanomorpha* (Bruegmann 1990).

Sophonia rufofascia (two-spotted leafhopper) is a recently introduced insect that causes feeding damage on leaves, typically in the form of stippling and yellowing. In addition to mechanical feeding damage, this insect may introduce a plant virus. It is suspected of causing severe dieback of the native fern *Dicranopteris linearis* (uluhe) and economic damage to crops and ornamental plants in Hawaii. The two-spotted leafhopper is a threat to *Hibiscadelphus giffardianus* and *Melicope zahlbruckneri* (M. Bruegmann, *in litt.*, 1994; Adam Asquith, USFWS, pers. comm., 1994).

The native plant bug, *Hyalopeplus pellucidus*, was found feeding and breeding on *Hibiscadelphus giffardianus*. Leaf yellowing is caused by this insect, which has been known to achieve large populations and cause economic damage to some crops (M.

Bruegmann, *in litt*., 1994; A. Asquith, pers. comm., 1994).

Aleurodicus dispersus (spiralling whitefly) was first collected on Oahu in 1978 (Nakahara 1981). Spiralling whitefly is a threat to *Neraudia ovata* (M. Bruegmann, *in litt.*, 1994).

Some species of *Pritchardia* are known to be susceptible to lethal yellowing, which is a bacterium-like organism producing disease in many palms. This disease is not yet reported in Hawaii, but if it were ever accidentally introduced on plant material brought into the State, it would be a potential threat to *Pritchardia schattaueri*. In addition, cultivated *Pritchardia* specimens in areas outside Hawaii may be affected by the disease (Hull 1980).

D. *The inadequacy of existing regulatory mechanisms.* Hawaii's Endangered Species Act states—''Any species of aquatic life, wildlife, or land plant that has been determined to be an endangered species pursuant to the [Federal] Endangered Species Act shall be deemed to be an endangered species under the provisions of this chapter * * *'' (Hawaii Revised Statutes (HRS), sect. 195D–4(a)). Therefore, Federal listing would automatically invoke listing under Hawaii State law, which prohibits taking of endangered plants in the State and encourages conservation by State agencies (HRS, sect. 195D–4 and 5).

None of the 13 proposed taxa are presently listed as an endangered species by the State of Hawaii. Seven of the 13 proposed taxa have populations located on privately owned land. The following taxa occur exclusively on State land—*Cyanea platyphylla*, *Hibiscadelphus hualalaiensis*, and *Zanthoxylum dipetalum* var. *tomentosum*. Two of these taxa, *Hibiscadelphus hualalaiensis* and *Zanthoxylum dipetalum* var. *tomentosum*, are found exclusively on State land leased to a private ranch. Four of the taxa (*Clermontia drepanomorpha*, *Cyanea platyphylla*, *Phyllostegia velutina*, and *Sicyos alba*) have one or more populations located in State NARs or a State wildlife sanctuary, which have rules and regulations for the protection of resources (Hawaii DLNR 1981; HRS, sects. 183D–4, 184–5, 195–5, and 195–8). However, most of these areas still support large populations of pigs maintained for sport hunting (M. Bruegmann, *in litt.*, 1994).

One or more populations of 9 of the 13 proposed taxa are located on land classified within conservation districts and owned by the State of Hawaii or private companies or individuals. Regardless of the owner, lands in these districts, among other purposes, are regarded as necessary for the protection of endemic biological resources and the maintenance or enhancement of the conservation of natural resources. Activities permitted in conservation districts are chosen by considering how best to make a multiple use of the land (HRS, sect. 205–2). Some uses, such as maintaining animals for hunting, are based on policy decisions, while others, such as preservation of endangered species, are mandated by State laws. Requests for amendments to district boundaries or variances within existing classifications can be made by government agencies and private landowners (HRS, sect. 205–4). Before decisions about these requests are made, the impact of the proposed reclassification on ''preservation or maintenance of important natural systems or habitat'' (HRS, sects. 205–4, 205–17) as well as the maintenance of natural resources is required to be taken into account (HRS, sects. 205–2, 205–4). For any proposed land use change which will occur on county or State land, will be funded in part or whole by county or State funds, or will occur within land classified as conservation district, an environmental assessment is required to determine whether or not the environment will be significantly affected (HRS, chapt. 343). If it is found that an action will have a significant effect, preparation of a full Environmental Impact Statement is required. Hawaii environmental policy, and thus approval of land use, is required by law to safeguard ''* * * the State's unique natural environmental characteristics * * *'' (HRS, sect. 344–3(1)) and includes guidelines to ''Protect endangered species of individual plants and animals * * *'' (HRS, sect. 344–4(3)(A)). Federal listing, because it automatically invokes State listing, would also trigger these other State regulations protecting the plants.

