

Species		Historic range	Family name	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
<i>Cyperus trachysanthos</i>	Pu'uka'a	U.S.A. (HI)	Cyperaceae	E	592	NA	NA
<i>Euphorbia haeleeleana</i>	'Akoko	U.S.A. (HI)	Euphorbiaceae	E	592	NA	NA
<i>Isodendron laurifolium</i>	Aupaka	U.S.A. (HI)	Violaceae	E	592	NA	NA
<i>Isodendron longifolium</i>	Aupaka	U.S.A. (HI)	Violaceae	T	592	NA	NA
<i>Panicum niihauense</i>	Lau 'ehu	U.S.A. (HI)	Poaceae	E	592	NA	NA
<i>Phyllostegia parviflora</i>	None	U.S.A. (HI)	Lamiaceae	E	592	NA	NA
<i>Platanthera holochila</i>	None	U.S.A. (HI)	Orchidaceae	E	592	NA	NA
<i>Sanicula purpurea</i>	None	U.S.A. (HI)	Apiaceae	E	592	NA	NA
<i>Schiedea hookeri</i>	None	U.S.A. (HI)	Caryophyllaceae	E	592	NA	NA
<i>Schiedea kauaiensis</i>	None	U.S.A. (HI)	Caryophyllaceae	E	592	NA	NA
<i>Schiedea nuttallii</i>	None	U.S.A. (HI)	Caryophyllaceae	E	592	NA	NA

Dated: September 24, 1996.

John G. Rogers,

Acting Director, Fish and Wildlife Service.

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50 CFR Part 17

RIN 1018-AC56

Endangered and Threatened Wildlife and Plants; Endangered Status for the Plant *Delissea undulata* (No Common Name)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines endangered species status pursuant to the Endangered Species Act of 1973, as amended (Act), for the plant *Delissea undulata* (No Common Name). This species is known in the wild from only a single individual, located on the island of Hawaii. The greatest immediate threats to the survival of this species are habitat degradation and predation by domestic and feral mammals, fire, and competition with alien plants. The small population size of one individual with its limited gene pool also comprises a serious threat to this species. This rule implements the protection provisions provided by the Act for this species.

EFFECTIVE DATE: November 12, 1996.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business

hours at the Pacific Islands Ecoregion Office, U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, Room 6307, P.O. Box 50167, Honolulu, Hawaii 96850.

FOR FURTHER INFORMATION CONTACT:

Marie M. Brueggemann, at the above address or telephone 808-541-3441.

SUPPLEMENTARY INFORMATION:

Background

Delissea undulata was first described by Charles Gaudichaud-Beaupre from specimens he collected in the Hawaiian Islands ("Isles Sandwich") in 1819 (St. John 1959). He chose the specific epithet to refer to the undulating margins of the leaves. F.E. Wimmer named a specimen J.F. Rock collected in 1911 from Kanahaha, Kona, as *Cyanea argutidentata*, which H. St. John later moved to the genus *Delissea* (St. John 1959, Wimmer 1943). St. John also named a specimen collected in 1968 from the southern Kona District as *D. konaensis* (St. John 1986). The current treatment of the family (Lammers 1988, 1990) considers all of the above species to be synonymous with *D. undulata*. Lammers recognizes three subspecies of *D. undulata*—subsp. *niihauensis*, subsp. *kauaiensis*, and subsp. *undulata* (Lammers 1988, 1990).

