

Gouania hillebrandii
(no common name)

**5-Year Review
Summary and Evaluation**

**U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii**

5-YEAR REVIEW

Species reviewed: *Gouania hillebrandii* (no common name)

TABLE OF CONTENTS

| | | |
|------------|---|-----------|
| 1.0 | GENERAL INFORMATION..... | 1 |
| 1.1 | Reviewers..... | 1 |
| 1.2 | Methodology used to complete the review:..... | 1 |
| 1.3 | Background:..... | 1 |
| 2.0 | REVIEW ANALYSIS..... | 3 |
| 2.1 | Application of the 1996 Distinct Population Segment (DPS) policy..... | 3 |
| 2.2 | Recovery Criteria..... | 3 |
| 2.3 | Updated Information and Current Species Status | 4 |
| 2.4 | Synthesis..... | 8 |
| 3.0 | RESULTS | 11 |
| 3.3 | Recommended Classification:..... | 11 |
| 3.2 | New Recovery Priority Number:..... | 11 |
| 3.3 | Listing and Reclassification Priority Number: | 11 |
| 4.0 | RECOMMENDATIONS FOR FUTURE ACTIONS..... | 11 |
| 5.0 | REFERENCES..... | 12 |
| | Signature Page..... | 14 |

5-YEAR REVIEW
***Gouania hillebrandii* (no common name)**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

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Lead Field Office:

Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (808)
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Cooperating Field Office(s):

N/A

Cooperating Regional Office(s):

N/A

1.2 Methodology used to complete the 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 March 16, 2009. The review was based on the final rule to list *Gouania hillebrandii* as an endangered species and to designate its critical habitat for *Gouania hillebrandii* (USFWS 1984), 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 Recovery Program Lead and the Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 Federal Register (FR) Notice citation announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2009. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 103 species in Hawaii. Federal Register 74(49):11130-11133.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1984. Endangered and threatened wildlife and plants; final rule to list *Gouania hillebrandii* as an endangered species and to designate its critical habitat; final rule. Federal Register 48(219):44753-44757

Date listed: November 9, 1984

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

1.3.3 Associated rulemakings:

No other associated rulemakings.

Critical habitat was designated for *Gouania hillebrandii* in two zones totaling 112 acres (45 hectares) on Maui (USFWS 1984). These designations include habitat on State lands. No critical habitat has been designated for the Molokai populations (USFWS 1984, 2009).

1.3.4 Review History:

Species status review [FY 2009 Recovery Data Call (August 2010)]:

Stable

Recovery achieved:

1 (0-25%) (FY 2007 Recovery Data Call)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

8

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: U.S. Fish and Wildlife Service. 1990. Recovery plan for *Gouania hillebrandii* (Rhamnaceae). U.S. Fish and Wildlife Service, Portland, Oregon. 36 pages.

Date issued: July 16, 1990.

Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Yes
 No

2.1.2 Is the species under review listed as a DPS?

Yes
 No

2.1.3 Was the DPS listed prior to 1996?

Yes
 No

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes
 No

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes
 No

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

Yes
 No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes
 No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

Yes
 No

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

Yes

No

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

A synthesis of the threats (Listing Factors A, C, D, and E) affecting this species is presented in section 2.4. Listing Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Downlisting and delisting objectives are provided in the recovery plan for *Gouania hillebrandii* (USFWS 1990). For the taxon to be downlisted from endangered to threatened status, the two existing populations on Maui and Molokai must be naturally reproducing and increasing in number, with a minimum of 500 mature individuals per population. In addition, cattle grazing and insect infestations should be stopped or removed.

This recovery objective has not been met.

For delisting, at least five subpopulations should exist, each with a minimum 10-year average of at least 500 reproductive plants. The subpopulations should include an age structure with a large proportion of adults but still with a healthy number of seedlings with the actual percentages to be determined.

This recovery objective has not been met.

2.3 Updated Information and Current Species Status

Gouania hillebrandii was originally listed as endangered in 1984 (USFWS 1984).