State laws relating to the conservation of biological resources allow for the acquisition of land as well as the development and implementation of programs concerning the conservation of biological resources (HRS, sect. 195D–5(a)). The State also may enter into agreements with Federal agencies to administer and manage any area required for the conservation, management, enhancement, or protection of endangered species (HRS, sect. 195D–5(c)). If listing were to occur, funds for these activities could be made available under section 6 (State Cooperative Agreements) of the Federal Endangered Species Act. The Hawaii DLNR is mandated to initiate changes in conservation district boundaries to include ''the habitat of rare native species of flora and fauna within the conservation district'' (HRS, sect. 195D–5.1). However, despite the existence of various State laws and regulations which give protection to Hawaii's native plants, their enforcement is difficult due to limited funding and personnel. Listing of these 13 plant species would trigger State listing under Hawaii's Endangered Species Act and supplement the protection available under other State laws. The Federal Act would offer additional protection to these species. For example, if they were to be listed as endangered, it would be a violation of the Act for any person to remove, cut, dig up, damage, or destroy any such plant in knowing violation of State law or regulation or in the course of any violation of a State criminal trespass law.

Although two species, *Hibiscadelphus giffardianus* and *Melicope zahlbruckneri*, are restricted to Federal land within HVNP and are actively managed by the Park, they are still threatened with extinction from naturally occurring events. *Hibiscadelphus giffardianus* is no longer extant in the wild, and is known only from the 24 individuals that have been replanted into original habitat by the Park. *Melicope zahlbruckneri* is known only from one population of 30 to 35 individuals. Both of these species are threatened by the two-spotted leafhopper, an introduced insect that is spreading throughout the Hawaiian Islands, may reach epidemic proportions if not controlled, and for which there is currently no known control.

E. *Other natural or manmade factors affecting its continued existence.* The small numbers of populations and individuals of most of these taxa increase the potential for extinction from naturally occurring events. The limited gene pool may depress reproductive vigor, or a single human-caused or natural environmental disturbance could destroy a significant percentage of the individuals or the only known extant population. This constitutes a major threat to 12 of the 13 taxa being proposed. (See Table 1.) Five of the proposed taxa, *Cyanea platyphylla, Melicope zahlbruckneri, Neraudia ovata, Phyllostegia warshaueri*, and *Zanthoxylum dipetalum* var. *tomentosum*, are known from a single population. Five other proposed taxa, *Clermontia drepanomorpha, Phyllostegia racemosa, Phyllostegia velutina, Pritchardia schattaueri*, and *Sicyos alba*, are known from only two to five populations.

Twelve of the proposed taxa are estimated to number no more than 100 known individuals. Two of these taxa, *Cyanea platyphylla* and *Neraudia ovata*, number no more than 10 known individuals, and one, *Phyllostegia warshaueri*, is known from only one individual. Two taxa, *Hibiscadelphus giffardianus* and *Hibiscadelphus hualalaiensis*, are extinct in the wild and are known only from cultivated material.

One or more of 21 taxa of introduced plants threaten all 13 of the proposed taxa. The original native flora of Hawaii consisted of about 1,000 species, 89 percent of which were endemic. Of the total native and naturalized Hawaiian flora of 1,817 species, 47 percent were introduced from other parts of the world and nearly 100 species have become pests (Wagner *et al.* 1990). Naturalized, introduced plant taxa compete with native plants for space, light, water, and nutrients (Cuddihy and Stone 1990). Some of these taxa were brought to Hawaii by various groups of people, including the Polynesian immigrants, for food or cultural reasons. Plantation owners, alarmed at the reduction of water resources for their crops caused by the destruction of native forest cover by grazing feral animals, supported the introduction of alien tree species for reforestation. Ranchers intentionally introduced pasture grasses and other species for agriculture, and sometimes they inadvertently introduced weed seeds as well. Other plants were brought to Hawaii for their potential horticultural value (Cuddihy and Stone 1990, Wenkam 1969).

