

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AB42

Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for Six Plants From the Island of Lanai, HI

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) proposes endangered status pursuant to the Endangered Species Act of 1973, as amended (Act), for six plants: *Abutilon eremitopetalum* (no common name (NCN)), *Cyanea macrostegia* var. *gibsonii* (NCN), *Gahnia lanaiensis* (NCN), *Phyllostegia glabra* var. *lanaiensis* (NCN), *Tetramolopium remyi* (NCN), and *Viola lanaiensis* (NCN). These taxa are known only from the Lanaihale area of Lanai Island, Hawaii. The six plants have been variously affected and are threatened by one or more of the following: Habitat degradation and competition by naturalized, exotic vegetation; predation or habitat destruction by feral animals; and an increased potential for extinction resulting from stochastic events because of the small numbers of extant individuals and their restricted distribution. Potential threats include fire and destruction or damage to the taxa and their habitat as a secondary result of urbanization and development of the island. A determination that these six taxa are endangered would implement the Federal protection and recovery provisions provided by the Act. Comments and materials related to this proposal are solicited.

DATES: Comments from all interested parties must be received by November 16, 1990. Public hearing requests must be received by November 1, 1990.

ADDRESSES: Comments and materials concerning this proposal should be sent to Ernest F. Kosaka, Field Office Supervisor, 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: Derral R. Herbst, at the above address (808/541-2749 or FTS 551-2749).

SUPPLEMENTARY INFORMATION: Background

Abutilon eremitopetalum, *Cyanea macrostegia* var. *gibsonii*, *Gahnia lanaiensis*, *Phyllostegia glabra* var. *lanaiensis*, *Tetramolopium remyi* and *Viola lanaiensis* are endemic to the island of Lanai; *Tetramolopium remyi* at one time also grew on west Maui, but presently is believed to be extinct on that island (Lowrey 1990). The island of Lanai is a small island totaling about 139 square miles (361 square kilometers) in area. Lanai is a shield volcano built by eruptions at its summit and along three rift zones; the principal rift zone runs in a northwesterly direction and forms a broad ridge whose highest point, Lanaihale, has an elevation of 3370 feet (ft) (1027 meters (m)). The entire ridge is commonly called Lanaihale, after its highest point. The only known extant populations of the six taxa in this proposed rule are found on the summit, slopes, or valleys of Lanaihale on private land. A Lowland Wet Forest community covers the summit and narrow valleys of Lanaihale. Lowland Wet Forest communities occur on the six largest Hawaiian Islands at about 300 to 4,000 ft (100 to 1,200 m) in elevation (Gagne and Cuddihy 1990). Although annual rainfall averages about 37 inches (in) (94 centimeters (cm)) considerable cloud cover during most of the afternoons and nights and fog drip nearly triples the annual precipitation (Ekern 1964). The substrate is primarily silty clay and clay (Foote *et al.* 1972). The vegetation is a mixture of native and exotic species with native 'ohi'a and uluhe fern (*Metrosideros polymorpha* and *Dicranopteris linearis*), respectively, being the dominant species. The known existing populations of *Cyanea macrostegia* var. *gibsonii*, *Gahnia lanaiensis*, *Phyllostegia glabra* var. *lanaiensis*, and *Viola lanaiensis* are members of this community.

Abutilon eremitopetalum and *Tetramolopium remyi* grow on the dry leeward slopes and valleys of Lanaihale. These species are members of the Lowland Dry Shrubland vegetation community that occurs in leeward situations on all of the main islands except Niihau and Kahoolawe, at about 330 to 1,970 ft (100 to 600 m) elevation (Gagne and Cuddihy 1990). The land type is "Rock land;" "Very stony land, eroded;" and "Rock outcrop." The annual rainfall is about 10 to 25 in (25 to 64 cm), mostly falling between November and April (Foote *et al.* 1972). The vegetation comprises typical dry lowland plants such as lama (*Diospyros sandwicensis*), wiliwili (*Erythrina sandwicensis*), 'a'ali'i (*Dodonaea viscosa*) and nehe (*Lipochaeta* spp.).

