

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Gouania meyenii* (no common name)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 70 species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii

Name of Reviewer(s):

Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Assistant Field Supervisor for Endangered Species
Jeff Newman, Pacific Islands Fish and Wildlife Office, Acting Deputy Field Supervisor

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on April 29, 2008. The review was based on final critical habitat designation for *Gouania meyenii* and other species from the island of Oahu and Kauai (USFWS 2003a,b), as well as a review of current, available information. The National Tropical Botanical Garden provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Tamara Sherrill, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Assistant Field Supervisor for Endangered Species and Acting Deputy Field Supervisor before submission to the Field Supervisor for approval.

Background:

For information regarding the species listing history and other facts, please refer to the Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database for threatened and endangered species (http://ecos.fws.gov/tess_public).

Application of the 1996 Distinct Population Segment (DPS) Policy:

This Policy does not apply to plants.

Review Analysis:

Please refer to the final critical habitat designation for *Gouania meyenii* published in the Federal Register on February 27 and June 17, 2003 (USFWS 2003a,b) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species'

biological status have come to light since listing to warrant a change in the Federal listing status of *G. meyenii*.

Originally listed as endangered in 1991 (USFWS 1991), *Gouania meyenii* was known historically from the central and southern areas of Oahu's Waianae Mountains, from Kamaileunu Ridge to Honouliuli, and Diamond Head. A few individuals were subsequently discovered on Kauai in 1992, with observations at Hipalau Valley, off Koaie, and at two locations in Kalalau Valley below Kalahu, north of the first Kalalau lookout and below Puu o Kila, observed between 1992 and 1994 (Lorence and Flynn 1995; National Tropical Botanical Garden 2009a; Perlman 2008; USFWS 2003c).

Currently, this species is found on Oahu and Kauai. On Oahu, it is found on the Makaha-Waianae Kai Ridge on State, private, and City and County lands. At Waianae Kai, on the ridge between Makaha and Waianae, 110 individuals were seen in 1987 at three locations between 747 and 770 meters (2,450 and 2,550 feet) elevation (Perlman 2008). In 2000, 20 to 25 individuals were seen there at 817 meters (2,680 feet) elevation (Perlman 2008; U.S. Army 2008). Between those years a few individuals were also observed there at 823 meters (2,700 feet) elevation (National Tropical Botanical Garden 2009a). By 1999, six to ten individuals were estimated to occur west of Waianae Kai, north of Puu Kawiwi, below and south of the Pinnacle Peaks at 747 to 860 meters (2,450 to 2,820 feet) (Hawaii Biodiversity and Mapping Program 2008; National Tropical Botanical Garden 2009a; U.S. Army 2008). Thirty individuals were also estimated to occur on the eastern side of the ridge, Makaha side, in 1999 at 792 to 853 meters (2,600 to 2,800 feet) elevation (Hawaii Biodiversity and Mapping Program 2008; U.S. Army 2008). At Waianae Kai's south side, below Mt. Kaala, off a side ridge at 738 to 762 meters (2,420 to 2,500 feet) elevation, three to five individuals were observed from 1991 to 1995, but not reported since (Hawaii Biodiversity and Mapping Program 2008; Perlman 2008). At Waianae Kai, northeast of Puu Kawiwi, eleven plants were seen in 1991 at 646 to 689 meters (2,120 to 2,260 feet) elevation (Hawaii Biodiversity and Mapping Program 2008). USFWS estimated 63 individuals in these four known populations on Oahu in 2003 (USFWS 2003b). Population numbers for Oahu appear to be based on surveys that have not been repeated for as much as ten years, and may not reflect the current status of the species. The actual number of individuals on Oahu is more likely between 20 and 40 individuals.

There were three populations of *Gouania meyenii* on Kauai. One population was in Hipalau Valley of Koaie Canyon at 671 meters (2,200 feet) elevation with one individual. Two populations were in Kalalau Valley within the Na Pali Coast State Park and Na Pali-Kona Forest Reserve in Puu o Kila at 725 meters (2,379 feet) elevation and below Kalahu at 488 to 878 meters (1,600 to 2,880 feet) elevation, with four individuals each. There were a total of nine individuals on Kauai (Hawaii Biodiversity and Mapping Program 2008; National Tropical Botanical Garden 2009a; USFWS 1998). Where there was only one individual in 1996, the Hipalau population has since been extirpated. Goats (*Sus scrofa*) have had a very severe impact on that area. The only individuals of *G. meyenii* known to be alive on Kauai are in Kalalau. One population is in an extremely inaccessible location where goats cannot reach, but where rockfall is a serious hazard for

botanist access. It is believed that 15 to 20 individuals may remain there. The second Kalalau location is known to have three individuals, last observed in August 2004 by Ken Wood of the National Tropical Botanical Garden (K. Wood and S. Perlman, National Tropical Botanical Garden, pers. comm. 2008). Currently, the total number of individuals on Kauai is estimated between 18 and 23, and the overall total number of individuals between 38 and 63.