Delissea undulata of the bellflower family (Campanulaceae) is a palm-like tree with unbranched woody stems 2 to 10 meters (m) (6 to 30 feet (ft)) tall. The leaves are long and narrow or elliptic with long petioles and undulate or flat, toothed margins, about 5 to 21 centimeters (cm) (2 to 8 inches (in)) long

and 3 to 10 cm (1 to 4 in) wide. The 5 to 15 flowering stalks each bear 5 to 20 greenish-white, slightly down-curved flowers 1.6 to 2.5 cm (0.6 to 1.0 in) long with one or two small knobs on the upper surfaces. The fruits are ovoid to globose purple berries 0.6 to 1.2 cm (0.2 to 0.4 in) long. The three subspecies of *D. undulata* can be distinguished from each other by leaf shape and leaf margin characteristics—subsp. *kauaiensis* has ovate leaves with flat, sharply toothed margins; subsp. *niihauensis* has leaves with heart-shaped bases and shallow roundly toothed margins; and subsp. *undulata* has narrower, lance-shaped leaves with undulating margins and spreading, pointed teeth (Lammers 1988, 1990). The species *D. undulata* is distinguished from closely related species in this genus by its broader leaf bases, larger flowers, and larger berries (Lammers 1990).

Historically, *Delissea undulata* is known from Niihau, Kauai, Maui, and Hawaii. Subspecies *kauaiensis* was collected west of the Hanapepe River on the island of Kauai by A.A. Heller in 1895 and has not been relocated (Hawaii Heritage Program (HHP) 1991a, Heller 1897, Lammers 1988). Subspecies *niihauensis* was collected twice in the 1800's on the island of Niihau and has not been located since (HHP 1991b, Hillebrand 1888, St. John 1959). Both of these subspecies are considered extinct (HHP 1991a, 1991b; Lammers 1990). *Delissea undulata* subsp. *undulata* was reported from four valleys of southwestern Maui in the 1800's, and from the Kona region of the island of Hawaii (HHP 1991c1 to 1991c9). This

subspecies was observed in 1971 at Puu Lehua and was subsequently thought to be extinct (HHP 1991c6, Lammers 1990). However, one individual plant was discovered on April 24, 1992, at Puu Waawaa, at a previously unreported location on Hualalai on the island of Hawaii. This site is owned by the State and leased to a private individual for ranching (Jon Giffin, Hawaii Department of Land and Natural Resources (Hawaii DLNR), *in litt.* 1993). Harold L. Lyon Arboretum of the University of Hawaii at Manoa is propagating seeds collected from the one remaining individual as part of an *ex situ* conservation program. The Arboretum has sent approximately 50 individual plants propagated from seed to the State's Hawaii forestry district for experimental outplanting in the Puu Waawaa area. Several outplanted individuals have produced seed after only two years, although no seedlings have been produced by these outplanted individuals (Charles H. Lamoureux, Harold L. Lyon Arboretum at University of Hawaii, pers. comm. 1993; J. Giffin, pers. comms. 1993, 1994).

Delissea undulata grows primarily in dry and mesic forests at about 1,000 to 1,750 m (3,300 to 5,700 ft) elevation (Lammers 1990; J. Giffin, *in litt.* 1993). The substrate is a thin organic soil layer over 'a'a or pahoehoe lava (Department of Geography 1983). The only known wild individual grows on the brink of a collapsed lava tube at 1,070 m (3,520 ft) elevation. The vegetation is open *Sophora chrysophylla* (mamane)-*Metrosideros polymorpha* ('ohi'a) forest with such associated species as *Santalum ellipticum* ('iliahi) and *Acacia koa* (koa). The endangered species *Nothocestrum breviflorum* ('aiea) also is found in the area of the one remaining wild individual of *D. undulata*. Introduced plants in the area include *Pennisetum clandestinum* (kikuyu grass), *Passiflora mollissima* (banana poka), and *Senecio mikanioides* (German ivy) (J. Giffin, *in litt.* 1993).

The greatest immediate threats to the survival of *Delissea undulata* are damage from domestic and feral herbivores and competition with alien plants. Fire, whether started naturally or by arson, poses a serious threat to the population. Slug damage has been observed on outplanted individuals of this species, and slugs may eat the fruits before germination can occur. The one individual known from the wild with its limited gene pool also comprises a serious threat to this species (M. Brueggemann, *in litt.* 1994; J. Giffin, *in litt.* 1993). The long-term viability or survivorship of the approximately 50 outplanted individuals is not known.

