

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Clermontia oblongifolia* subsp. *mauiensis* (‘ōhā wai)

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 Hawaii, Oregon, Washington, Montana, and Idaho. Federal Register 81(29): 7571–7573.

Lead Region/Field Office:

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

Name of Reviewers:

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Gregory Koob, 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) beginning in August 2017. The review was based on a review of current, available information since the last 5-year review for *Clermontia oblongifolia* subsp. *mauiensis* (USFWS 2011). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Gregory Koob, 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 (http://ecos.fws.gov/tess_public).

Review Analysis:

Please refer to the previous 5-year review for *Clermontia oblongifolia* subsp. *mauiensis* published in the Federal Register on August 2, 2011 (available at https://ecos.fws.gov/docs/five_year_review/doc3812.pdf) for a complete review of the species’ status, threats, and management efforts. We are not aware of any significant new information regarding the species’ status since listing to warrant a change in the Federal listing status of *C. oblongifolia* subsp. *mauiensis*.

This short-lived perennial shrub or tree in the Campanulaceae (bellflower) family is endangered, currently known from Maui, and historically also known from Lāna‘i. The current status and trends for *Clermontia oblongifolia* subsp. *mauiensis* are provided in the tables below.

New Status Information:

- At the time of the last 5-year review in 2011, there were four individuals on east Maui at Haipua‘ena, and no individuals had been observed on Lāna‘i between Palea and Kamiki ridges since 1998. Currently, there is one individual on west Maui (the identity of which is uncertain) and fewer than 30 individuals total in four populations on east Maui (Oppenheimer 2018, in litt.).
- As discussed in the previous 5-year review, an examination indicates that the type specimen of *Clermontia oblongifolia* subsp. *mauiensis* may be a hybrid, and further studies of individuals from Maui are necessary, as they may be hybrids of *C. oblongifolia* with *C. arborescens* or *C. kakeana* (Service 1997).
- In 2012, the Service revised critical habitat for *Clermontia oblongifolia* subsp. *mauiensis* and the proposed rule identified three critical habitat units on Lāna‘i in the lowland mesic and lowland wet ecosystems (11,776 ac; 4,767 ha) (77 FR 34464, July 11, 2012). In the final rule the Service excluded critical habitat for this subspecies on the island of Lāna‘i because, as demonstrated by the ongoing conservation activities by the private landowner, their commitment to develop the Lāna‘i Natural Resources Plan, and a memorandum of understanding with the Service, exclusion from critical habitat would provide greater long-term benefits to the species than designation of critical habitat (USFWS 2015; 81 FR 17790, March 30, 2016). Also, in 2016, 13 critical habitat units were designated in the lowland wet and montane wet ecosystems on east and west Maui for this subspecies (40,691 ac, 16,468 ha) (81 FR 17790, March 30, 2016).

New Threats:

- Climate change loss or degradation of habitat—Climate change may pose a threat to this subspecies. Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under climate change. The assessment by Fortini *et al.* (2013) was conducted for *Clermontia oblongifolia* at the species level, and concluded that this species is vulnerable to the impacts of climate change, with a vulnerability score of 0.329 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions are needed to conserve this taxon into the future.
- Hybridization impacts—This subspecies may hybridize with the more common *Clermontia arborescens* or *C. kakeana* that could lead to loss of species diversity, local adaptations, and genetic representation.

New Management Actions:

- Surveys and inventories—Surveys are ongoing and have located three new populations on Maui; however, vouchers should be studied to support or refute the taxonomy of individuals at these locations (PEPP 2013, 2015; Oppenheimer 2018, in litt.)

- Captive propagation for genetic storage and reintroduction—Lyon Arboretum Seed Conservation Laboratory reports 1,064 seeds in collection from the population at Kawaipapa (Lyon Arboretum 2017).

Synthesis:

Surveys conducted since completion of the last 5-year review for this subspecies located three new populations of *Clermontia oblongifolia* subsp. *mauiensis*; however, the identity of these individuals is uncertain. A landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections was made by Fortini *et al.* (2013) and their analysis showed that *C. oblongifolia* is vulnerable to the effects of climate change. Seed collections are ongoing.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Recovery Plan for the Maui Plant Cluster (USFWS 1997), 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.