Lantana camara (lantana), brought to Hawaii as an ornamental plant, is an aggressive, thicket-forming shrub which can now be found on all of the main islands in mesic forests, dry shrublands, and other dry, disturbed habitats (Wagner *et al.* 1990). Lantana threatens *Pleomele hawaiiensis* and the only known populations of *Neraudia ovata* and *Zanthoxylum dipetalum* var. *tomentosum* (HHP 1993c2; HPCC 1992a, 1993b, 1993d; M. Bruegmann, *in litt.*, 1994). *Leucaena leucocephala* (koa haole), a naturalized shrub which is sometimes the dominant species in low elevation, dry, disturbed areas on all of the main Hawaiian islands, threatens *Neraudia ovata*, *Pleomele hawaiiensis*, and *Zanthoxylum dipetalum* var. *tomentosum* (Geesnick *et al.* 1990; HPCC 1993d; Nishida 1993; M. Bruegmann, *in litt.*, 1994).

Passiflora mollissima (banana poka), a woody vine, poses a serious problem to mesic forests on Kauai and Hawaii by covering trees, reducing the amount of light which reaches trees as well as understory, and causing damage and death to trees by the weight of the vines. Animals, especially feral pigs, eat the fruit and distribute the seeds (Cuddihy and Stone 1990, Escobar 1990). Banana poka threatens *Phyllostegia racemosa* and *Sicyos alba* (HPCC 1993c; J. Jeffrey, pers. comm., 1994). *Passiflora ligularis* (sweet granadilla) was first collected in Hawaii in 1909, and has since spread to mesic and wet areas of Kauai, Oahu, Lanai, and Hawaii (Escobar 1990). This taxon threatens the only known population of *Cyanea platyphylla* (HPCC 1991a). After escaping from cultivation, *Schinus terebinthifolius* (Christmas berry) became naturalized on most of the main Hawaiian Islands and threatens *Pleomele hawaiiensis* and *Pritchardia schattaueri* and the only known population of *Neraudia ovata* (Nishida 1993; Wagner *et al.* 1990; M. Bruegmann, *in litt.*, 1994). *Juncus planifolius* is a perennial rush which has naturalized in moist, open, disturbed depressions on margins of forests and in bogs on Kauai, Oahu, Molokai, Maui, and Hawaii (Coffey 1990). This taxon is a threat to the only known individual of *Phyllostegia warshaueri* (M. Bruegmann, *in litt.*, 1994).

Psidium cattleianum (strawberry guava), an invasive shrub or small tree native to tropical America, has become naturalized on all of the main Hawaiian islands. Like Christmas berry, strawberry guava is capable of forming dense stands that exclude other plant taxa (Cuddihy and Stone 1990) and is dispersed mainly by feral pigs and fruit-eating birds (Smith 1985). This alien plant grows primarily in mesic and wet habitats and provides food for several alien animal species, including feral pigs and game birds, which disperse the plant's seeds through the forest (Smith 1985, Wagner *et al.* 1985). Strawberry guava is considered one of the greatest alien plant threats to Hawaii's rain forests and is known to pose a direct threat to *Pritchardia schattaueri* and *Sicyos alba* and the only known populations of *Cyanea platyphylla* and *Phyllostegia warshaueri* (Cuddihy *et al.* 1982; HHP 1991g2; HPCC 1991a, 1992e1; M. Bruegmann, *in litt.*, 1994).

Psidium guajava (common guava) was brought to Hawaii and has become widely naturalized on all the main islands, forming dense stands in disturbed areas. Common guava invades disturbed sites, forming dense thickets in dry as well as mesic and wet forests (Smith 1985, Wagner *et al.* 1990). This species also provides food for several alien animal species, including feral pigs and game birds, which disperse the plant's seeds through the forest (Smith 1985, Wagner *et al.* 1985). Common guava threatens *Pritchardia schattaueri* and the only known population of *Cyanea platyphylla* (Cuddihy *et al.* 1982; HPCC 1991a6, 1991a9; HPCC 1992e1; M. Bruegmann, *in litt.*, 1994).

