

Phyllostegia mannii
(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: *Phyllostegia mannii* / no common name

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5-YEAR REVIEW
***Phyllostegia mannii* (no common name)**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

Region 1, Endangered Species Program, Division of Recovery, Jesse D'Elia, (503) 231-2071

Lead Field Office:

Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (808) 792-9400

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 final critical habitat designations for *Phyllostegia mannii* and other species from the islands of Molokai and Maui (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 Samuel Aruch, 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 Deputy 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. 1992. Endangered and threatened wildlife and plants; determination of threatened or endangered status for 16 plants from the island of Molokai, Hawaii; final rule. Federal Register 57(196):46325-46340.

Date listed: October 8, 1992

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:

USFWS. 2003a. Endangered and threatened wildlife and plants; final designations and nondesignations of critical habitat for 42 plant species from the island of Molokai, Hawaii; final rule. Federal Register 68(52):12982-13141.

USFWS. 2003b. Endangered and threatened wildlife and plants; final designation of critical habitat for 60 plant species from the islands of Maui and Kahoolawe, Hawaii; final rule. Federal Register 68(93):25934-26165.

Critical habitat was designated for *Phyllostegia mannii* in three units totaling 1,428 hectares (3,528 acres) on the island of Molokai. This designation includes habitat on State and private lands (USFWS 2003a). Critical habitat was designated for *Phyllostegia mannii* in a single unit totaling 570 hectares (1,408 acres) on the island of Maui. This designation includes habitat on State and private lands (USFWS 2003b).

1.3.4 Review History:

Species status review [FY 2010 Recovery Data Call (September 2010)]:
Improving

Recovery achieved:

1 (1-25%) (FY 2007 Recovery Data Call – most recent year reported)

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

5

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: U.S. Fish and Wildlife Service. 1996. Recovery plan for the Molokai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 143 pages.

Date issued: September 26, 1996.

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 2.3.2 and Table 2. Listing Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the Molokai plant cluster recovery plan (USFWS 1996), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Phyllostegia mannii* is a short-lived perennial, and to be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g.*, fenced, weeding, etc.) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on Molokai, and if possible, at least one other island where they now occur or occurred historically. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

There is no known population containing more than 50 individuals and all threats have not been managed. This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Phyllostegia mannii* should be documented on islands where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 300 mature individuals per population. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery objective has not been met.

For delisting, a total of eight to ten populations of *Phyllostegia mannii* should be documented on islands where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 mature individuals per population for long-lived perennials. Each population should persist at this level for a minimum of five consecutive years before delisting is considered.

This recovery objective has not been met.

2.3 Updated Information and Current Species Status

No new information.

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:

In 1996, four individuals were known from two populations, both in Hanalilolilo (USFWS 1996). Three populations of *Phyllostegia mannii* are currently known, all located in the Kamakou Preserve in East Molokai, which is managed by the Nature Conservancy of Hawaii (Perlman 2010). Currently, three individuals are known from the Kamakou Preserve. One individual, seen in 2008, is located near Puu Alii at 1,195 meters

(3,920 feet) elevation (Perlman 2010). Two individuals are located near Hanalilolilo, one at 1,234 meters (4,050 feet) elevation, seen in 2008 (Perlman 2010), and the other, observed in 2009, after the Hanalilolilo tunnels, above the stream at 1,143 meters (3,750 feet) elevation (Perlman 2010). Also in Hanalilolilo, a single individual was reported in 1993 at 1,177 meters (3,860 feet) elevation (Wood 2010). In 2000, a single mature individual was reported in poor health was observed at 1,152 meters (3,780 feet) elevation in Hanalilolilo (Hawaii Biodiversity and Mapping Program 2009). The observations of *Phyllostegia mannii* at 3,750 and 3,780 feet elevations may be referring to the same individual.

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

No new information.

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.):

No new information

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

The habitat in Kamakou Preserve where *Phyllostegia mannii* occurs is *Metrosideros polymorpha* (ohia) – *Cheirodendron trigynum* (olapa) wet forest with associated native species including *Astelia menziesiana* (painiu), *Broussaisia arguta* (kanawao), *Cibotium* spp. (hapuu), *Clermontia pallida* (haha), *Coprosma* spp. (pilo), *Cyrtandra grayana* (keokeo haiwale), *Dicranopteris linearis* (uluhe), *Diplazium sandwichianum* (hoio), *Dubautia laxa* (naenae pua melemele), *Elaphoglossum* spp. (hoe a Maui), *Ilex anomala* (kawau), *Joinvillea ascendens*

subsp. *ascendens* (ohe), *Kadua* sp., *Machaerina angustifolia* (uki), *Melicope clusiifolia* (kolokolo mokihana), *Myrsine lessertiana* (kolea lau nui), *Psychotria* spp. (kopiko), *Rubus hawaiiensis* (akala), *Sadleria* spp. (amau or apuu), and *Scaevola chamissoniana* (naupaka kuahiwi) (National Tropical Botanical Garden 2009; Perlman 2010; Wood 2010).