Gouania meyenii typically grows on moderate to steep slopes in dry or mesic shrubland and lowland forest at elevations between 17 to 930 meters (56 to 3,050 feet). Associated native plant species on Oahu include *Acacia koa* (koa), *Alyxia stellata* (maile), *Bidens torta* (kookoolau), *Canavalia* sp. (awikiwiki), *Carex meyenii* (no common name [NCN]), *C. wahuensis* (NCN), *Chamaesyce multiformis* (akoko), *Charpentiera* sp. (papala), *Coprosma foliosa* (pilo), *Diospyros sandwicensis* (lama), *Dodonaea viscosa* (aalii), *Doodia kunthiana* (okupukupu), *Dryopteris unidentata* (akole), *Dubautia plantaginea* (naenae), *D. sherffiana* (naenae), *Eragrostis grandis* (NCN), *E. variabilis* (kawelu), *Hibiscus* sp. (kokio), *Kadua cordata* subsp. *cordata* (kopa), *Labordia tinifolia* (kamakahala), *Leptecophylla tameiameia* (pukiawe), *Lysimachia hillebrandii* (kolokolo kuahiwi), *Melicope makahae* (alani), *Metrosideros polymorpha* (ohia), *Myrsine lessertiana* (kolea), *Nestegis sandwicensis* (olopua), *Osteomeles anthyllidifolia* (ulei), *Peperomia* sp. (ala ala wai nui), *Pisonia* sp. (papala kepau), *Polypodium pellucidum* (ae), *Pouteria sandwicensis* (alaa), *Psychotria* sp. (kopiko), *Psydrax odorata* (alahee), *Rumex albescens* (huahuako), *Santalum* sp. (iliahi), *Sapindus oahuensis* (lonomea), *Scaevola gaudichaudiana* (naupaka kuahiwi), *Schiedea* sp. (NCN), *Senna gaudichaudii* (kolomona), *Sida fallax* (ilima), *Sophora chrysophylla* (mamane), *Vaccinium* sp. (ohelo), *Viola chamissoniana* var. *trachelifolia* (pamakani), and *Wikstroemia* sp. (akia) (Perlman 2008; USFWS 1998, 2003b).

On Kauai, this species typically grows on rocky ledges, cliff faces, and ridge tops in dry shrubland or in *Metrosideros polymorpha* lowland diverse mesic forest at elevations between 375 and 1,179 meters (1,231 and 3,867 feet). Associated native plant species include *Artemisia* sp. (hinahina), *Bidens* spp., *Bobea timonioides* (ahakea), *Carex meyenii*, *Chamaesyce* spp., *Diospyros* spp. (lama), *Dodonaea viscosa*, *Eragrostis variabilis*, *Euphorbia haeleeleana* (NCN), *Flueggea neowawraea* (mehamehame), *Gardenia remyi* (nanu), *Hibiscadelphus* spp. (hau kuahiwi), *Hibiscus waimeae* subsp. *waimeae* (kokio keokeo), *Kadua* spp. (manono), *Kokia kauaiensis* (kokio), *Lepidium serra* (anaunau), *Lobelia niihauensis* (NCN), *Lysimachia* spp., *Melicope pallida* (alani), *Myrsine* sp. (kolea), *Neraudia kauaiensis* (NCN), *Nestegis sandwicensis*, *Nototrichium divaricatum* (kului), *Panicum lineale* (NCN), *Peucedanum sandwicensis* (makou), *Poa mannii* (NCN), *Psychotria* spp., *Psydrax odorata*, *Senna gaudichaudii* (kolomona), and *Wilkesia gymnoxiphium* (iliau) (Perlman 2008; USFWS 1998).