A recent introduction to the Hawaiian Islands, *Rubus ellipticus* (yellow Himalayan raspberry) is rapidly becoming a major weed pest in wet forests, pastures, and other open areas on the island of Hawaii. It forms large thorny thickets and displaces native plants. Its ability to invade the understory of wet forests enables it to fill a niche presently unoccupied by any other major wet forest weed in Hawaii (Cuddihy and Stone 1990). This has resulted in an extremely rapid population expansion of this alien plant in recent years. *Phyllostegia velutina* and *Sicyos alba* are threatened by yellow Himalayan raspberry (HPCC 1990b, 1993c). A related species, *Rubus rosifolius* (thimbleberry), was introduced from Asia in the 1880s to the island of Hawaii and is now found in disturbed mesic and wet forests throughout the Hawaiian Islands. Although it is less aggressive than other alien species of *Rubus*, thimbleberry can become very abundant locally, especially in areas disturbed by pigs (Cuddihy and Stone 1990, Wagner *et al.* 1990). This species is a threat to *Clermontia drepanomorpha* and *Pritchardia schattaueri* and the only known populations of *Cyanea platyphylla* and *Phyllostegia warshaueri* (Cuddihy *et al.* 1982; HHP 1991g2; HPCC 1991a, 1993a; M. Bruegmann, *in litt.*, 1994).

Grevillea robusta (silk oak) was extensively planted in Hawaii for timber and is now naturalized on most of the main islands (Smith 1985, Wagner *et al.* 1990). Silk oak threatens the only known population of *Zanthoxylum dipetalum* var. *tomentosum* (HPCC 1993d). *Tibouchina herbacea* (glorybush) first became established on the island of Hawaii in the late 1970s and, by 1982 was collected in Lanilili on West Maui (Almeda 1990). Although the disruptive potential of this alien plant is not fully known, glorybush appears to be invading mesic and wet forests of Hawaii, and is considered a threat to the only known individual of *Phyllostegia warshaueri* (HPCC 1992c).

Several hundred species of grasses have been introduced to the Hawaiian Islands, many for animal forage. Of the approximately 100 grass species which have become naturalized, 8 species threaten 11 of the 13 proposed taxa. *Anthoxanthum odoratum* (sweet vernalgrass) is a perennial, tufted grass which has naturalized in pastures,

disturbed areas in wet forest, and sometimes in subalpine shrubland on Molokai, Maui, and Hawaii and is a threat to *Phyllostegia racemosa* (O'Connor 1990; J. Jeffrey, pers. comm. 1994). The perennial grass *Paspalum conjugatum* (Hilo grass), naturalized in moist to wet disturbed areas on most Hawaiian Islands, produces a dense ground cover, even on poor soil, and threatens the only known populations of *Hibiscadelphus giffardianus* and *Melicope zahlbruckneri* (Cuddihy and Stone 1990; O'Connor 1990; Smith 1985; L. Pratt, pers. comm., 1994). A related species, *Paspalum dilatatum* (Dallis grass) has become naturalized and common in wet to dry grassland, fields, and roadsides on most Hawaiian Islands, and also threatens *Hibiscadelphus giffardianus* and *Melicope zahlbruckneri* (O'Connor 1990; L. Pratt, pers. comm., 1994). *Ehrharta stipoides* (meadow ricegrass) is naturalized in openings in wet forest and other moist, shaded sites on Oahu, Maui, and Hawaii (O'Connor 1990). Meadow ricegrass is the third grass species to threaten *Hibiscadelphus giffardianus* and *Melicope zahlbruckneri.*

All three of these grass species prevent seedling establishment of the two proposed species (L. Pratt, pers. comm., 1994).

Pennisetum clandestinum (Kikuyu grass), an aggressive perennial grass introduced to Hawaii as a pasture grass, withstands trampling and grazing and has naturalized on four Hawaiian Islands in dry to mesic forest. It produces thick mats which choke out other plants and prevent their seedlings from establishing and has been declared a noxious weed by the U.S. Department of Agriculture (7 CFR 360) (O'Connor 1990, Smith 1985). Kikuyu grass is a threat to *Phyllostegia racemosa, Phyllostegia velutina, Pritchardia schattaueri,* and the only known populations of *Hibiscadelphus hualalaiensis* and *Zanthoxylum dipetalum* var. *tomentosum* (HHP 1992b, 1993c2, 1993g; HPCC 1992a; M. Bruegmann, *in litt.*, 1994; L. Lau, *in litt.*, 1990; J. Jeffrey, pers. comm., 1994).