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 the habitat of *Phyllostegia mannii* include feral goats (*Capra hircus*), pigs (*Sus scrofa*), and landslides, which may occur because of erosion caused by feral ungulates. Invasive introduced plant species such as *Axonopus fissifolius* (narrow leaved carpetgrass), *Erigeron karvinskianus* (daisy fleabane), *Juncus effusus* (Japanese mat rush), and *Rubus rosifolius* (thimbleberry) also degrade the habitat and may inhibit native plant regeneration (Perlman 2010; Wood 2010).

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

Not a threat.

2.3.2.3 Disease or predation:

Rats (*Rattus* sp.) and slugs (unidentified species) apparently feed on this non-aromatic species of the mint family (Perlman 2010; Wood 2010).

2.3.2.4 Inadequacy of existing regulatory mechanisms:

No new information.

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 also a threat to *Phyllostegia mannii* because they compete with the species for water, light, and nutrients.

In addition to all of the other threats, species like *Phyllostegia mannii* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes, landslides, flooding, and disease outbreaks. The extent of these natural processes on this single island endemic are exacerbated by anthropogenic threats, such as habitat loss for human development or predation by introduced species (USFWS 1996).

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.

Collections of seeds and/or cuttings were made from all three individuals on Molokai in 2009 (A. Bakutis, Plant Extinction Prevention Program, pers. comm. 2009). Three individuals are growing in Bill Garnett's nursery in Kalae, Molokai, and the Olinda Rare Plant Facility on Maui has three individuals in their nursery (B. Garnett, Wiliwili Rare Plant Nursery, pers. comm. 2009; National Tropical Botanical Garden 2010; Olinda Rare Plant Facility 2009). Eighteen individuals from the Olinda Rare Plant Facility were reintroduced into the Kamakou Preserve (Olinda Rare Plant Facility 2009). The Harold L. Lyon Arboretum has 363 seeds in storage (Center for Conservation Research and Training Seed Storage Laboratory 2010).

In 2009, one million dollars in funds from the federal Department of Interior's Cooperative Endangered Species Conservation Fund will be used on Molokai, to help acquire a perpetual conservation easement over 248 hectares (614 acres) of strategic watershed on the eastern end of the island. The property has several federally listed threatened or endangered species as well as critical habitat in and around the proposed easement area. Among federally listed species that will benefit

from this protection are *Cyanea mannii* (haha), *Canavalia molokaiensis* (awikiwiki), *Hibiscus arnottianus* ssp. *immaculatus* (kokio keokeo), *Brighamia rockii* (puaala), *Cyanea dunbariae* (haha), *Gardenia brighamii* (nanu), *Pritchardia munroi* (loulou), and *Phyllostegia hispida* (USFWS 2009; C. Rowland, USFWS, pers. comm. 2010). This area may provide protected suitable habitat for reintroducing *Phyllostegia mannii*.

2.4 Synthesis

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for the Molokai plant cluster (USFWS 1996), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Phyllostegia mannii* is a short-lived perennial, and to be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on islands where they now occur or occurred historically. For the species to be considered stable, 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 as there are only three known individuals, thus there is no known population containing more than 50 individuals (Table 1). In addition, all threats are not being managed (Table 2). Therefore, *Phyllostegia mannii* meets the definition of endangered as it remains in danger of extinction throughout its range.

