

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Phyllostegia waimeae* (no common name)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 2020. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

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

Interior Region 12/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

### **Name of Reviewer:**

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Megan Laut, Conservation & Restoration Team Manager, PIFWO

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

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (Service or USFWS) beginning in October 2021. The review was based on a review of current, available information since the last 5-year review for *Phyllostegia waimeae* (USFWS 2017). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Conservation and Restoration Team Manager.

### **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 (<https://ecos.fws.gov/ecp/species/8551>).

### **Review Analysis:**

Please refer to the previous 5-year reviews for *Phyllostegia waimeae* published in the Federal Register on January 18, 2008, and September 17, 2017 (available at [http://ecos.fws.gov/docs/tess/species\\_nonpublish/1156.pdf](http://ecos.fws.gov/docs/tess/species_nonpublish/1156.pdf) and [http://ecos.fws.gov/docs/tess/species\\_nonpublish/2485.pdf](http://ecos.fws.gov/docs/tess/species_nonpublish/2485.pdf)) for a complete review of the species' status, threats, management efforts, and references cited. We are not aware of any significant new information regarding the species' biological status since listing to warrant a change in the Federal listing status of *P. waimeae*.

This short-lived perennial shrub in the Lamiaceae (mint) family is listed as endangered and is known from the island of Kaua‘i. The status and trends for *Phyllostegia waimeae* are provided in the tables below.

New Status Information:

- Currently, there is one wild individual remaining (Perlman 2019). Initially, one reintroduced population was recruiting; however, no plants have been observed since that time (Kishida 2015; Kishida et al. 2018).

New Threats:

- None reported.

New Management Actions:

- Surveys and monitoring—The Plant Extinction Prevention Program (PEPP) surveys for and monitors wild and reintroduced *Phyllostegia waimeae* on Kaua‘i (Perlman 2019; Kishida et al. 2018; PEPP [PEPP] 2021). The reintroduced plants at Kawai Iki could not be relocated in 2017 (PEPP 2021).
- Captive propagation for genetic storage and reintroduction—The National Tropical Botanical Garden (NTBG) added one cloned plant (representing one founder from Koai‘e) to the living collection at the Southshore garden and has one cloned plant (also from Koai‘e) in the nursery (NTBG 2021). In 2010 there were 20 seeds in storage representing one founder at Kawai Iki (NTBG 2020).
- From 2010 to 2011, the Lyon Arboretum Seed Conservation Laboratory reported storage of 1,306 seeds representing three founders from Koai‘e (Lyon Arboretum 2022).

**Table 1. Status and trends of *Phyllostegia waimeae* from listing through current 5-year review.**

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1994 (listing)	1	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1995 (recovery plan)	1?	0	All threats managed in all 3 population	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	6	0	All threats managed in all 3 populations	No

			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2008 (5-year review)	10 mat 20 seedlings	119	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>*Preventing Extinction Criteria identified by HPPRCC</b>	<b>*Preventing Extinction Criteria Completed?</b>
2017 (5-year review)	1?	126, 18 survive	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	Partially, recruitment at reintroduction
			3 populations with 50 mature individuals each	No
2022 (5-year review)	1	0; none remain	All threats managed in all 3 populations	Partially, reintroductions in exclosures
			Complete genetic storage	Complete, last three founders represented
			Natural reproduction at all 3 populations	Partially, no survival to maturity
			3 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 waimeae* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Destruction and degradation of habitat by feral ungulates	A	Ongoing	None
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	None
Fire destruction and degradation of habitat	A	Ongoing	None
Climate change degradation and destruction of habitat, including hurricanes	A	Ongoing	None
Collecting impacts	B	Ongoing	Partial, some storage and propagation
Predation and herbivory by rodents	C	Ongoing	None
Predation and herbivory by invertebrates	C	Ongoing	Partial, control in nursery settings
Reduced viability due to low numbers	E	Ongoing	Partial, seed storage and propagation

**Synthesis:**

Currently, there is only one known wild individual of *Phyllostegia waimeae* on Kaua‘i. Seed collection (from reintroduced plants) and storage, propagation, and establishment of living collections is ongoing. Individuals are reintroduced to exclosures; however, there is no survival to maturity and further recruitment.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Kaua‘i Islandwide Recovery Plan (USFWS 2021) and have been updated according to the draft revised recovery objective guidelines developed by the Hawai‘i 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 life span defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