Pennisetum setaceum (fountain grass) is a fire-adapted bunch grass that has spread rapidly over bare lava flows and open areas on the island of Hawaii since its introduction in the early 1900s. Fountain grass is particularly detrimental to Hawaii's dry forests because it is able to invade areas once dominated by native plants, where it interferes with plant regeneration, carries fires into areas not usually prone to fires, and increases the likelihood of fires (Cuddihy and Stone 1990, O'Connor 1990, Smith 1985). Fountain grass threatens *Phyllostegia velutina* and *Pleomele hawaiiensis* and the only known populations of *Neraudia ovata* and *Zanthoxylum dipetalum* var. *tomentosum* (HHP 1991h5, 1993g; HPCC 1990a, 1991c, 1993b; Nishida 1993; M. Bruegmann, *in litt.*, 1994; J. Lau, *in litt.*, 1990; C. Imada, pers. comm., 1994).

Setaria palmifolia (palmgrass), native to tropical Asia, has become naturalized in mesic valleys, wet forests, and along streams on Oahu, Lanai, Maui, and Hawaii. First collected in 1903, major infestations can now be found in the Olaa area and the windward side of the island of Hawaii (Cuddihy and Stone 1990, O'Connor 1990). Palmgrass is a threat to *Sicyos alba* and the only known individual of *Phyllostegia warshaueri* (HPCC 1993c; M. Bruegmann, *in litt.*, 1994). *Paspalum urvillei* (Vasey grass) is widespread in disturbed areas on the islands of Maui and Hawaii. It has invaded some rain forests and montane mesic communities, and is a threat to *Phyllostegia racemosa* and *Phyllostegia velutina* (Cuddihy and Stone 1990; HPCC 1992b; O'Connor 1990; J. Jeffrey, pers. comm., 1994).

Because Hawaiian plants were subjected to fire during their evolution only in areas of volcanic activity and from occasional lightning strikes, they are not adapted to recurring fire regimes and are unable to recover well following a fire. Alien plants are often better adapted to fire than native plant species, and some fire-adapted grasses have become widespread in Hawaii. Native shrubland and dry forest can thus be converted to land dominated by alien grasses. The presence of such species in Hawaiian ecosystems greatly increases the intensity, extent, and frequency of fire, especially during drier months or drought. Fire-adapted alien plant taxa can reestablish in a burned area, resulting in a reduction in the amount of native vegetation after each fire. Fire can destroy dormant seeds as well as plants, even in steep or inaccessible areas. Fires may result from natural causes, or they may be accidentally or purposely set by humans. Three fires have occurred in the Puu Waawaa/Kaupulehu dry forests on the slopes of Hualalai over the last ten years, and have destroyed habitat as well as individuals of many endangered and proposed endangered species, including *Pleomele hawaiiensis* (Cuddihy and Stone 1990; HHP 1991h4; HPCC 1992d, 1993b; J. Lau, *in litt.*, 1990). Fire is also a threat to *Phyllostegia velutina* and the only known populations of *Hibiscadelphus hualalaiensis* and *Zanthoxylum dipetalum* var. *tomentosum* (HPCC 1991i, 1992a, 1993c2; M. Bruegmann, *in litt.*, 1994).

Natural changes to habitat and substrate can result in the death of individual plants as well as the destruction of their habitat. This especially affects the continued existence of taxa or populations with limited numbers and/or narrow ranges and is often exacerbated by human disturbance and land use practices (See Factor A.). Two of the five volcanoes that make up the island of Hawaii, Kilauea and Mauna Loa, are active and a third, Hualalai, is dormant but may erupt again. Ten of the proposed taxa are in areas where volcanic activity could result in the destruction of all of the populations: *Hibiscadelphus giffardianus, Hibiscadelphus hualalaiensis, Melicope zahlbruckneri, Neraudia ovata, Phyllostegia velutina, Pleomele hawaiiensis, Pritchardia schattaueri, Sicyos alba,* and *Zanthoxylum dipetalum* var. *tomentosum*. Some populations of *Phyllostegia racemosa* are also threatened by volcanic activity.