Previous Federal Action

Federal action on this species began as a result of section 12 of the Endangered Species Act (16 U.S.C. 1531 *et seq.*), which directed the Secretary of the Smithsonian Institution to prepare a report on plants considered to be endangered, threatened, or extinct. This report, designated as House Document No. 94-51, was presented to Congress on January 9, 1975. On July 1, 1975, the Service published a notice in the Federal Register (40 FR 27823) accepting the report as a petition within the context of section 4(c)(2) (now section 4(b)(3)(A)) of the Act, and giving notice of its intention to review the status of the plant taxa named therein. In this and subsequent notices, *Delissea undulata* var. *undulata* was included as extinct, and *D. undulata* var. *argutidentata* was included as endangered. As a result of this review, on June 16, 1976, the Service published a proposed rule in the Federal Register (41 FR 24523) to determine approximately 1,700 vascular plant species, including *D. undulata*, endangered pursuant to section 4 of the Act. In 1978, amendments to the Act required that all proposals over 2 years old be withdrawn. A 1-year grace period was given to proposals already over 2 years old. On December 10, 1979, the Service published a notice in the Federal Register (44 FR 70796) of the withdrawal of that portion of the June 16, 1976, proposal that had not been made final, including *D. undulata*, along with four other proposals that had expired.

The Service published an updated Notice of Review for plants on December 15, 1980 (45 FR 82480), including *Delissea undulata* as a category 1 candidate, meaning that the Service had substantial information indicating that a listing proposal was appropriate. In the updated Notice of Review for plants on September 27, 1985 (50 FR 39525), and February 21, 1990 (55 FR 6183), *D. undulata* was included as a Category 1* candidate, meaning that the Service had substantial information indicating that this taxon was vulnerable in the recent past but that it may already have become extinct.

Section 4(b)(3)(B) of the Act, requires the Secretary to make findings on certain pending petitions within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires that all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. The latter was the case for *Delissea undulata* because the Service had accepted the 1975 Smithsonian report as a petition.

On October 13, 1983, the Service found that the listing of the species 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 petition to be reconsidered periodically, 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, and 1992. The proposed rule published on June 27, 1994 (59 FR 32946), to list *D. undulata* as an endangered species constituted the final 1-year finding that was required for this species.

Based on comments received in response to the proposal (see Comments and Recommendations, below), the Service now determines *Delissea undulata* to be endangered with the publication of this final rule.

Summary of Comments and Recommendations

In the June 27, 1994, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. The public comment period ended on August 26, 1994, but was reopened until November 29, 1994 to ensure that all parties had adequate time to provide comments on the proposed rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. A newspaper notice inviting public comment was published in the "Hawaii Tribune-Herald" on November 7, 1994.

Comments were received from two parties. Both parties supported the listing of the *Delissea undulata* as an endangered species. One of the parties also requested the designation of critical habitat for this species, to force State action to protect the species, and also to allow for citizen action if necessary. However, the designation of critical habitat is not necessary for citizen suits under Section 11(g)(1) of the Act, which states that any person may commence a civil suit on his own behalf to enjoin any person in violation of the Act. Furthermore, it is unclear how designation of critical habitat under the Federal Endangered Species Act would prompt any more State action than simply listing the plant. The protections afforded a species by designating critical habitat are limited and apply only in the context of section 7 of the Act, which affects only Federal agency actions.

Pursuant to the Service's policy on peer review (59 FR 34270), the Service also solicited the expert opinions of four appropriate and independent specialists regarding pertinent scientific or commercial data and assumptions relating to the taxonomy, population models, and biological and ecological information for *Delissea undulata*. No responses from these peer reviewers were received.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Delissea undulata* should be classified as an endangered species. Procedures found at section 4(a)(1) of the Act and regulations implementing the listing provisions of the Act (50 CFR part 424) were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Delissea undulata* Gaud. (No Common Name) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The habitat of *Delissea undulata* has undergone extreme alteration because of past and present land management practices, including deliberate and accidental alien mammal and plant introductions and agricultural development. Natural disturbances such as the collapse of lava tubes also destroy habitat and can have a significant effect on small populations of plants. Competition with alien plants as well as destruction of individuals and modification of habitat by introduced animals are the primary threats facing this species.