Discussion of the Six Species Proposed for Listing

The description of *Abutilon eremitopetalum* is based on a specimen collected by George C. Munro in Maunalei Valley, Lanai, in 1930 (Caum 1933; Munro *in litt.* 1951). Edward L. Caum described it as a new species, naming it *A. cryptopetalum* because its petals were small and completely enclosed by the calyx (Caum 1933). *Abutilon cryptopetalum* Caum is a later homonym, as the name had previously been given to an Australian species of the genus, so Caum renamed his plant *A. eremitopetalum*, maintaining the meaning of his original specific epithet (Christophersen 1934). In 1932, Otto Degener discovered a shrub in the Waianae Mountains of Oahu, which looked like an *Abutilon* except that it had reduced or "aborted" petals completely enclosed by the calyx. He established a new genus, *Abortopetalum*, for his discovery, basing the genus upon its short, enclosed petals which he believed to be a unique feature (Degener 1932). Degener later transferred Caum's species to his new genus, giving rise to the epithet *Abortopetalum eremitopetalum* (Degener 1936). Erling Christophersen (1934) noted that all characters of the genus *Abortopetalum* are encompassed within the morphological range of *Abutilon*, and reduced Degener's genus to synonymy, a course accepted by all botanists except Degener.

Abutilon eremitopetalum is a shrub in the mallow family (Malvaceae) with grayish-green, densely hairy, heart-shaped leaves; the leaves are 2.5 to 5 in (7 to 12 cm) long. One or two flowers on stems up to 1.5 in (4 cm) long are in the leaf axils. The calyx of the flowers is green, cup-shaped, and about 0.5 in (1.5 cm) long. The petals are shorter than the calyx and are bright green on the upper surface and reddish on the lower surface. The staminal column extends beyond the calyx and is white to yellow, with red style branches tipped with green stigmas. The fruit is a hairy, brown, dry, cylindrical capsule and about 0.3 in (1 cm) long. It is the only *Abutilon* on Lanai whose flowers have green petals hidden within the calyx (Bates 1990).

Historically, *Abutilon eremitopetalum* was found in small, widely scattered colonies at elevations of between 700 to 1,000 ft (215 to 305 m) in the lands (geographical areas) of Kalulu, Mahana, Maunalei, Mamaki, and Paawili on the northern, northeastern, and eastern parts of Lanai Island (Caum 1933; Hawaii Heritage Program (HHP) 1990b; HHP 1990c; Munro, *in litt.* 1951). Today,

about 30 (Perlman 1990a; Robert Hobdy, Forester, State Dept. of Land and Natural Resources, pers. comm., 1990) to 70 (HHP 1990a) individuals are known from a single population in Kahea Gulch on the northeastern part of the island. Habitat degradation and competition by encroaching exotic plant species such as lantana (*Lantana camara*), koa haole (*Leucaena leucocephala*), and soursbush (*Pluchea carolinensis*), probably are the main threats of this species (HHP 1990a, Perlman 1990a). Axis deer (*Axis axis*) browsing is another threat (HHP 1990a; Hobdy, pers. comm., 1990; Perlman 1990a). Although *Abutilon eremitopetalum* does not appear to be a preferred food of the deer, they will browse the species if other food sources become scarce. Through ground disturbance, deer grazing on grasses and forbs have the potential to promote soil erosion that is usually limited to sheet erosion as the shrubs in the area prevent mass movement of the soil (Hobdy, pers. comm., 1990). Fire is another potential threat because the area is dry much of the year. The small number of extant individuals is in itself a considerable threat, as the limited gene pool may depress reproductive vigor, or a single natural or man-caused environmental disturbance could destroy the only known existing population. Cattle (*Bos taurus*) are known to have destroyed the plants in the past (Munro, in litt., 1951), but today are not a problem as the island is no longer a cattle ranch.