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

No new information.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Gouania hillebrandii was historically known from Molokai, Lanai, and East and West Maui. At the time of listing, it was known from only two

localities on West Maui at Paupau above Lahaina and at Lihau. Estimates from 1980 reported that the Paupau subpopulation contained around 30 to 40 mature individuals, which decreased from 300 individuals a decade earlier, and the Lihau subpopulation contained 950 to 1,100 individuals (USFWS 1990).

Currently on West Maui, *Gouania hillebrandii* is located at Paupau above Lahaina on the west facing slopes forming the south wall of Kahana Stream between 335 and 488 meters (1,100 and 1,600 feet) elevation. This subpopulation occupies about 6 hectares (15 acres) in designated critical habitat of about 20 hectares (50 acres) on three ridges of weathered lava (USFWS 2009). A vigorous population of *G. hillebrandii* was observed in the district of Lahaina from 1979 to 1993 by Ken Wood and Steve Perlman of the National Tropical Botanical Garden, at 396 to 518 meters (1,300 to 1,700 feet) elevation in Lihau, between Olowalu and Launiupoko (Perlman 2009; Wood 2009). In 2005, these plants were still there, but most of the individuals of *G. hillebrandii* were burned in wildfires that occurred in 2007 and 2008 (Perlman 2009). In 2008, the Lihau subpopulation was estimated to contain approximately 1,000 individuals (USFWS 2010).

On Molokai, 50 individuals of *Gouania hillebrandii* were seen from 1993 to 1995 in Mokolelau, south of Puu Kolekole at 890 to 963 meters (2,920 to 3,160 feet) elevation (Perlman 2009; Wood 2009). Most recently, in 1999, a healthy regenerating population of 50 individuals was observed at Mokolelau at 914 meters (3,000 feet) elevation (Wood 2009). As of 2010, total population estimates on Molokai are at least 1,000 individuals of *G. hillebrandii*.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

There is distinct variation between the Maui and Molokai <http://www.fws.gov/Web/Files/Pacificislands/wesa/answer/akepacorrect.html> plants that may be considered different forms of the same species (Wood 2009). The West Maui form is an upright, erect woody shrub with compact leaves. In contrast, the Molokai plants have widely or loosely spreading leaves, and they grow more prostrate and vine-like along the ground or weakly climbing on other vegetation. Both forms contain small white flowers (USFWS 2009; Wood 2009).

2.3.1.4 Taxonomic classification or changes in nomenclature:

No new information.

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

See section 2.3.1.2.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

On West Maui, *Gouania hillebrandii* occurs in lowland dry shrubland habitat on leeward slopes with associated native shrubs including *Bidens menziesii* (kookoolau), *Dodonaea viscosa* (aalii), *Eragrostis variabilis* (kawelu), *Heteropogon contortus* (pili), *Kadua coriacea* (kioele), *Leptecophylla tameiameiae* (pukiawe), *Lipochaeta rockii* (nehe), *Melanthera lamarum* (nehe), *Myoporum sandwicense* (naio), *Santalum ellipticum* (iliahi), *Schiedea menziesii* (no common name [NCN]), *Sida fallax* (ilima), *Senna gaudichaudii* (kolomona), and *Spermolepis hawaiiensis* (NCN) (Perlman 2009; USFWS 2009; Wood 2009).

On Molokai, *Gouania hillebrandii* is located in *Metrosideros polymorpha* mixed mesic and lowland mesic forest habitat with associated native species including *Alphitonia ponderosa* (kauila), *Bidens menziesii*, *Chamaesyce* sp.(akoko), *Coprosma foliosa* (pilo), *Diospyros sandwicensis* (lama), *Dissochondrus biflorus* (NCN), *Dodonaea viscosa*, *Dubautia linearis* subsp. *opposita* (naenae), *Exocarpos gaudichaudii* (hulumoa), *Leptecophylla tameiameiae*, *Lipochaeta rockii*, *Lysimachia remyi* (NCN), *Melicope hawaiiensis* (mokihana kukae moa), *Myrsine lanaiensis* (kolea), *Neraudia sericea* (NCN), *Nestegis sandwicensis* (olopua), *Nototrichium sandwicense* (kului), *Ochrosia compta* (holei), *Osteomeles anthyllidifolia* (ulei), *Pittosporum argentifolium* (hoawa), *Pleomele auwahiensis* (halapepe), *Pouteria sandwicensis* (alaa), *Santalum ellipticum* (iliahialoe), *Schiedea lydgatei* (NCN), *Viola chamissoniana* subsp. *trachelifolia* (pamakani), *Wikstroemia oahuensis* (akia), and *Zanthoxylum hawaiiense* (ae) (National Tropical Botanical Garden 2009a; Perlman 2009; USFWS 2009; Wood 2009).