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. Land was cleared for these enterprises to such a great extent that climatic conditions began to change and the amount and distribution of rainfall were altered (Wenkam 1969).

Past and present impacts of introduced alien animals are the primary factor in altering and degrading vegetation and habitats on the island of Hawaii as well as on Kauai and Maui, where populations of *Delissea undulata* previously existed. Feral ungulates trample and eat native vegetation and

disturb open areas. This causes erosion and allows the invasion of alien plant species (Cuddihy and Stone 1990, Wagner *et al.* 1990). *Delissea undulata* is threatened by habitat degradation resulting from introduced ungulates (e.g., cattle, goats, sheep, and pigs). Habitat degradation by these ungulates threatens the only known wild plant, any potential natural germination of seedlings, as well as potential suitable habitat occurring throughout the historic range of the species.

Cattle (*Bos taurus*), 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. Large ranches in the tens of thousands of acres were created on Maui and Hawaii. Much of the land used in these private enterprises was leased from the State or was privately owned. Feral cattle formerly existed on Maui and damaged the forests there. Feral cattle are presently found on the island of Hawaii, and ranching is still a major commercial activity there. 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 becomes degraded to grassland pasture in areas grazed by cattle, 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). Cattle have altered and degraded the vegetation of much of Hawaii, including the areas where *Delissea undulata* formerly grew, and where it is still known to exist (Tomich 1986; J. Giffin, *in litt.* 1993). Hunting of feral cattle is no longer allowed in Hawaii (Hawaii DLNR 1985).

Goats (*Capra hircus*), 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 Kauai, feral goats have been present in drier, more rugged areas since 1820; they still occur in Waimea Canyon. On Hawaii, goats damage low elevation dry forests, montane parklands, 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). *Delissea undulata* currently is threatened by goats that use the area where the single known wild individual exists (J. Giffin, *in litt.* 1993).

Sheep (*Ovis aries*) became firmly established on the island of Hawaii (Tomich 1986) following their introduction almost 200 years ago (Cuddihy and Stone 1990). Like feral goats, sheep roam the upper elevation dry forests, including Puu Waawaa, causing damage similar to that of goats (Stone 1985). Sheep have decimated vast areas of native forest and shrubland on Hawaii. Sheep threaten the habitat of *Delissea undulata* (Cuddihy and Stone 1990; J. Giffin, *in litt.* 1993) as well as the one remaining wild plant.

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 currently are 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 feces, and the disturbed soil is fertilized by their feces, helping alien plants to establish (Cuddihy and Stone 1990, Smith 1985, Stone 1985, Tomich 1986, Wagner *et al.* 1990). Feral pigs pose a threat to *Delissea undulata* and its habitat (J. Giffin, *in litt.* 1993).

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 could result from increased publicity. This is a potential threat to *Delissea undulata*, which was once thought to be extinct and is represented now by only one known wild plant. The long-term viability or survivorship of the

approximately 50 outplanted individuals propagated from seed is not known. The species is of some horticultural and ornamental interest. Taking and vandalism are potential threats that could result from increased specific publicity.

C. Disease or predation. Cattle, goats, pigs, and sheep have been reported in the area where *Delissea undulata* is known to occur. As this taxon is not known to be unpalatable to these ungulates, predation is a probable threat where these animals have been reported. The lack of seedlings and the occurrence of the only known individual in an area less accessible to ungulates seem to indicate the effect that browsing mammals, especially cattle, have had in restricting the distribution of this plant. Though not legally obligated to protect the species prior to this listing, the State fenced the one wild individual to protect it from damage by ungulates (J. Giffin, *in litt.* 1993). See Factor D.

