

## 5-YEAR REVIEW

### Short Form Summary

**Species Reviewed:** *Phyllostegia glabra* var. *lanaiensis* (no common name)

**Current Classification:** Endangered

#### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2016. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 76 species in Hawai‘i, Oregon, Washington, Montana, and Idaho. Federal Register 81(29):7571–7573. February 12, 2016.

#### **Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

#### **Name(s) of reviewer(s):**

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Gregory Koob, Conservation and Restoration Team Manager, PIFWO

Kristi Young, Acting Project Leader, PIFWO

#### **Methodology used to complete this 5-year review:**

This review was conducted by USFWS PIFWO staff beginning in August 2017. The review was based on an analysis of current, available information since the last 5-year review for *Phyllostegia glabra* var. *lanaiensis* (USFWS 2012). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Gregory Koob, then Conservation and Restoration Team Manager, before it was forwarded to the acting Project Leader and then to the Regional Office for review and approval.

#### **Background:**

For information regarding the species listing history and other facts, please refer to the USFWS Environmental Conservation Online System (ECOS) database for threatened and endangered species ([http://ecos.fws.gov/tess\\_public](http://ecos.fws.gov/tess_public)).

#### **Review analysis:**

Please refer to the previous 5-year review for *Phyllostegia glabra* var. *lanaiensis* published in the Federal Register on August 28, 2012 (available at [https://ecos.fws.gov/docs/five\\_year\\_review/doc4068.pdf](https://ecos.fws.gov/docs/five_year_review/doc4068.pdf)), for a complete review of the species' status, threats, and management efforts. Information regarding the biological status of *Phyllostegia glabra* var. *lanaiensis* since the last 5-year review in 2012 indicates that a change in its listing status is warranted.

This short-lived perennial herb in the Lamiaceae (mint) family has been listed as endangered and is endemic to Lāna‘i. The current status and trends for *P. glabra* var. *lanaiensis* are provided in the following tables.

New status information:

- This taxon was last seen in Maunalei Valley in the 1980s by Hobdy (USFWS 1991). In 2003, designation of critical habitat was considered not prudent in the proposed critical habitat rule for plant species from the island of Lānaʻi because this plant had not been observed in the wild in over 20 years and no viable genetic material was available for recovery efforts (USFWS 2000). Despite repeated surveys of historical and suitable habitat by botanists since 2006, *P. glabra* var. *lanaiensis* has not been found (Plant Extinction Prevention Program (PEPP) 2012, Oppenheimer 2019, in litt.). In 2012, PEPP reported that *P. glabra* var. *lanaiensis* was likely extinct.

New threats:

- Climate change related loss or degradation of habitat — We previously reported that effects due to climate change may pose a threat to this species, anticipating an analysis by 2013. The assessment conducted by Fortini *et al.* (2013) concluded that *P. glabra* is vulnerable to the impacts of climate change, with a vulnerability score of 0.284 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change).

New management actions:

- Surveys and inventories — PEPP surveys and monitors rare plant species on Lānaʻi and botanical surveys are conducted on a rotational basis, based on the needs for collections and monitoring. No observations of *P. glabra* var. *lanaiensis* have been reported since the 1980s. By 2012, PEPP determined that this variety was likely extirpated (PEPP 2012). However, botanists were still searching for it on any surveys in or near its last known location and other suitable habitat as recently as January 2019 (Oppenheimer 2019, in litt.).
- Habitat and natural process management and restoration — The environmental conservation organization Pūlama Lānaʻi has begun to provide conservation benefits for plant and animal species on Lānaʻi. These benefits are demonstrated by the initiation of conservation efforts on the island, the commitment to develop the Lānaʻi Natural Resources Plan (LNRP), and a memorandum of understanding (MOU) between USFWS and Pūlama Lānaʻi (USFWS 2015). Actions covered by the MOU include completion of construction of an ungulate-proof fence at the Lānaʻihale summit area, construction of a tree snail enclosure, establishment of the LNRP planning team and implementation of management actions such as ungulate control, invasive plant control, predator control, fire control, restoration, research and monitoring, and overall improvement of the ecological status of covered species, as detailed in the plan. If *P. glabra* var. *lanaiensis* is rediscovered within a fenced and managed area on Lānaʻi, it may benefit from these management actions. Kaiholena Gulch (the last known location of this taxon) is within Increment 1 of the Lānaʻihale fence.

**Synthesis:**

Currently, there are no known individuals of *P. glabra* var. *lanaiensis* on Lānaʻi, and there are no propagules in *ex situ* storage. A landscape-based assessment of climate change vulnerability for native plants of Hawaiʻi using high-resolution climate change projections was conducted by Fortini *et al.* (2013). Their analysis showed that *P. glabra* is vulnerable to the effects of climate change, in that there will be a smaller area of suitable habitat available for the species in the near future. If individuals are rediscovered within a fenced and managed area on Lānaʻi, they may be provided protection by ongoing ungulate and nonnative plant control actions.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Lānaʻi Plant Cluster Recovery Plan (USFWS 1995). These objectives have been updated according to the draft revised recovery objective guidelines developed by the Hawaiʻi and Pacific Plants Recovery Coordinating Committee (HPPRCC 2011). The HPPRCC identifies an additional initial objective, the Preventing Extinction Stage, in addition to the Interim Stabilization, Delisting, and Downlisting objectives. Furthermore, life history traits such as breeding system, population size fluctuation or decline, and reproduction type (sexual or vegetative), have been included in the calculation of goals for the number of populations and reproducing individuals for each stage. The goals for each stage remain grouped by lifespan defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

*P. glabra* var. *lanaiensis* is a short-lived perennial herb. To prevent extinction, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g.*, fenced) and have 50 individuals (or the total number of individuals if fewer than 50 exist) from each of 3 populations represented in *ex situ* (secured off-site, such as a nursery or seed bank) collections. In addition, a minimum of three populations should be documented on Lānaʻi. Each of these populations must be naturally reproducing (*i.e.*, viable seeds, seedlings, saplings) and increasing in number, with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been, nor will be met as there are no known individuals, no seeds, and no plants in propagation (Table 1). Currently, all threats are not being sufficiently managed throughout the range of the species (Table 2). Even after repeated surveys, no individuals have been found within the historical range of the variety. Because of this taxon's biological status, we recommend delisting *P. glabra* var. *lanaiensis* due to presumed extinction.