Cyanea macrostegia subsp. *gibsonii* was first collected by William Hillebrand in July 1870, "on the highest wooded ridge" (Lanaihale) of the island of Lanai (Rock 1919). Hillebrand, a medical doctor and author of "Flora of the Hawaiian Islands," named his new species *Cyanea gibsonii* in honor of Walter Murray Gibson (Hillebrand 1888), a Mormon missionary who had established a settlement on the island and later became a notorious figure in Hawaiian politics. The type specimen was deposited in the Berlin Herbarium, which was destroyed in 1943; in 1988 an isotype in the National Herbarium of Victoria, Melbourne, Australia, was designated as the lectotype (Lammers 1988). In 1987, Harold St. John, questioning the validity of the characters used to delineate the genus *Cyanea*, transferred all species of *Cyanea* to the closely related genus *Delissea* (St John 1987, St. John and Takeuchi 1987). Few botanists have accepted St. John's taxonomy for this group; the majority continue to recognize the genus *Cyanea* (Lammers 1990). Several botanists have remarked on the similarity between *C. gibsonii*

and a Maui species of *Cyanea*, *C. macrostegia* (Rock 1919, Wimmer 1943); the Lanai plant differing only in that it has an curved (rather than suberect) corolla. Thomas Lammers, the latest monographer of the Hawaiian members of this family, believed that it would be more appropriate to treat the two as conspecific subspecies and published the new combination and status in 1988 (Lammers 1988).

Cyanea macrostegia var. *gibsonii*, a member of the bellflower family (Campanulaceae), is a palm-like tree 3.2 to 23 ft (1 to 7 m) tall. The leaves are elliptic or oblong, about 8 to 31 in (20 to 80 cm) long and 2.5 to 8 in (6.5 to 20 cm) wide; the upper surface usually is smooth, while the lower is covered with fine hairs. The leaf stem often is covered with small prickles throughout its length. The inflorescences are horizontal and clustered among the leaves, each bearing 5 to 15 curved flowers which are blackish-purple externally and white or pale lilac within. The fruit is a yellowish-orange berry about 0.6 to 1.2 in (1.5 to 3 cm) long. The following combination of characters separates this taxon from the other members of the genus on Lanai: calyx lobes oblong, narrowly oblong, or ovate in shape; and the calyx and corolla both more than 0.2 in (0.5 cm) wide (Lammers 1990, Rock 1919, Wimmer 1943).

Cyanea macrostegia var. *gibsonii* historically is documented from the summit of Lanaihale and the upper parts of Mahana, Kaiholena, and Maunalei Valleys of Lanai Island (Lammers 1990, Rock 1919). It presently is known from two gulches in upper Kaiholena Valley and in one of the feeder gulches into Maunalei Valley. The Maunalei population was last seen in the late 1980s and, although its habitat showed signs of disturbance, was the healthiest of the three populations (Hobdy, pers. comm., 1990). In 1989, only a single plant could be found at one of the Kaiholena sites, and it was being overgrown by kahili ginger (*Hedychium gardnerianum*) (Hobdy, pers. comm., 1990). Deer browsing and encroaching exotic species of plants are the main threats (Hobdy, pers. comm., 1990). The small number of extant individuals also is a threat, as the limited gene pool may depress reproductive vigor, or any natural or man-caused environmental disturbance could destroy the only known existing population.

Gahnia lanaiensis was first collected by Otto and Isa Degener on "Lanai, east of Munro Trail and north of Lanai-hale, in shrubby rainforest at 3,000 ft., Sept. 4, 1964 . . ." (Degener and Degener 1965). The following year, the Degeners and

J.H. Kern published the new taxon, naming it for the island on which it grows (Degener *et al.*, 1964). The species is endemic to the island of Lanai, but is very closely related to *G. melanocarpa* of eastern Australia (Koyama 1990).

Gahnia lanaiensis, a sedge (Cyperaceae), is a tall (5 to 10 ft (1.5 to 3 m)), tufted, perennial, grass-like plant. This sedge may be distinguished from grasses and other genera of sedges on Lanai by its spirally arranged flowers; its solid stems; and its numerous, three-ranked leaves. *Gahnia lanaiensis* differs from the other members of the genus on the island by its achenes (seed-like fruits) which are 0.14 to 0.18 in (0.35 to 0.45 cm) long, and purplish-black when mature (Koyama 1990).