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 the roof or black rat (*Rattus rattus*), 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 house mouse (*Mus musculus*), Polynesian rat (*R. exulans*), and Norway rat (*R. norvegicus*), 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 that supports rodent populations. It is probable that rats damage the fleshy fruit of *Delissea undulata*. Introduced game birds also may eat the fruits (J. Giffin, *in litt.* 1993).

Little is known about the predation of rare Hawaiian plants by slugs. Predation by slugs on plant parts of *Delissea undulata* has been observed by field botanists (M. Bruegmann, *in litt.* 1994). The effect of slugs on the decline of this and related species is unclear, although slugs may pose a threat to this species, because they feed on the stems and may eat the fruit before germination can occur, reducing the vigor of the plants and limiting the number of seeds for germination. While seeds produced on the wild plant and outplanted individuals are viable, no germination has been observed in the wild (M. Bruegmann, *in litt.* 1994, J. Giffin, pers. comm. 1994).

D. The inadequacy of existing regulatory mechanisms. The only known wild *Delissea undulata* occurs

on State land within the State's conservation district. Conservation district lands (HRS, sect. 205-4) are regarded, among other purposes, as necessary for the protection of endemic biological resources and the maintenance or enhancement of the conservation of natural resources. Activities permitted in the conservation district are chosen by considering how best to make 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 both Federal and 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 on 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 that would occur on county or State land, that would be funded in part or whole by county or State funds, or that would occur within land classified as a 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 under State law 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)). Despite provisions for conserving endemic resources, individual rare species may be overlooked during consideration of other land use priorities.

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" (HRS, sect. 195D-4(a)). Therefore, Federal listing automatically invokes listing under Hawaii State law. State law prohibits cutting, collecting, uprooting, destroying, injuring, or possessing any

listed species of plant on State or private land, or attempting to engage in any such conduct. The State law encourages conservation of such species by State agencies and triggers other State regulations to protect the species (HRS, sect. 195AD-4 and 5).

E. Other natural or manmade factors affecting its continued existence. The fact that there is only one remaining wild individual of *Delissea undulata* increases the potential for extinction from random events. While seeds produced on the wild plant and outplanted individuals are viable, no germination has been observed in the wild (M. Bruegmann, *in litt.* 1994, J. Giffin, pers. comm. 1994). The limited gene pool may depress reproductive vigor, or a single human-caused or natural environmental disturbance could destroy the only known extant individual. This constitutes a major threat to *D. undulata*.

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 or narrow ranges and is often exacerbated by human disturbance and land use practices (see Factor A). Additional collapse of the lava tube where the only known wild individual of *Delissea undulata* occurs is a potential threat to this species (J. Giffin, *in litt.* 1993).

Three species of introduced plants threaten *Delissea undulata*. The historic 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 (Smith 1985, Wagner *et al.* 1990). Naturalized, introduced species degrade the Hawaiian landscape and compete with native plants for space, light, water, and nutrients (Cuddihy and Stone 1990). Some of these species 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 inadvertently introduced weed seeds as well. Other plants were brought to Hawaii for their potential horticultural value (Cuddihy and Stone 1990, Wenkam 1969).

Passiflora mollissima (banana poka), a woody vine, poses a serious problem to mesic forests, in which *Delissea undulata* primarily grows, on Kauai and Hawaii by covering trees, reducing the amount of light that 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). *P. mollissima* is a threat to *D. undulata* and its habitat (J. Giffin, *in litt.* 1993).

Senecio mikanioides (German ivy) is another vine that poses a serious threat to mesic and dry forests on Hawaii. It is becoming established on Maui as well. *Senecio mikanioides* may be capable of establishing itself over vast areas of the island of Hawaii, including most of Hualalai. The vine covers the forest canopy, which can result in structural damage and the reduction of available light. *Senecio mikanioides* also can form a significant ground cover in native forests of the southern Kona region of Hawaii where it may limit native plant reproduction (Cuddihy and Stone 1990). *Senecio mikanioides* threatens *Delissea undulata* and its habitat (J. Giffin, *in litt.* 1993).