**Table 1. Status and trends of *Phyllostegia glabra* var. *lanaiensis* from listing through the current 5-year review.**

<b>Date (Action)</b>	<b>Number of Wild Individuals</b>	<b>Number Outplanted</b>	<b>Stability Criteria Identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1991 (listing)	0	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
1995 (recovery plan)	0	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
2003 (critical habitat not prudent)	0	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
2012 (5-year review)	0	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
2019 (5-year review)	0	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Reproduction ( <i>i.e.</i> viable seeds, seedlings) at all three populations	No
			Three populations with 50 mature individuals each	No

\* The Preventing Extinction Stage was established in 2011. Prior to 2011, the Interim Stabilization Stage was the first stage towards recovery (now it is the second stage after Preventing Extinction).

**Table 2. Threats to *Phyllostegia glabra* var. *lanaiensis* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/Management Efforts
Ungulate degradation of habitat	A	Ongoing	Lāna‘ihale fence under construction, ungulate control initiated
Degradation of habitat by established ecosystem-altering invasive plant species	A	Ongoing	Lāna‘ihale fence under construction; management actions initiated
Climate change related loss or degradation of habitat	A	Ongoing	Lāna‘ihale fence under construction; management actions initiated
Ungulate herbivory	C	Ongoing	Lāna‘ihale fence under construction; ungulate control initiated
Reduced viability due to low numbers	E	Ongoing	None, no propagative material available

**Recommendations for future actions:**

There are instances where rare Hawaiian plants were rediscovered after they were presumed extinct. Should *Phyllostegia glabra* var. *lanaiensis* be rediscovered, we will reassess its status and possibly recommend the following actions be implemented for habitat protection, propagation, and reintroduction.

- Surveys and inventories — If the variety is rediscovered, survey for additional populations of *Phyllostegia glabra* var. *lanaiensis* in areas of potentially suitable habitat on Lāna‘i.
- Ungulate monitoring and control — If the variety is rediscovered, construct an ungulate-proof enclosure around the population.
- Captive propagation for genetic storage and reintroduction — If the variety is rediscovered, collect material for genetic storage.
- Climate change adaptation strategy — If the variety is rediscovered, assess the modeled effects of climate change to determine future landscape needed for recovery of the species.
- Alliance and partnership development — If the variety is rediscovered, work with the Lāna‘i landowner and land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management of sites for potential reintroduction.

## References:

- Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon III, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change vulnerability for all native Hawaiian plants. Technical report HCSU-044. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hawai'i. 134 pp.
- [HBMP] Hawaii Biodiversity and Mapping Program. 2010. Species Access database. Unpublished.
- [HPPRCC] Hawai'i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. Unpublished. 8 pp.
- Oppenheimer, H. 2019, in litt. Email regarding current status of *Phyllostegia glabra* var. *lanaiensis*. January 28-30, 2019.
- [PEPP] Plant Extinction Prevention Program. 2012. PEPP annual report fiscal year 2012 (July 1, 2011-June 30, 2012). 169 pp.
- [USFWS] U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; determination of endangered status for six plants from the island of Lanai, Hawaii. Federal Register 56(183):47686-47695. September 20, 1991.
- [USFWS] U.S. Fish and Wildlife Service. 1995. Lāna'i Plant Cluster Recovery Plan. Portland, Oregon. 119 pp. + appendices.
- [USFWS] U.S. Fish and Wildlife Service. 2000. Endangered and threatened wildlife and plants: prudency determinations for eight plant species from the Hawaiian Islands, and proposed critical habitat designations for eighteen plant species from the island of Lanai, Hawaii. Federal Register 65(249):82086-82126. December 27, 2000.
- [USFWS] U.S. Fish and Wildlife Service. 2012. *Phyllostegia glabra* var. *lanaiensis* (no common name) 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, Hawai'i ([https://ecos.fws.gov/docs/five\\_year\\_review/doc4068.pdf](https://ecos.fws.gov/docs/five_year_review/doc4068.pdf)).
- [USFWS] U.S. Fish and Wildlife Service. 2015. Memorandum of understanding between Lanai Resorts, LLC, Castle & Cooke Properties, Inc., and the U.S. Department of the Interior Fish and Wildlife Service. January 26, 2015. 34 pp.
- [USFWS] U.S. Fish and Wildlife Service. 2016. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 76 species in Hawaii, Oregon, Washington, Montana, and Idaho. Federal Register 81(29):7571-7573. February 12, 2016.

**U.S. FISH AND WILDLIFE SERVICE**  
**SIGNATURE PAGE for 5-YEAR REVIEW of**  
***Phyllostegia glabra* var. *lanaiensis* (no common name)**

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

**Recommendation resulting from the 5-year review:**

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

Approved by:

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**Project Leader,**  
**Pacific islands Fish and Wildlife Office**

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**Assistant Regional Director,**  
**Ecological Services, Pacific Regional Office**