People are more likely to come into contact with taxa which have populations near trails or roads or in recreational areas. Alien plants may be introduced into such areas as seeds on footwear, or people may cause erosion, trample plants, or start fires (Cuddihy and Stone 1990). The following proposed taxa have populations in recreational areas, close to roads or trails, or in areas where ranching or logging is occurring, and are potentially threatened by human disturbance: *Clermontia drepanomorpha, Hibiscadelphus hualalaiensis, Phyllostegia racemosa, Phyllostegia velutina, Sicyos alba,* and *Zanthoxylum dipetalum* var. *tomentosum* (Bruegmann 1990; Corn 1983; HHP 1991f1; HPCC 1991d, 1991h, 1992b; Pratt and Cuddihy 1990; Stemmermann 1987).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these taxa in determining to propose this rule. Based on this evaluation, the preferred action is to propose listing these 13 plant taxa as endangered: *Clermontia drepanomorpha, Cyanea platyphylla, Hibiscadelphus giffardianus, Hibiscadelphus hualalaiensis, Melicope zahlbruckneri, Neraudia ovata, Phyllostegia racemosa, Phyllostegia velutina, Phyllostegia warshaueri, Pleomele hawaiiensis, Pritchardia schattaueri, Sicyos alba,* and *Zanthoxylum dipetalum* var. *tomentosum*. Twelve of the taxa proposed for listing number no more

than 100 individuals and are known from 5 or fewer populations. The 13 taxa are threatened by one or more of the following—habitat degradation and/or predation by cattle, pigs, goats, sheep, insects, and rats; competition from alien plants; fire and volcanic activity; human impacts; and lack of legal protection or difficulty in enforcing laws which are already in effect. Small population size and limited distribution make these taxa particularly vulnerable to extinction and/or reduced reproductive vigor from naturally occurring events. Because these 13 taxa are in danger of extinction throughout all or a significant portion of their ranges, they are proposed to be listed as endangered.

Critical habitat is not being proposed for the 13 taxa included in this rule, for reasons discussed in the ''Critical Habitat'' section of this proposal.

Critical Habitat

Critical habitat is defined in section 3 of the Act as: (i) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management consideration or protection and; (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

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 a species is listed as endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for these 13 taxa. Service regulations (50 CFR 424.12(a)(1)) state that designation of critical habitat is not prudent when one or both of the following situations exist—(1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species. As discussed under Factor B, these taxa are threatened by overcollection, due to extremely low population size. The publication of precise maps and descriptions of critical habitat in the Federal Register and local newspapers as required in a proposal for critical habitat would increase the degree of threat to these plants from take or vandalism and, therefore, could contribute to their decline. The listing of these taxa as endangered publicizes the rarity of the plants and, thus, can make these plants attractive to researchers, curiosity seekers, or collectors of rare plants. All involved parties and the major landowners have been notified of the location and importance of protecting the habitat of these taxa. Additional protection of the habitat of these taxa will be addressed through the recovery process and through the section 7 consultation process. The Service finds that designation of critical habitat for these 13 taxa is not prudent at this time. Such a designation would increase the degree of threat from vandalism, collecting, or other human activities and is unlikely to aid in the conservation of these taxa.

Available Conservation Measures

Conservation measures provided to taxa listed as endangered under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing results in public awareness and conservation actions by Federal, State, and local agencies, private organizations, and individuals. The Act provides for possible land acquisition and cooperation with the State and requires that recovery plans be developed for listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7 (a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any taxon that is proposed or listed as endangered and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) requires Federal agencies to confer with the Service 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. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. One or more populations of four of the proposed taxa are located on federally owned and/or managed land. Three taxa are located in HVNP and one taxon is found in Hakalau Forest National Wildlife Refuge. HVNP is actively managing Kipuka Puaulu to maintain *Melicope zahlbruckneri* and the cultivated plants of *Hibiscadelphus giffardianus* (Mountainspring 1985). Staff at Hakalau National Wildlife Refuge are monitoring *Phyllostegia racemosa* populations and controlling threats (J. Jeffrey, pers. comm., 1994).

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered plant species. With respect to the 13 plant taxa proposed to be listed as endangered, all of the prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, will apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export any endangered plant; transport such species in interstate or foreign commerce in the course of a commercial activity; sell or offer for sale such species in interstate or foreign commerce; remove and reduce to possession any such species from areas under Federal jurisdiction; maliciously damage or destroy any such species on any area under Federal jurisdiction; or remove, cut, dig up, damage, or destroy any such species on any other area in knowing violation of any State law or regulation including State criminal trespass law. Certain exceptions to the prohibitions apply to agents of the Service and State conservation agencies.