Pennisetum clandestinum (Kikuyu grass), an aggressive, fire adapted, 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 becoming established. It has been declared a noxious weed by the U.S. Department of Agriculture (7 CFR 360) (O'Connor 1990, Smith 1985).

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 do not recover quickly following a fire. Fires may result from natural causes, or they may be accidentally or purposely set by people. Vegetation on the slopes of Hualalai is particularly vulnerable to fire due to the extensive invasion of *P. clandestinum*. Alien plants are often better adapted to fire than native plant species, and some fire-adapted grasses have become widespread in Hawaii. Native shrubland 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. Many fire-adapted alien species can quickly reestablish in burned areas, resulting in a reduction in

the amount of native vegetation after each fire. Fire can destroy dormant seeds as well as mature plants and seedlings, even in steep or inaccessible areas (Cuddihy and Stone 1990). The only known wild individual of *Delissea undulata* occurs in an area heavily grazed by cattle, and is offered some protection from fires since the cattle reduce the fuel load of *P. clandestinum*. However, fire remains a potentially serious threat to the only known wild individual of *D. undulata*, its potential regeneration, and other suitable habitat (J. Giffin, *in litt.* 1993).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by *Delissea undulata* in determining to make this rule final. Based on this evaluation, this rulemaking will list *D. undulata* as endangered. Only one wild individual of this species is known to exist, and it is threatened by habitat degradation by feral ungulates and alien plants, fire, and lack of legal protection. The seeds produced on the wild plant and the outplanted individuals are viable but no germination has been observed in the wild. Small population size makes this species particularly vulnerable to reduced reproductive vigor and/or extinction from stochastic events. Because this species is in danger of extinction throughout all of its range, it fits the definition of endangered as defined in the Act.

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 should designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for *Delissea undulata*. 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.

Such a determination would provide no additional protection to *Delissea undulata* and could increase the degree of threat to the species. The extant population is on State land; State government agencies can be alerted to the presence of the plant without the publication of critical habitat descriptions and maps. The publication of such descriptions and maps would potentially increase the degree of threats from taking or vandalism because a live specimen of *D. undulata* would be of interest to curiosity seekers or collectors of rare plants. Although taking by humans is not currently a primary threat, listing *D. undulata* is likely to substantially increase interest in the plant, thus increasing the threat from human disturbance. All involved parties and landowners have been notified of the importance of protecting this species' habitat. In addition, protection of the species' habitat will be addressed through the recovery planning process. Furthermore, the limited protections added by designating critical habitat are provided by section 7 of the Act, which applies only to actions by Federal agencies. There are no known Federal activities within the currently known habitat of this species. Therefore, the Service finds that designation of critical habitat for this species is not prudent at this time, because such designation would increase the degree of threat from vandalism, collecting, or other human activities and because it is unlikely to aid in the conservation of this species.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing can result in conservation actions by Federal, State, and local agencies, private organizations, and individuals. Harold L. Lyon Arboretum of the University of Hawaii at Manoa is propagating seeds collected from the one remaining individual as part of an *ex situ* conservation program. The Arboretum has over 400 seedlings growing as part

of this conservation program, and has sent approximately 50 individuals to the State's Hawaii forestry district for experimental outplanting in the Puu Waawaa area. Several outplanted individuals have produced seed after only two years, although no seedlings have been produced by these outplanted individuals (Charles H. Lamoureux, Harold L. Lyon Arboretum at University of Hawaii, pers. comm. 1993; J. Giffin, pers. comms. 1993, 1994). The Act provides for possible land acquisition and cooperation with State agencies and requires that recovery actions be carried out for all listed species. Since *Delissea undulata* is known to occur on State land, cooperation between Federal and State agencies is necessary to provide for its conservation. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7 of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened. 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. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species. If a Federal action may affect a listed species, the responsible Federal agency must enter into formal consultation with the Service. No Federal involvement is known or anticipated that would affect *Delissea undulata*, as the only known site is on State owned land.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered plants. All prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, would apply to *Delissea undulata*. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export, transport in interstate or foreign commerce in the course of a commercial activity, sell or offer for sale in interstate or foreign commerce, or remove and reduce an endangered plant species to possession from areas under Federal jurisdiction. In addition, for plants listed as endangered, the Act prohibits the malicious damage or destruction on areas under Federal jurisdiction and the