Gahnia lanaiensis is known from 15 to 16 large clumped plants growing along the summit of Lanaihale (HHP 1990d, 1990e, 1990f). The population extends for a distance of about 0.8 mi between 3,000 and 3,360 ft (915 and 1,025 m) in elevation (HHP 1990d, 1990e, 1990f). This distribution encompasses the entire known historic range of the species. The primary threat to this species is the small number of plants and their restricted distribution, which increases the potential for extinction from stochastic events. Potentially, a long term threat to the species is posed by the planned development of the island. Presently, hotels are being build and a tourist industry is planned. The Munro Trail, which traverses Lanaihale, affords a beautiful view of the island and is sure to be popular with tourists. Approximately 30 percent of the known plants of *Gahnia lanaiensis* grow along this trail system. Increased human use of the trail could lead to the destruction of individuals of the species. Disturbance of the soil or destruction of groundcover plants would increase the potential for erosion and open the area to invading exotic plants (Joel Lau, botanist, Hawaii Heritage Program, pers. comm., 1990). Manuka (*Leptospermum scoparium*), a weedy tree introduced from New Zealand, is spreading along Lanaihale, but has not yet reached the *Gahnia* area. However, the manuka may expand its distribution into the remaining *Gahnia* habitat and may compete with *Gahnia* for space.

Phyllostegia glabra var. *lanaiensis* was first collected by Horace Mann, Jr. and William Tufts Brigham during the year they spent collecting botanical specimens in Hawaii (May 1864 to May 1865). It is presumed that all collections of this taxon were made in the "mountains of Lanai," but the plant definitely is known only from Kaiholena Gulch. Earl E. Sherff described this

variety in 1934, naming it for the island on which it grows (Sherff 1934).

Phyllostegia glabra var. *lanaiensis* is a robust, erect to decumbent, glabrous, perennial herb in the mint family (Lamiaceae). Its leaves are thin, narrow, lance-shape, 3 to 9.5 in (8 to 24 cm) long and 0.6 to 1 in (1.6 to 2.5 cm) wide, often red-tinged or with red veins, and toothed at their edges. The flowers are in clusters of 6 to 10 per leaf axil, mostly only at the ends of branches. The flowers are white, occasionally tinged with purple, and are variable in size, about 0.4 to 1 in (1 to 2.5 cm). The fruit consists of four small, fleshy nutlets. Two varieties of *Phyllostegia glabra* occur on Lanai. The variety *lanaiensis* can be distinguished from the variety *glabra* by its shorter calyx and narrower leaves. *Phyllostegia imminuta*, the only other member of the genus on Lanai, is a hairy plant with a calyx about 0.1 in (0.3 cm) long, while *Phyllostegia glabra* lacks hair and has a calyx about 0.2 to 0.4 in (0.4 to 1.1 cm) long (Degener and Degener 1960, Fosberg 1936a, Sheff 1935b, Wagner *et al.*, 1990).

Phyllostegia glabra var. *lanaiensis* has not been seen for several years. The last sighting was that of a single plant made in the 1980s by Robert Hobdy in a gulch feeding into the back of Maunalei Valley (Hobdy, pers. comm., 1990). The gulches and valleys of Lanaihale are very rugged and with steep walls; consequently they are not explored with any frequency or regularity. Because no thorough recent surveys for this species have been conducted in this rugged terrain, the chances that this plant is still extant are very good. Browsing by deer and competition from invading, exotic plants are the two main threats to all the native vegetation within the historic range of this species (Hobdy, pers. comm., 1990).

Tetramolopium remyi was first collected on Maui, most likely in the foothills of western Maui, by Ezechiel Jules Remy, between 1851 and 1855. In 1861, Asa Gray described the species as *Vittadinia remyi*, reducing the genus *Tetramolopium* to a section of *Vittadinia* in the same publication (Gray 1861). William Hillebrand was the first to collect the species on Lanai. After reviewing previous work, he decided to maintain the genus *Tetramolopium* and transferred all Hawaiian *Vittadinia* to that genus (Hillebrand 1888). Drake del Castillo (1888) placed this species in the closely related genus *Erigeron*; he gave no explanation for his action, and this course has not been followed by other botanists.