2.3.1.7 Other:

No new information.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

Threats that modify habitat on Maui include feral goats (*Capra hircus*) which degrade the habitat and invasive introduced plant species including *Opuntia* sp. (NCN), *Acacia farnesiana* (klu), *Leucaena leucocephala* (koa haole), and *Rhynchelytrum repens* (natal redtop) (Perlman 2009; USFWS 2009; Wood 2009).

Threats on Molokai including browsing and trampling by cattle (*Bos taurus*), feral deer (*Axis axis*), and goats. Invasive introduced plant species alter and degrade the habitat of *Gouania hillebrandii* such as *Fraxinus uhdei* (tropical ash), *Ricinus communis* (castor bean), *Melinis minutiflora* (molasses grass), and *Lantana camara* (lantana) (Perlman 2009; USFWS 2009; Wood 2009).

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

2.3.2.3 Disease or predation:

Rats (*Rattus* spp.), slugs (unidentified species), cattle, and possibly goats are reported to eat the leaves and seeds of this species (Perlman 2009; USFWS 2009; Wood 2009). The leaf-feeding introduced insect hibiscus snow scale (*Pinnaspis strachani*) is also a threat to *Gouania hillebrandii* (USFWS 2009), although the degree of threat to the species is unclear.

2.3.2.4 Inadequacy of existing regulatory mechanisms:

2.3.2.5 Other natural or manmade factors affecting its continued existence:

The introduced invasive plant species discussed in section 2.3.2.1 above are a threat to *Gouania hillebrandii* because they compete with the species for water, light, and nutrients.

Fire destroyed much of the population on West Maui in 2007(Wood 2009). Fire is also a threat on Molokai (Wood 2009).

Climate change may also pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

Strategic fences have been placed on the ridges of West Maui by the West Maui Watershed Partnership Program to protect these populations from

feral ungulates. These plant populations exist in areas that are remote and difficult to access, and thus there have been few *in situ* (on-site, in natural areas) conservation efforts for this species (USFWS 2009).

Seeds of two other Hawaiian endemic species of *Gouania* are in storage at the Center for Conservation Research and Training Seed Storage Facility, but not those of *G. hillebrandii* (Center for Conservation Research and Training Seed Storage Facility 2009). The National Tropical Botanical Garden has several accessions from both populations of *G. hillebrandii* in seed storage, but these were collected over fifteen years ago and should be replaced with newer collections if possible (National Tropical Botanical Garden 2009b). The Maui Nui Botanical Gardens has a small population of plants that came from Lihau which are producing seeds and seedlings (Maui Nui Botanical Gardens 2009).

2.4 Synthesis

Downlisting and delisting objectives are provided in the recovery plan for *Gouania hillebrandii* (USFWS 1990). For the taxon to be downlisted from endangered to threatened status, the two existing populations on Maui and Molokai must be naturally reproducing and increasing in number, with a minimum of 500 mature individuals per population. In addition, cattle grazing and insect infestations should be stopped or removed.

The downlisting goals for this species have not been met (Table 1), because fires may have destroyed most of the individuals located on West Maui in 2007 (Perlman 2009; USFWS 2009; Wood 2009). A survey to determine whether 500 mature individuals still exist in each subpopulation has not been conducted, and not all threats are being managed (Table 2). Therefore, *Gouania hillebrandii* meets the definition of endangered as it remains in danger of extinction throughout its range.