removal, cutting, digging up, or damaging or destroying of such plants in knowing violation of any State law or regulation, including State criminal trespass law. Certain exceptions 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 plants under certain circumstances. Such permits are available for scientific purposes and to enhance the propagation and survival of the species. It is anticipated that few 50 CFR 17.63 permits relating to economic hardship would ever be sought or issued because the species is uncommon in cultivation and is very rare in the wild.

It is the policy of the Service (59 FR 34272) to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. Such information is intended to clarify the potential impacts of a species' listing on proposed and ongoing activities within the species' range. The only known wild individual of *Delissea undulata* occurs on State land. Collection, damage, or destruction of this species on State land would constitute a violation of section 9 if conducted in knowing violation of Hawaii State law or regulations or in violation of a State criminal trespass law (see Hawaii State Law section below). Damage or destruction of the last known individual of this species via vandalism, arson fire, domestic cattle, feral ungulates, or as a result of the deliberate introduction of plant predators or pathogens that attack this species could be considered such a violation.

Requests for copies of the regulations regarding 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 NE 11th Avenue, Portland, Oregon 97232-4181, telephone (503) 231-6131.

Hawaii State Law

Federal listing will automatically invoke listing under the State's endangered species legislation. 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 * * *" (HRS, sect. 195D-4(a)). Therefore, Federal listing will accord the species listed status under Hawaii State Law. State law prohibits cutting, collecting, uprooting, destroying, injuring, or possessing any listed

species of plant on State or private land, or attempting to engage in any such conduct. The State law encourages conservation of such species by State agencies and triggers other State regulations to protect the species (HRS, sect. 195D-4 and 5).

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).

Required Determinations

The Service has examined this regulation under the Paperwork Reduction Act of 1995 and found it to contain no information collection requirements. This rulemaking was not subject to review by the Office of Management and Budget under Executive Order 12866.

References Cited

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

Author

The primary author of this final rule is Marie M. Bruegmann of the 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, Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

2. Amend section 17.12(h) 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							
Delissea undulata	None	U.S.A. (HI)	Campanulaceae	E	593	NA	NA

Dated: September 19, 1996.

John G. Rogers,

Acting Director, Fish and Wildlife Service.

[FR Doc. 96-25555 Filed 10-9-96; 8:45 am]

BILLING CODE 4310-55-P

50 CFR Part 17**RIN 1018-AD49****Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Plant Species (*Cyanea dunbarii*, *Lysimachia maxima*, and *Schiedea sarmentosa*) from the Island of Molokai, Hawaii****AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final 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 three plants: *Cyanea dunbarii* (haha), *Lysimachia maxima* (No common name (NCN)), and *Schiedea sarmentosa* (NCN). All three species are endemic to the island of Molokai, Hawaiian Islands. The three plant species and their habitats have been variously affected or are currently threatened by one or more of the following—competition, predation, or habitat degradation from introduced species; fire; and natural disasters. This rule implements the Federal protection and recovery provisions afforded by the Act for these three species.

EFFECTIVE DATE: This rule takes effect November 12, 1996.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the Pacific Islands Ecoregion Office, U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, Room 3108, P.O. Box 50088, Honolulu, Hawaii 96850.

FOR FURTHER INFORMATION CONTACT: Brooks Harper, Field Supervisor (see **ADDRESSES** section) (telephone 808/541-3441; facsimile 808/541-3470).