Tetramolopium remyi, a member of the sunflower family (Asteraceae), is a much branched, decumbent or

occasionally erect shrub up to about 15 in (40 cm) tall. Its leaves are firm, very narrow, 0.6 to 1.4 in (1.5 to 3.5 cm) long, and with the edges rolled inward when the leaf is mature. There is a single flower head per branch. The heads are 0.4 to 0.6 in (0.9 to 1.5 cm) in diameter and on stalks 1.6 to 4.7 in (4 to 12 cm) tall; each comprises 70 to 100 yellow disk and 150 to 250 white ray florets. The stems, leaves, flower bracts, and fruit are covered with sticky hairs. *Tetramolopium remyi* has the largest flower heads in the genus. Two other species of the genus are known historically from Lanai, but both have purplish instead of yellow disk florets and from 4 to 60 instead of a single flower head per branch (Lowrey 1986, 1990; Sherff 1935a).

A single population of *Tetramolopium remyi*, comprising about 35 plants growing in an area of about 50 feet square (15 m square), is known to be extant; the population is found on Aualua Ridge at an elevation of about 750 ft (228 m). From the time the population was first observed about 11 years ago, it has decreased slightly. However, fluctuations in population size are normal, depending on season and rainfall (Hobdy, pers. comm., 1990). Historically, the species also was known from the Lahaina area of West Maui. As it has not been documented from Maui since 1944, it is believed to be extinct on that island. Browsing by deer and mouflon sheep (*Ovis musimon*) and competition from invading weedy species, primarily broomsedge (*Andropogon virginicus*) and Guinea grass (*Panicum maximum*), are the main threats to the species (Hobdy, pers. comm., 1990; Perlman 1990b). The plants are tiny and can easily be displaced and eliminated by invading exotic species. Because the population grows on a dry part of the island, fires also are a potential threat (Perlman 1990b).

Viola lanaiensis was first collected by Remy on Lanai sometime between 1851 and 1855. Hillebrand (1888) mentioned in passing that Remy's specimen probably was *V. robusta*, but it was not until 1911 that it was critically studied. In that year, Joseph Rock described the Lanai plant as a variety of *Viola helenae*, a species restricted to the Wahiawa drainage basin of Kauai (Rock 1911). Independently, and without knowledge of Rock's publication, Wilhelm Becker described the taxon, named it *V. lanaiensis*, and selected a specimen collected by Rock as the type (Becker 1916). The similarity between the two taxa is superficial, and most botanists today regard the Lanai plant as a distinct species (Becker 1916; St. John 1979, 1989; Wagner *et al.* 1990).

Viola lanaiensis, in the violet family (Violaceae), is a small, erect, unbranched or few-branched subshrub, 4 to 16 in (10 to 40 cm) tall. The leaves, which are clustered toward the upper part of the stem, are lance-shaped, about 2.4 to 4.3 in (6 to 11 cm) long and 0.5 to 1.0 in (1.3 to 2.5 cm) wide. Below each leaf is a pair of narrow, membranous stipules, about 0.4 in (0.9 cm) long. The flowers are small, 0.4 to 0.6 in (1.0 to 1.5 cm) long, white tinged with purple or with purple veins, occurring singly or up to four per upper leaf axil. The fruit are capsules, about 0.4 to 0.50 in (1.0 to 1.3 cm) long. It is the only member of the genus on Lanai (Becker 1916, MacCaughy 1918, St. John 1989, Skottsberg 1940, Wagner *et al.* 1990).

Viola lanaiensis historically was known from the summit and upper slopes of Lanaihale from near the head of Hookio Gulch to Haalelepaakai, a distance of about 2.5 mi (4 km). Presently, two small populations exist. Although their size currently is unknown, it is estimated that the two populations total less than 500 plants (HHP 1990g). This estimate undoubtedly is very high (Herbst, pers. obs.). Threats include browsing by deer and competition from invading exotic plants (HHP 1990g, St. John 1981), and the potential of extinction from stochastic events due to the small population size and restricted distribution. As most of the plants grow along the Lanaihale trails, the threat of destruction or damage to the plants will increase as the tourist industry continues to develop on the island.