Clermontia oblongifolia subsp. *mauiensis* is a short-lived perennial shrub or tree. 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 three populations represented in *ex situ* (secured, off-site, such as in a nursery or seed bank) collections. In addition, a minimum of three populations should be documented on Maui and Lāna‘i. 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 subspecies have not been met as there are no populations of at least 50 reproducing individuals, genetic representation is incomplete (Table 1), and all threats are not being sufficiently managed throughout the range of the species (Table 2). Therefore, *Clermontia oblongifolia* subsp. *mauiensis* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

Hybridization is a threat to *Clermontia oblongifolia* subsp. *mauiensis*; however, we are not aware of significant new information regarding the subspecies’ biological status since the last 5-year review in 2011. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2018.

- Surveys and inventories—Continue surveys for additional populations of *Clermontia oblongifolia* subsp. *mauiensis* in areas of potentially suitable habitat.
- Hybridization impacts—
 - Conduct genetic analysis to determine if the taxon is valid or a hybrid.
 - Conduct pollen studies to evaluate pollen quality and viability, as pollen is often aborted in this subspecies.
- Climate change adaptation strategy—Assess the modeled effects of climate change on this subspecies, and determine future landscape needed for its recovery.

Table 1. Status and trends of *Clermontia oblongifolia* subsp. *mauiensis* from listing through current 5-year review.

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1992 (listing)	1 (Maui)	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
1997 (recovery plan)	1 (Maui)	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2003 (critical habitat)	1 (Maui) unknown (Lāna‘i)	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No

2011 (5-year review)	4 (Maui)	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2016 (critical habitat)	4 (Maui)	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2018 (5-year review)	<30 (Maui) Unknown (Lāna‘i)	0	All threats managed in all three populations	No
			Complete genetic storage	Partial, seeds in storage
			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 after Preventing Extinction).

Table 2. Threats to *Clermontia oblongifolia* subsp. *mauiensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A	Ongoing	Partial, fencing at Hanawi NAR
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, fencing at Hanawi NAR
Climate change degradation or loss of habitat	A	Ongoing	Partial, fencing at Hanawi NAR
Ungulate predation or herbivory	C	Ongoing	Partial, fencing at Hanawi NAR
Rodent predation or herbivory	C	Ongoing	None
Invertebrate predation or herbivory	C	Ongoing	None
Stochastic events—Reduced viability due to low numbers	E	Ongoing	Partial, seed storage efforts are ongoing

References:

See the previous 5-year review for a full list of references (Service 2011). Only references for new information are provided below.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, 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.

[HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

Lyon Arboretum. 2017. Micropropagation and seed conservation laboratory databases.

Oppenheimer, H. 2018, in litt. GIS data for *Clermontia oblongifolia* subsp. *mauiensis*.

[PEPP] Plant Extinction Prevention Program. 2013. PEPP annual report fiscal year 2013 (July 1, 2012-June 30, 2013). 207 pp.

[PEPP] 2015. PEPP annual report fiscal year 2015 (July 1, 2014-June 30, 2015). 179 pp.

[PEPP] 2016. Hawai‘i Department of Land & Natural Resources, DOFAW rare plant program, section 6 interim performance report, F15AF00595, Plant Extinction

Prevention Program annual report Fiscal Year 2016 (July 1, 2015-June 30, 2016).
53 pp.

- [USFWS] U.S. Fish and Wildlife Service. 2011. *Clermontia oblongifolia* subsp. *mauiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/five_year_review/doc3812.pdf.
- [USFWS] 2012. Endangered and threatened wildlife and plants; listing 38 species on Molokai, Lanai, and Maui as Endangered and designating critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species; proposed rule. Department of the Interior, Federal Register 77 (112): 34464–34775, June 11, 2012.
- [USFWS] 2015. Memorandum of understanding between Lanai Resorts, LLC, Castle & Cooke Properties, Inc., and U.S. Department of the Interior, Fish and Wildlife Service. 36 pp.
- [USFWS] 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.
- [USFWS] 2016. Endangered and threatened wildlife and plants; designation and nondesignation of critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species; final rule. Federal Register 81 (61): 17790–18110, March 30, 2016.

U.S. FISH AND WILDLIFE SERVICE

SIGNATURE PAGE for 5-YEAR REVIEW of *Clermontia oblongifolia* subsp. *mauiensis*
(‘ōhā wai)

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