*Phyllostegia waimeae* is a short-lived perennial shrub. To prevent extinction, which is the first milestone 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 three populations represented in *ex situ* (secured off-site, such as a

nursery or seed bank) collections that are well managed. In addition, a minimum of a total of three populations should be documented on Kaua'i where this species now occurs or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, seedlings) with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for *Phyllostegia waimeae* have not been met. There may be one wild individual remaining (Table 1). Seeds and propagated plants in living collections represent three founders (Table 1, Table 2). All threats are not controlled and this species is susceptible to many threats, such as to habitat destruction by feral ungulates, nonnative plant competition, fire, predation by rodents and invertebrates, and hurricanes (Table 2). Therefore, *P. waimeae* meets the definition of Endangered as it remains in danger of extinction throughout its range.

### **Recommendations for Future Actions:**

No new threats and no significant new information regarding the species' biological status have been reported since the last 5-year review in 2017. Thus, the following recommendations for future actions are reiterated or updated for the 5-year review for 2022.

- Surveys and inventories—Continue to survey for populations of *Phyllostegia waimeae* in areas of potentially suitable habitat.
- Feral ungulate monitoring and control—Continue to construct and maintain exclosures to protect occurrences against disturbance by feral ungulates.
- Nonnative invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species and those that compete with *P. waimeae* at all populations.
- Fire monitoring and control—Develop and implement fire management plans for all occurrences.
- Predator and herbivore monitoring and control—
  - Implement effective control measures for rodents at all populations.
  - Determine the level of threat from invertebrates and any additional needed recovery actions.
- Climate change adaptation strategy—Research suitability of habitat for viability of species, including where to conduct translocations in the future due to impacts of climate change.
- Captive propagation for genetic storage and reintroduction—
  - Continue collection and propagation efforts for maintenance of genetic stock.
  - Implement collecting protocols that provide the least impacts to any remaining wild individuals.
- Reintroduction and augmentation—Continue reintroduction of individuals into protected suitable habitat that is being managed for known threats to this species.
- Build resiliency and redundancy—Increase numbers of individuals and populations through translocations and habitat restoration to reduce impacts of threats, including climate change, fire, hurricanes, and reduced viability due to small population size.

- Population biology research—Study *P. waimeae* populations to determine viable population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.
- Alliance and partnership development—Continue to work with partners and other land managers in planning and implementation of ecosystem-level restoration and management to benefit this species.

## References:

- Clark, M. 2015. *Phyllostegia waimeae*. The IUCN Red List of Threatened Species 2015:e.T80174830A80174875. <http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T80174830A80174875.en>.
- [HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.
- Kishida, W. 2015. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Phyllostegia waimeae*, Pacific Islands Fish and Wildlife Office.
- Kishida, W. and S. Perlman. 2017. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Phyllostegia waimeae*, Pacific Islands Fish and Wildlife Office.
- Kishida, W., S. Perlman, R. Agurauja, and L. Arnold. 2018. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Phyllostegia waimeae*, Pacific Islands Fish and Wildlife Office.
- [NTBG] National Tropical Botanical Garden. 2020. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

[NTBG] 2021. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

Lyon Arboretum. 2022. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

Perlman, S. 2019. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Phyllostegia waimeae*, Pacific Islands Fish and Wildlife Office.

[PEPP] Plant Extinction Prevention Program. 2021. Fiscal year 2021 interim performance report (October 1, 2020-September 30, 2021) cooperative agreements F18AC00502 and F19AC00532, US Fish and Wildlife Service CFDA Program #15.657, Endangered species conservation—recovery implementation funds, University of Hawaii at Manoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program.

[USFWS] U.S. Fish and Wildlife Service. 2008. *Phyllostegia waimeae* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1156.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1156.pdf).

[USFWS] 2017. *Phyllostegia waimeae* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2485.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2485.pdf).

[USFWS] 2020. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

[USFWS] 2021. Kaua‘i Islandwide Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 65 pp. + appendices.

**U.S. FISH AND WILDLIFE SERVICE**  
SIGNATURE PAGE for 5-YEAR REVIEW of *Phyllostegia waimeae*  
(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
- X   No Change in listing status

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

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Date \_\_\_\_\_