Previous Federal Action

Federal government action on these plants began as a result of section 12 of the Act, 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, *Gahnia lanaiensis* and *Viola lanaiensis* (as *V. helenae* var. *lanaiensis*) were considered to be endangered; and *Abutilon eremitopetalum*, *Cyanea macrostegia* var. *gibsonii* (as *C. gibsonii*), *Phyllostegia glabra* var. *lanaiensis*, and *Tetramolopium remyi*, were considered to be extinct. 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 taxa

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 approximately 1,700 vascular plant species, including *Abutilon eremitopetalum*, *Cyanea macrostegia* var. *gibsonii*, *Gahnia lanaiensis*, *Phyllostegia glabra* var. *lanaiensis*, *Tetramolopium remyi*, and *Viola lanaiensis* to be endangered species pursuant to section 4 of the Act. 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 relation to the 1976 proposal are summarized in an April 26, 1978, **Federal Register** publication (43 FR 17909). In 1978, amendments to the Act required that all proposals over 2 years old be withdrawn. A 1-year grace period was given to proposals already over 2 years old. On December 10, 1979, 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 an updated notice of review for plants on December 15, 1980 (45 FR 82479), and September 27, 1985 (50 FR 39525). *Abutilon eremitopetalum*, *Cyanea macrostegia* var. *gibsonii*, *Gahnia lanaiensis*, *Phyllostegia glabra* var. *lanaiensis*, *Tetramolopium remyi*, and *Viola lanaiensis* (as *V. helenae*) were included as Category 1 candidates on both lists, indicating that the Service had substantial information warranting their proposal for listing as endangered or threatened. In the last notice of review published on February 21, 1990 (55 FR 6183), all six of the species included in this proposed rule were considered Category 1 species.

Section 4(b)(3)(B) of the Act requires the Secretary to make findings on certain pending petitions with 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 *Gahnia lanaiensis* and *Viola lanaiensis* because the Service had accepted the 1975 Smithsonian report as a petition. On October 13, 1983, the Service found that the petitioned listing of these 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 recycled, pursuant to section 4(b)(3)(C)(i) of the Act. The finding was reviewed in October of 1984, 1985, 1986, 1987, 1988, and 1989. Publication of the present proposal constitutes the final 1-year finding for these species.

Summary of Factors Affecting the Species

Section 4 of the Endangered Species Act (16 U.S.C. 1533) and regulations (50 CFR part 424) promulgated to implement the Act set forth the procedures for adding species to the Federal Lists. 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 *Abutilon eremitopetalum* Caum (NCN), *Cyanea macrostegia* var. *gibsonii* (Hillebr.) Lammers (NCN), *Gahnia lanaiensis* Degener, I. Degener, and J. Kern (NCN), *Phyllostegia glabra* var. *lanaiensis* Sherff (NCN), *Tetramolopium remyi* (A. Gray) Hillebr. (NCN), and *Viola lanaiensis* W. Becker (NCN) are as follows:

A. The present or threatened destruction, modification, or curtailment of its habitat or range. As evidenced by remnants of native vegetation on the island, Lanai probably was covered throughout by forests and shrublands before the early Polynesians discovered the islands. Much of the island's vegetation was destroyed by early land use practices, which included cattle and sheep (*Ovis aries*) ranching; the clearing of land for pineapple cultivation; and the introduction of feral animals such as goats (*Capra hircus*), deer, and mouflon sheep, and domestic animals such as cattle and pigs (*Sus scrofa*) which later became feral (Cuddihy and Stone 1990, Fosberg 1936b, Tomich 1986). Over the ensuing years the cattle, sheep, goats, and pigs were destroyed or removed from the island. It is estimated that only about ten percent of the island presently remains in native forest or shrubland (Alan Holt, Director of Science and Stewardship, The Nature Conservancy of Hawaii, pers. comm., 1990). Today, habitat degradation due to axis deer, and, to a lesser extent, mouflon, and the invasion of and competition by exotic species of plants probably are the two greatest threats to the six species herein proposed for listing as endangered. The axis deer is now considered to be a major threat to the forests of Lanai (Culliney 1988). Deer and mouflon browse on native vegetation (see Factor C), destroying or damaging the habitat. Also, their trampling removes vegetation and litter important to soil-water