The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plant species under certain circumstances. Such permits are available for scientific purposes and to enhance the propagation or survival of the species. It is anticipated that few trade permits would be sought or issued for most of the 13 taxa, because they are not in cultivation or common in the wild. Requests for copies of the regulations concerning listed plants and inquiries regarding prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Ecological Services, Endangered Species Permits, 911 N.E. 11th Avenue, Portland, Oregon 97232–4181 (telephone: 503/231–6241; facsimile: 503/231–6243).

Public Comments Solicited

The Service intends that any final action resulting from this proposal will be as accurate and as effective as possible. Therefore, comments or

suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule are hereby solicited. Comments particularly are sought concerning:

(1) Biological, commercial trade, or other relevant data concerning any threat (or lack thereof) to these 13 taxa;

(2) The location of any additional populations of these taxa and the reasons why any habitat should or should not be determined to be critical habitat as provided by section 4 of the Act;

(3) Additional information concerning the range, distribution, and population size of these taxa; and

(4) Current or planned activities in the range of these taxa and their possible impacts on these taxa.

The final decision on this proposal will take into consideration the comments and any additional information received by the Service, and such communications may lead to a final regulation that differs from this proposal.

The Endangered Species Act provides for one or more public hearings on this proposal, if requested. Requests must be received within 45 days of the date of publication of the proposal in the Federal Register. Such requests must be made in writing and be addressed to the Pacific Islands Ecoregion Manager (see **ADDRESSES** section).

National Environmental Policy Act

The Fish and Wildlife Service has determined that Environmental Assessments and Environmental Impact Statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein is available upon request from the Pacific Islands Ecoregion Office (see **ADDRESSES** section).

Author: The author of this proposed rule is Marie M. Bruegmann, Pacific Islands Ecoregion Office (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, the Service hereby proposes 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. Section 17.12(h) is amended by adding the following, in alphabetical order under FLOWERING PLANTS, to the List of Endangered and Threatened Plants to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
FLOWERING PLANTS							
*	*	*	*	*	*	*	
Clermontia drepanomorpha.	'Oha wai	U.S.A.(HI)	Campanulaceae—Bellflower.	E		NA	NA
*	*	*	*	*	*	*	
Cyanea platyphylla ..	Haha	U.S.A.(HI)	Campanulaceae—Bellflower.	E		NA	NA
*	*	*	*	*	*	*	
Hibiscadelphus giffardianus.	Hau kuahiwi	U.S.A.(HI)	Malvaceae—Mallow	E		NA	NA
*	*	*	*	*	*	*	
Hibiscadelphus hualalaiensis.	Hau kuahiwi	U.S.A.(HI)	Malvaceae—Mallow	E		NA	NA
*	*	*	*	*	*	*	
Melicope zahlbruckneri.	Alani	U.S.A.(HI)	Rutaceae—Citrus ...	E		NA	NA
*	*	*	*	*	*	*	
Neraudia ovata	None	U.S.A.(HI)	Urticaceae—Nettle .	E		NA	NA
*	*	*	*	*	*	*	
Phyllostegia racemosa.	Kiponapona	U.S.A.(HI)	Lamiaceae—Mint ...	E		NA	NA
*	*	*	*	*	*	*	
Phyllostegia velutina	None	U.S.A.(HI)	Lamiaceae—Mint ...	E		NA	NA
*	*	*	*	*	*	*	
Phyllostegia warshaueri.	None	U.S.A. (HI)	Lamiaceae—Mint ...	E		NA	NA

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
*	*	*	*	*	*	*	
Pleomele hawaiiensis.	Hala pepe	U.S.A.(HI)	Agavaceae—Agave	E		NA	NA
*	*	*	*	*	*	*	
Pritchardia schattaueri.	Loulu	U.S.A.(HI)	Arecaceae—Palm	E		NA	NA
*	*	*	*	*	*	*	
Sicyos alba	'Anunu	U.S.A.(HI)	Curcurbitaceae—Gourd.	E		NA	NA
*	*	*	*	*	*	*	
Zanthoxylum *dipetalum* var. *tomentosum*.	A'e	U.S.A.(HI)	Rutaceae—Citrus	E		NA	NA
*	*	*	*	*	*	*	

Dated: August 18, 1995.

John G. Rogers,

Acting Director, Fish and Wildlife Service.

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