

5-YEAR REVIEW

Short Form Summary

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

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2021. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 77 Species in Oregon, Washington, Idaho, and Hawaii. Federal Register 86(120): 33726–33728, June 25, 2021.

Lead Region/Field Office:

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

Name of Reviewer:

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, Acting Recovery 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 October 2021. The review was based on a review of current, available information since the last 5-year review for *Clermontia oblongifolia* ssp. *mauiensis* (USFWS 2018). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Acting Recovery 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/ecp/species/7350>).

Review Analysis:

Please refer to the previous 5-year reviews for *Clermontia oblongifolia* ssp. *mauiensis* published in the Federal Register on August 2, 2011, and October 22, 2018 (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1756.pdf and https://ecos.fws.gov/docs/tess/species_nonpublish/2617.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 *C. oblongifolia* ssp. *mauiensis*.

This short-lived perennial shrub in the Campanulaceae (bellflower) family is endangered and is known from the northern slopes of Haleakalā (east Maui), Kahālāwai (west Maui), and historically from Lāna‘i. The status and trends for *Clermontia oblongifolia* ssp. *mauiensis* are provided in the tables below.

New Status Information:

- In 2018, there were estimated to be fewer than 30 individuals on Haleakalā (east Maui). Currently, there are no longer individuals at Haipua‘ena, and no recent observations of previously known populations at Pi‘ina‘au-Ke‘anae (1 individual) or ‘Ohe‘o (1 individual) (Maui Plant Extinction Prevention Program [Maui PEPP] 2020). More plants were found in other locations because of more intensive survey efforts including three individuals at Makawao-Olinda, 1 individual at Waikamoi Gulch, 1 individual at Nailiilihaele, 1 individual at Puohokamoa, 1 individual at Pa‘akea, 1 individual at Hanawī, and 1 individual at Kopili‘ula (Maui PEPP 2020–2021). In 2021, there were as many as 10 individuals at Kahawaihāpapa (their identity needs confirmation) and 12 individuals in three subpopulations at Kawaipapa (Maui PEPP 2022). In summary, the number of wild individuals on Haleakalā is approximately 33. A recent survey discovered a small population of 4 mature individuals with 6 immatures and seedlings at Honokōwai, Mauna Kahālāwai (west Maui) (Maui PEPP 2023).
- At least eight founders (maternal lines) from six locations are represented in *ex situ* storage and propagation.

New Threats:

- Drought destruction and degradation of habitat and plants—Maui PEPP reported drought as a threat to populations of *Clermontia oblongifolia* ssp. *mauiensis* at Waiokamilo, Makawao-Olinda, Puohokamoa, West Wailua Iki, and Wailua Nui (Maui PEPP 2020–2023). Over the last 100 years, the Hawaiian Islands have experienced an annual decline in precipitation of over 9 percent, increasing to as much as 15 percent within the last 20 years (U.S. National Science and Technology Council [US-NSTC] 2008, p. 61; Chu and Chen 2005, pp. 4812–4813; Diaz et al. 2005, pp. 1–3). Drought affects plants directly by desiccation. The increase in drought frequency and intensity leads to a self-perpetuating cycle of increase in cover of nonnative plants, increase in the number of fires, and an increase of erosion (U.S. Global Change Research Program [US-GCRP] 2009, pp. 18, 24; Warren 2011). Recent episodes of drought have also driven nonnative deer farther into urban and forested areas in search of food, increasing their negative impacts to native vegetation by herbivory and trampling (Waring 1996, in litt; Nishibayashi 2001, in litt.).

New Management Actions:

- Surveys and inventories—On a survey of Mauna Kahālāwai (west Maui) PEPP discovered a new population of *Clermontia oblongifolia* ssp. *mauiensis* consisting of 3 to 4 mature plants with 6 immatures or seedlings (Maui PEPP 2023). Maui PEPP also monitors 17 small populations on Haleakalā (Maui PEPP 2020–2023).
- Nonnative invasive plant control—Maui PEPP controls nonnative invasive plants at Waiokamilo, Kūhiwa and Honokōwai (Maui PEPP 2023).
- Invertebrate control—Maui PEPP controls slugs at Kūhiwa (Maui PEPP 2023).
- Collection and propagation for genetic storage and reintroduction—

- In 2022, the Lyon Arboretum Seed Conservation Laboratory reported storage of more than 10,000 seeds representing one founder from ‘Ohe‘o; more than 8,000 seeds representing one founder from Pa‘akea; more than 45,000 seeds representing two founders from Makawao-Olinda; 900 seeds representing one founder from Puohokamoa, and more than 800 seeds representing one founder from Nailiilihaele (Lyon Arboretum 2022).
- In 2020, the Olinda Rare Plant Facility (ORPF) reported storage of 4 plants in the nursery representing 1 founder from Puohokamoa (ORPF 2020). From 2021 to 2022, ORPF reported propagation and storage of 43 plants representing 2 founders from Makawao-Olinda, 10 plants representing 1 founder from Nailiilihaele, 2 plants representing 1 founder from Pa‘akea, and 2 plants representing 1 founder from Puohokamoa (ORPF 2023).
- Maui PEPP collected fruit from the recently discovered plants on Mauna Kahālāwai and sent them to Lyon Arboretum for storage and propagation (Maui PEPP 2023). Maui PEPP collects from other populations opportunistically.
- Translocation and Augmentation—Between 2022 and 2023, Maui PEPP reported translocation of a total of 51 individuals at Kopili‘ula, Waiokamilo, Wailua Nui, West Wailua Iki, Hanawī, and Kūhiwa (Maui PEPP 2022, 2023). The Kūhiwa translocation was recently surveyed and found 5 of the 6 translocated plants surviving (Maui PEPP 2023).