relations, compacts the soil, promotes erosion, and opens areas allowing exotic plants to invade. Deer are common throughout the summit; very few patches of forest are untouched by them. Ridge tops in particular, and even gulches are being invaded (Hobdy, pers. comm., 1990).

Lanai is in the process of converting from an agricultural (pineapple) to a tourist based economy. Hotels are being built in conjunction with an anticipated increase in the tourist industry. Although at present no development plans exist which would result in direct impacts to Lanaihale, it is inevitable that an increase in the number of people on the island would have that effect. The Munro Trail, which traverses Lanaihale, affords a beautiful view of the island and is sure to be popular with tourists. Approximately 30 percent of the known plants of *Gahnia lanaiensis* and most of the known *Viola* plants grow along this trail or one of its branches. Increased hiking and jeep-riding along the trail could lead to the destruction of individuals of these species. Disturbance of the soil or destruction of groundcover plants due to these activities would increase the potential for erosion and open the area to invading exotic plants.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Illegal collecting for scientific or horticultural purposes or excessive visits by individuals interested in seeing rare plants could result from increased publicity, and would seriously impact the species. Disturbance to the area by trampling during recreational use (hiking, for example), would promote erosion and greater ingress by competing exotic species. This threat will increase as the tourist industry becomes a more prominent force on the island.

C. Disease or predation. Axis deer and mouflon sheep are managed by the State for recreational hunting on the island. The deer are primarily on the summit and in the gulches of Lanaihale, whereas the mouflon are more common on the drier slopes—precisely the habitat of the six species included in this proposal. In addition to habitat degradation resulting from their activities, which was discussed in Factor A above, their browsing also destroys or damages plants.

D. The inadequacy of existing regulatory mechanisms. There are no State laws or existing regulatory mechanisms at the present time to protect these species or to prevent their further decline. However, Hawaii's Endangered Species Act (HRS, Sect.

195D-4(a)) states that "Any species of wildlife or wild plant that has been determined to be an endangered species pursuant to the Endangered Species Act (of 1973) shall be deemed to be an endangered species under the provisions of this chapter" Further, the State may enter into agreements with Federal agencies to administer and manage any area required for the conservation, management, enhancement, or protection of endangered species (Sect. 195D-5(c)). Funds for these activities could be made available under section 6 of the Act (State Cooperative Agreements). The Act also would offer additional protection to these species because if they were 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 an area not under Federal jurisdiction in knowing violation of State law or regulation or in the course of any violation of a State criminal trespass law.

E. Other natural or manmade factors affecting its continued existence. The small number of populations and of individual plants of these species increases the potential for extinction from stochastic events. The limited gene pool may depress reproductive vigor, or a single man-caused or natural environmental disturbance could destroy a significant percentage of the individuals of these species.

Several species of exotic plants have become common on the summit and in the gulches and valleys of Lanaihale. Strawberry guava (*Psidium cattleianum*) is most common on the northern end of Lanaihale, firebush (*Myrica faya*) is most common on the south end, and manuka has spread through the range (Hobdy, pers. comm., 1990). Kahili ginger is common on some of the valley floors, as in Kaiholena Gulch, for instance, while koa haole, lantana, and sourbush also are aggressive invaders. These weedy plants are more aggressive than the native species and more successfully compete for water, minerals, space, and light. In the drier areas, broomsedge and Guinea grass are the dominant exotic species (Hobdy, pers. comm., 1990). Not only do these species replace native plants such as *Tetramolopium remyi*, but they are a source of fuel, increasing the potential threat of fire in the area (Perlman [1990b]).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these species in determining to propose this rule. Based on this evaluation, the preferred action is to list *Abutilon*