SUPPLEMENTARY INFORMATION:**Background**

Cyanea dunbarii, *Lysimachia maxima*, and *Schiedea sarmentosa* are endemic to the island of Molokai. This island, the fifth largest in the Hawaiian island chain, is approximately 61 kilometers (km) (38 miles (mi)) long, up to 16 km (10 mi) wide, and encompasses an area of about 688 square (sq) km (266 sq mi) (Foote *et al.* 1972, Plasch 1985). Three shield volcanoes make up most of the land mass of Molokai—West Molokai Mountain, East Molokai Mountain, and a volcano that formed Kalaupapa Peninsula (Department of Geography 1983). Molokai can also be divided into three major sections—the west Molokai section, comprising West Molokai Mountain; the central Molokai section or Hoolehua Plain formed between the two large mountain masses; and the east Molokai section, incorporating East Molokai Mountain and Kalaupapa Peninsula (Foote *et al.* 1972).

The taller and larger East Molokai Mountain rises 1,813 meters (m) (4,970 feet (ft)) above sea level (Walker 1990) and comprises roughly 50 percent of the island's land area. Topographically, the windward side of East Molokai differs from the leeward side. Precipitous cliffs line the northern windward coast with deep inaccessible valleys dissecting the coastline. The annual rainfall on the windward side is 200 to over 375 centimeters (cm) (75 to over 150 inches (in)), distributed throughout the year. The soils are poorly drained and high in organic matter. The gulches and valleys are usually very steep, but sometimes gently sloping (Foote *et al.* 1972). Much of the native vegetation on the northern part of East Molokai is intact because of its relative inaccessibility to humans and animals (Culliney 1988), although destructive ungulates have begun to enter the coastline in recent years (Joel Lau, Hawaii Heritage Program (HHP), pers. comm. 1990). *Lysimachia maxima* is found in windward wet forest.

Although Molokai's windward side receives most of the island's rainfall, some falls onto the upper slopes of the

leeward (southern) side, decreasing as elevation decreases, and resulting in diverse leeward communities, from wet forests to dry shrub and grasslands. The average annual rainfall on the leeward side of East Molokai is between 80 and 130 cm (30 and 50 in), mostly falling between November and April. The gently sloping to very steep topography of upland regions has predominantly well drained and medium-textured soils (Foote *et al.* 1972). *Cyanea dunbarii* and *Schiedea sarmentosa* are found in lowland mesic forest and dry shrubland on the leeward side of the island.

With the advent of cattle ranching and later pineapple cultivation, most of Molokai, particularly West Molokai and East Molokai's southern section, was converted to pasture land. The only remaining large tracts of native vegetation are found within the Molokai Forest Reserve on the upper elevation portions of East Molokai. All three plant species in this rule are restricted to this forest reserve (Culliney 1988). The land that supports these three plant species is owned by various private parties and the State of Hawaii (including forest reserves). The only known populations of *Lysimachia maxima* and *Schiedea sarmentosa* occur on privately owned land. The only known population of *Cyanea dunbarii* occurs on State land.

Discussion of the Three Species Included in This Final Rule

Cyanea dunbarii was first described by Joseph F. Rock, who named it in honor of the collector, L.M. Dunbar (Rock 1919). Harold St. John (1987a, St. John and Takeuchi 1987) merged *Cyanea* with *Delissea*, the genus with priority. Lammers (1990) retained both genera in the currently accepted treatment of the family.

Cyanea dunbarii, a member of the bellflower family (Campanulaceae), is a branched shrub 1.5 to 2 m (4.9 to 6.6 ft) tall. The oval to broadly elliptic leaves are 10 to 22 cm (3.9 to 8.7 in) long and 6 to 14 cm (2.4 to 5.5 in) wide, with irregularly lobed or cleft margins. The flowers are arranged in groups of six to eight on a stalk that is 3 to 7 cm (1.2 to 2.8 in) long. The corolla is white,