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

| Date | No. wild individuals | No. outplanted | Downlisting Criteria identified in Recovery Plan | Downlisting Criteria Completed? |
|-------------------------------------|-----------------------------|-----------------------|---|--|
| 1984 (listing and critical habitat) | >30 | 0 | Cattle grazing stopped or removed | No |
| | | | Insect threats controlled | No |
| | | | 2 populations with 500 mature individuals each | No |
| 1990 (recovery plan) | 1,303-1,510 | 0 | Cattle grazing stopped or removed | No |
| | | | Insect threats controlled | No |
| | | | 2 populations with 500 mature individuals each | Yes |
| 2010 (5-year review) | ~1,000 | 0 | Cattle grazing stopped or removed | Partially (Table 2) |
| | | | Insect threats controlled | No |
| | | | 2 populations with 500 mature individuals each | Unknown |

Table 2. Threats to *Gouania hillebrandii*.

| Threat | Listing factor | Current Status | Conservation/ Management Efforts |
|--|-----------------------|-----------------------|--|
| Ungulates – habitat modification and herbivory | A, C, D | Ongoing | Partially: strategic fences on West Maui |
| Rats – herbivory | C | Ongoing | No |
| Slugs– herbivory | C | Ongoing | No |
| Insect hibiscus snow scale | C | Ongoing | No |
| Invasive introduced plants | A, E | Ongoing | No |
| Fire | E | Ongoing | No |
| Climate change | A, E | Increasing | No |

3.0 RESULTS

3.3 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number:

Brief Rationale:

3.3 Listing and Reclassification Priority Number:

Reclassification (from Threatened to Endangered) Priority Number: _____

Reclassification (from Endangered to Threatened) Priority Number: _____

Delisting (regardless of current classification) Priority Number: _____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Monitor known populations and collect any available seed for genetic storage and reintroduction.
- Survey and monitor West Maui and Molokai populations for current status.
- Maintain or build fences around existing populations to protect them from the negative impacts of ungulates.
- Control invasive introduced plant species around known populations.
- Control rats in the vicinity of these populations.
- Determine the impact of hibiscus snow scale to the species and whether control is necessary.
- Develop and implement methods to control slugs.
- Propagate for augmentations of wild populations.
- Establish ex-situ or inter-situ populations that can be managed for genetic preservation.

- Coordinate fire prevention and response efforts between land managers and County fire departments.
- Work with Hawaii Division of Forestry and Wildlife, Hawaii State Parks, West Maui Mountains Watershed Partnership Program, and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

5.0 REFERENCES

Center for Conservation Research and Training Seed Storage Facility. 2009. Seed storage lab database report. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Maui Nui Botanical Garden. 2009. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Maui Nui Botanical Garden, Kahului, Hawaii. 15 pages. Unpublished.

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[USFWS] U.S. Fish and Wildlife Service. 2009. Endangered species in the Pacific islands: recovery plan for *Gouania hillebrandii*. April 27, 2009. U.S. Fish and Wildlife Service, Pacific Islands Office. Available online at <http://www.fws.gov/pacificislands/flora/gouania_hillebrandii.html>. Accessed 27 April 2009.

[USFWS] U.S. Fish and Wildlife Service. 2010. Recovery program, rare plant tracking database, species list report. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. Unpublished.

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Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Gouania hillebrandii* (no common name)

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

Recommendation resulting from the 5-year review:

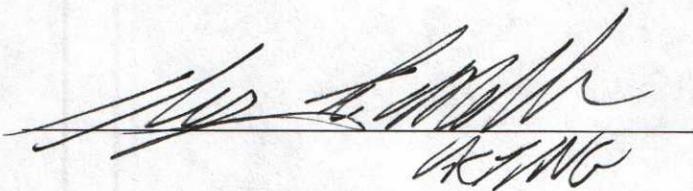
- Delisting
- Reclassify from Endangered to Threatened status
- Reclassify from Threatened to Endangered status
- No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

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Date 8/2/11