Table 1. Status of *Phyllostegia mannii* from listing through 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1992 (listing)	4	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1996 (recovery plan)	4	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	1	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2010 (5-year review)	3	18	All threats managed in all 3 populations	No (Table 2)
			Complete genetic storage	Yes: collections made from all 3 individuals on Molokai in 2009
			3 populations with 50 mature individuals each	No: only 3 known individuals

Table 2. Threats to *Phyllostegia mannii*.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification and herbivory	A, C, D	Ongoing	Partially: suitable habitat for reintroduction may be protected in the near future
Rats – herbivory	C	Ongoing	No
Slugs – herbivory	C	Ongoing	No
Landslides	A, E	Ongoing	No
Invasive introduced plants	A, E	Ongoing	No
Climate change	A, E	Increasing	No
Small population size	E	Ongoing	Yes: seeds collected and propagules growing in nurseries

3.0 RESULTS

3.1 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 seeds for genetic storage and reintroduction.
- Fence existing populations to provide protection from the negative impacts of feral ungulates.
- Control invasive introduced species around known populations.
- Control rats in the vicinity of these populations.
- Develop and implement methods to control slugs.
- Propagate to augment the existing populations.
- Establish additional populations within protected suitable habitat.
- Survey areas where *Phyllostegia mannii* have been reported to determine the current status of the species.
- Work with The Nature Conservancy of Hawaii 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 Laboratory. 2009. Seed storage lab database report for *Phyllostegia mannii*. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.
- Hawaii Biodiversity and Mapping Program. 2009. Program database. Hawaii Biodiversity and Mapping Program, Honolulu, Hawaii.
- National Tropical Botanical Garden. 2009. Herbarium database. National Tropical Botanical Garden, Kalaheo, Hawaii. Unpublished.
- National Tropical Botanical Garden. 2010. Nursery inventory control system reports. National Tropical Botanical Garden, Kalaheo, Hawaii. Unpublished.

- Olinda Rare Plant Facility. 2009. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Olinda, Hawaii. 6 pages. Unpublished.
- Perlman, S. 2010. *Phyllostegia mannii*. National Tropical Botanical Garden, Kalaheo, Hawaii. 2 pages. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 1992. Endangered and threatened wildlife and plants; determination of threatened or endangered status for 16 plants from the island of Molokai, Hawaii; final rule. Federal Register 57(196):46325-46340.
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- [USFWS] U.S. Fish and Wildlife Service. 2003a. Endangered and threatened wildlife and plants; final designations and nondesignations of critical habitat for 42 plant species from the island of Molokai, Hawaii; final rule. Federal Register 68(52):12982-13141.
- [USFWS] U.S. Fish and Wildlife Service. 2003b. Endangered and threatened wildlife and plants; designation of critical habitat for 60 plant species from the islands of Maui and Kahoolawe, Hawaii; final rule. Federal Register 68(93):25934-26165.
- [USFWS] U.S. Fish and Wildlife Service. 2009. Press release: Fish and Wildlife Service provides \$1 million in land acquisition funds to Hawaii, Honolulu, Hawaii. April 17, 2009.
- Wood, K..R. 2010. Notes on *Phyllostegia mannii*. National Tropical Botanical Garden, Kalaheo, Hawaii. 1 page. Unpublished.

Personal Communications:

- Bakutis, Ane. Molokai Coordinator, Plant Extinction Prevention Program, Kaunakakai, Hawaii. E-mail to Margaret A. Clark, National Tropical Botanical Garden, dated August 19, 2009. Subject: USFWS 5 yr review list and schedule.
- Garnett, Bill. Wiliwili Rare Plant Nursery, Kalae, Hawaii. Interview with Margret Clark, National Tropical Botanical Garden, August 19, 2009.
- Rowland, Craig. 2010. Conservation Partnerships Program Coordinator, Pacific Islands Fish and Wildlife Office, U.S. Fish and Wildlife Service. E-mail to

Marie Bruegmann, U.S Fish and Wildlife Service, dated April 16, 2010.
Subject: Additional information on status of Molokai easement.

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

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

Recommendation resulting from the 5-year review:

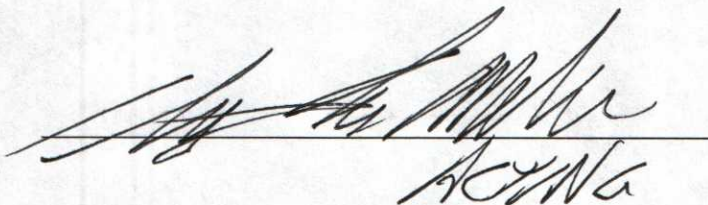
- Delisting
- Reclassify from Endangered to Threatened status
- Reclassify from Threatened to Endangered status
- No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

Chelsie Javar, Fish and Wildlife Biologist
Marie Bruegmann, Plant Recovery Coordinator
Jess Newton, Recovery Program Lead
Assistant Field Supervisor for Endangered Species

Field Supervisor, Pacific Islands Fish and Wildlife Office


ACVNa

Date 07/2/11