Table 1. Status and trends of *Clermontia oblongifolia* ssp. *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 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2011 (5-year review)	4 (Maui)	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 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 3 populations	No
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	No
			Complete genetic storage	Partially, seeds in storage
			3 populations with 50 mature individuals each	No
2023 (5-year review)	ca 33 (Haleakalā, Maui) 4 mature, 6 immatures or seedlings (Mauna Kahālāwai, Maui); Unknown (Lāna‘i)	51, 50 remain at 7 sites	All threats managed in all 3 populations	Partially, few plants fenced at Kūhiwa and ‘Ohe‘o
			Complete genetic storage	Partially, 6 of the 17 populations currently represented
			Natural reproduction at all 3 populations	No
			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 *Clermontia oblongifolia* ssp. *mauiensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, fencing at Kūhiwa and ‘Ohe‘o
Established ecosystem altering invasive plant species degradation of habitat	A, E	Ongoing	Partial, nonnative plant control within enclosure
Degradation and destruction by drought	A	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Predation and herbivory by feral ungulates	C	Ongoing	Partial, fencing at Kūhiwa and ‘Ohe‘o
Predation and herbivory by rodents	C	Ongoing	None
Predation and herbivory by invertebrates	C	Ongoing	Partial, slug control at 1 population
Loss of genetic representation due to hybridization	E	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, seed storage, propagation, and translocation efforts

Synthesis:

Surveys conducted since the last 5-year review for *Clermontia oblongifolia* ssp. *mauiensis* located new individuals, bringing the total known individuals on Haleakalā to 33. A new population was discovered on Mauna Kahālāwai with 4 mature individuals and 6 immatures and seedlings. No new surveys on Lāna‘i have occurred as this species may be extirpated from that island and previously known individuals may have been hybrids. Seed collections have been made representing at least eight founders from six locations and four plants representing one founder are in storage. Translocations are ongoing at Waiokamilo, Wailua Nui, West Wailua Iki, Hanawī, Helele‘ike‘ōhā, Kopili‘ula, and Kūhiwa. Two populations re provided protection by fencing.

Stabilizing (interim), downlisting, and delisting objectives are 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 ssp. *mauiensis* is a short-lived perennial shrub. 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 a nursery or seed bank) collections that are well managed. In addition, a minimum of a total of three populations should be documented on Maui and Lānaʻi where they now occur or occurred historically. Each of these populations must be naturally reproducing (e.g., viable seeds, seedlings) and increasing in number, with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for *Clermontia oblongifolia* ssp. *mauiensis* have not been met. There are no populations totaling more than 50 mature, reproducing individuals (Table 1). Genetic representation is incomplete, and further genetic studies need to be conducted to determine if some individuals may be hybrids. In addition, not all threats are being managed (Table 1, Table 2). Therefore, *C. oblongifolia* ssp. *mauiensis* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

Drought is added as a threat to this taxon. No significant new information regarding the species' biological status has been reported since the last 5-year review in 2018. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2023.

- Surveys and inventories—Continue surveys to determine the current status of all wild individuals and for additional populations of *Clermontia oblongifolia* ssp. *mauiensis* in areas of potentially suitable habitat on Maui and Lānaʻi.
- Ungulate monitoring and control—Construct and maintain exclosures to protect individuals from the negative impacts of habitat destruction and herbivory by ungulates.
- Invasive nonnative plant monitoring and control—Continue control of established ecosystem-altering nonnative invasive plant species at all wild and translocated populations.
- Climate change adaptation strategy—Assess the modeled effects of climate change and determine future landscape needed for the recovery of this subspecies.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for translocation.
- Translocation and augmentation—Continue translocation of individuals into suitable habitat within historic range that is being managed for known threats.
- Build resiliency, redundancy, and representation—Continue to augment wild populations and translocate individuals into suitable habitat that is being managed

for known threats to this species to reduce impacts of herbivory, drought, and low numbers.

- Hybridization impacts—
 - Conduct genetic analyses to determine if the taxon is valid or a result of hybridization with other *Clermontia* species.
 - Conduct pollen studies to evaluate pollen quality and viability, as pollen is often aborted in this subspecies.
- Build resiliency, redundancy, and representation—Increase numbers of populations and individuals throughout historic range to reduce impacts of drought, predation, potential hybridization, and reduced viability.
- Alliance and partnership development—Work with partners and other land managers in planning and implementation of ecosystem-level restoration and management to benefit this subspecies.

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U.S. FISH AND WILDLIFE SERVICE

SIGNATURE PAGE for 5-YEAR REVIEW of *Clermontia oblongifolia* ssp. *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
- No Change in listing status

For Field Supervisor, Pacific Islands Fish and Wildlife Office

_____ Date _____