eremitopetalum, *Cyanea macrostegia* var. *gibsonii*, *Gahnia lanaiensis*, *Phyllostegia glabra* var. *lanaiensis*, *Tetramolopium remyi*, and *Viola lanaiensis* as endangered. These species are threatened by predation and habitat degradation by feral animals, by encroachment and competition from exotic species of plants, and/or by the potential of stochastic events to extirpate these small populations with restricted distributions. They also face the potential threat of damage to their habitat by increased human traffic stemming from recreational use and development-related activities. In addition, unintended wildfires can eliminate plants and habitat. Given these circumstances, the determination of endangered status seems warranted.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary propose critical habitat at the time a species is proposed to be endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for these species. The publication of descriptions and maps required in a proposal for critical habitat would increase the degree of threat to these plants from possible take or vandalism and, therefore, could contribute to their decline and increase enforcement problems. A listing of these species as either endangered or threatened would publicize the rarity of the plants and, thus, could 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 habitat of these species. Protection of the species' habitat will be addressed through the recovery process. Therefore, the Service finds that designation of critical habitat for these species is not prudent at this time because designation would increase the degree of threat from vandalism, collecting, or other human activities.

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 encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the

State and requires that recovery actions be carried out for all 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 species that is proposed or listed as endangered or threatened 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) of the Act requires Federal agencies to confer informally with the Service on any action that is likely to jeopardize the continued existence of a proposed species 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. As none of these species are on Federal land and no Federal activities are anticipated in the area, no section 7 consultations or impact on activities of Federal agencies are anticipated as the result of this proposal.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 for endangered plant species set forth a series of general trade prohibitions and exceptions that apply to all endangered plants. With respect to the six plants from the island of Lanai, all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, would apply. These prohibitions, in part, make it illegal with respect to any endangered plant 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 these species in interstate or foreign commerce, or to remove and reduce to possession any such species from areas under Federal jurisdiction; or to maliciously damage or destroy any such plants 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 or in the course of any violation of a 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 plant species under certain circumstances.

It is anticipated that few trade permits would ever be sought or issued because the species are not common in cultivation or in the wild. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, room 432, 4401 N. Fairfax Drive, Arlington, Virginia 22203 (703/358-2093, FTS 921-2093, FAX 703-358-2281).

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 species;
- (2) The location of any additional populations of these species 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 species; and
- (4) Current or planned activities in the subject area and their possible impacts on these species.

Any final decision on this proposal concerning these six taxa of plants 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 a public hearing on this proposal, if requested. Requests must be received within 45 days of the date of publication of the proposal. Such requests must be made in writing and addressed to the Field Office Supervisor (see **ADDRESSES** section).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined pursuant to 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).

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List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and

recordkeeping requirements and Transportation.

Proposed Regulation Promulgation

Accordingly, it is hereby proposed 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. It is proposed to amend § 17.12(h) by adding the following, in alphabetical order under the families indicated, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.

* * * * *
(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Asteraceae—Aster family:						
<i>Tetramolopium remyi</i>	None.....	U.S.A. (HI).....	E		NA	NA
Campanulaceae—Bellflower family:						
<i>Cyanea macrostegia</i> var. <i>gibsonii</i>	None.....	U.S.A. (HI).....	E		NA	NA
Cyperaceae—Sedge family:						
<i>Gahnia lanaiensis</i>	None.....	U.S.A. (HI).....	E		NA	NA
Lamiaceae—Mint family:						
<i>Phyllostegia glabra</i> var. <i>lanaiensis</i> ...	None.....	U.S.A. (HI).....	E		NA	NA
Malvaceae—Mallow family:						
<i>Abutilon eremitopetalum</i>	None.....	U.S.A. (HI).....	E		NA	NA
Violaceae—Violet family:						
<i>Viola lanaiensis</i>	None.....	U.S.A. (HI).....	E		NA	NA

Dated: August 23, 1990.
Richard N. Smith,
Acting Director, Fish and Wildlife Service.
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