The major threats to *Gouania meyenii* on Oahu are competition from invasive introduced plant species such as (Factor E) *Ageratina riparia* (spreading mist flower), *Blechnum appendiculatum* (NCN), *Grevillea robusta* (silk oak), *Bryophyllum pinnatum* (airplant), *Lantana camara* (lantana), *Leucaena leucocephala* (haole koa), *Lythrum maritimum* (loosestrife), *Melinis minutiflora* (molasses grass), *Oplismenus hirtellus* (basketgrass),

Pimenta dioica (allspice), *Psidium cattleianum* (strawberry guava), *Psidium guajava* (common guava), *Rubus* sp. (blackberry), and *Schinus terebinthifolius* (Christmas berry) (National Tropical Botanical Garden 2009a; USFWS 2003b). Other threats include fire (Factor E); habitat degradation by feral pigs (*Sus scrofa*) and goats (Factor A); and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of remaining occurrences and individuals (Factor E) (National Tropical Botanical Garden 2009a; USFWS 2003b).

On Kauai, threats to *Gouania meyenii* include competition from invasive introduced plant species such as (Factor E) *Melinis minutiflora*, *Psidium cattleianum*, and *Schinus terebinthifolius*; fire; and habitat degradation by feral pigs and goats (Factor A). The small number of extant populations and individuals is also a threat to *Gouania meyenii* on Kauai (Factor E) (National Tropical Botanical Garden 2009a; USFWS 2003a).

Climate change may also pose a threat to *Gouania meyenii* (Factors A and E). However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

Although there are some seeds and cloned seedlings at the National Tropical Botanical Garden on Kauai, there are currently fewer than 100 seeds in long-term storage collected from Oahu in 2005. In addition, uncounted seeds from Oahu and Kauai collected between 1992 and 1994 are in storage at National Tropical Botanical Garden (2009a). The Harold L. Lyon micropropagation lab has successfully tissue-cultured (cloned) this species using seeds from Makaha on Oahu and has produced 13 plants by this method (Harold L. Lyon Arboretum 2009).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Oahu (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Gouania meyenii* is a short-lived perennial, and to be considered stable, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (at other than the plant's natural location, such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on the island of Oahu, and, if possible, Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The interim stabilization goals for this species have not been met (see Table 1), as no population has more than 50 mature individuals and all threats are not being managed. Therefore, *Gouania meyenii* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Collect material for genetic storage and propagation for reintroduction.

- Construct exclosures to protect populations from negative impacts of feral ungulates.
- Control competing invasive introduced plant species within exclosures.
- Develop and implement fire management plans for each population.
- Survey current and historical populations on Oahu to determine current species status.
- Work with Hawaii Division of Forestry and Wildlife and Hawaii State Parks to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

References:

Harold L. Lyon Arboretum Micropropagation Laboratory. 2009. Micropropagation database. Unpublished.

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Lorence, D.H. and T. Flynn. 1995. Contributions to the flora of Hawaii. III. New additions, range extensions, and rediscoveries of flowering plants. Bishop Museum occasional papers, records of the Hawaii biological survey for 1994. 41(Part 1: Articles):80.

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[USFWS] U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; determination of endangered status for 26 plants from the Waianae Mountains, island of Oahu, Hawaii; final rule. Federal Register 56(209):55770-55786.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages+ appendices.

[USFWS] U.S. Fish and Wildlife Service. 2003a. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, Hawaii; final rule. Federal Register 68(39):9116-9479.

[USFWS] U.S. Fish and Wildlife Service. 2003b. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 101 plant species from the island of Oahu, Hawaii; final rule. Federal Register 68(116):35949-35998.

[USFWS] U.S. Fish and Wildlife Service. 2003c. Biological opinion of the U.S. Fish and Wildlife Service for routine military training and transformation of the 2nd Brigade 25th Infantry Division (lights). U.S. Fish and Wildlife Service, Honolulu, Hawaii. 351 pages. Unpublished.

Personal Communications:

Wood, Ken R. and Steve Perlman. 2009. National Tropical Botanical Garden, Kalaheo, Hawaii. *Gouania meyenii* data from Plant Extinction Prevention Program meeting. Received by Margaret Clark, dated November 17, 2009.

Table 1. Status of *Gouania meyenii* from listing through 5-year review.

Date	No. wild indivs.	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1991 (listing)	75	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1995 (recovery plan)	92	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	92	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 50 mature individuals each	No
2009 (5-year review)	38-63	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

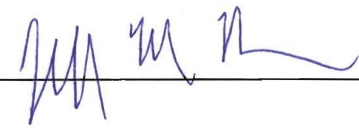
U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Gouania meyenii* (no common name)

Pre-1996 DPS listing still considered a listable entity? N/A

Recommendation resulting from the 5-year review:

- Delisting
- Reclassify from Endangered to Threatened status
- Reclassify from Threatened to Endangered status
- No Change in listing status

FS **Field Supervisor, Pacific Islands Fish and Wildlife Office**



Date AUG 27 2010