

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Tetramolopium remyi* (no common name)

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:

Dan Adamski, 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 2022. The review was based on a review of current, available information since the last 5-year review for *Tetramolopium remyi* (USFWS 2018). The evaluation by Daniel Adamski, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator/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/1173>).

Review Analysis:

Please refer to the previous 5-year reviews for *Tetramolopium remyi* published in the Federal Register on September 20, 2011, (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1813.pdf) and (available at https://ecos.fws.gov/docs/tess/species_nonpublish/2666.pdf) October 23, 2018, 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 *T. remyi*.

This short-lived perennial shrub in the Asteraceae (sunflower) family is endangered and is known from the island of Lāna‘i, and historically from Mauna Kahālāwai on Maui. The status and trends for *Tetramolopium remyi* are provided in the tables below.

New Status Information:

- Currently, there is a single wild population at ‘Āwehi on Lāna‘i totaling 11 plants, with 4 mature and 7 immature individuals (PEPP, 2022).
- Currently, there are approximately 13 founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks and plants in a nursery or living collection.

New Threats:

- None

New Management Actions:

- Monitoring and surveys—The Plant Extinction Prevention Program (PEPP) surveys for new populations and monitors the single wild population of *Tetramolopium remyi* on Lāna‘i. Pūlama Lāna‘i also surveys for wild plants and monitors a reintroduced population on Lāna‘i (Pūlama Lāna‘i 2021).
- Ungulate monitoring and management—Fencing is monitored and maintained at the wild and reintroduced population by Pūlama Lāna‘i (Pūlama Lāna‘i 2021).
- Invasive nonnative plant management—Between 2018 and 2022, PEPP controlled nonnative plants around *Tetramolopium remyi* individuals at the wild population at ‘Āwehi on Lāna‘i (PEPP 2022).
- Collection and propagation for genetic storage and reintroduction—
 - The Lyon Seed Conservation Laboratory reports over 99,500 seeds in storage from 13 founder plants from ‘Āwehi and plants grown in cultivation from unknown founders from ‘Āwehi (Lyon Arboretum 2022).
 - National Tropical Botanical Garden (NTBG) reports 6,746 seeds in storage representing 5 founder plants (NTBG 2022).
 - Olinda Rare Plant Facility reports 4 individual plants in greenhouse cultivation representing 3 founders (Olinda Rare Plant Facility 2023).
 - Pūlama Lāna‘i Nursery reports 4 individual plants in greenhouse cultivation representing one founder plant (Pūlama Lāna‘i 2021).
 - Reintroduction/ Augmentation/ Introduction— Pūlama Lāna‘i reintroduced 36 individuals of *Tetramolopium remyi* in 2021 at a new population site at ‘Āwehi on Lāna‘i (Pūlama Lāna‘i 2021).
- Research— Pūlama Lāna‘i collects *Tetramolopium remyi* seeds from greenhouse cultivated plants for use in seed viability research at Lyon Arboretum (Pūlama Lāna‘i 2021).

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1991 (listing)	35	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)	1	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			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)	147	0	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2023 (5-year review)	11	36	All threats managed in all 3 populations	Partially

			Complete genetic storage	Partially
			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 *Tetramolopium remyi* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, wild and reintroduced population fenced
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control within two fenced exclosures
Drought destruction and degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Degradation and destruction by fire	A	Ongoing	Partial, management plan in preparation
Predation and herbivory by feral ungulates	C	Ongoing	Partial, five exclosures constructed
Reduced viability due to low numbers	E	Ongoing	Partial, propagation and seed storage efforts are ongoing

Synthesis:

Currently there are 11 wild individuals of *Tetramolopium remyi* on Lāna‘i, 4 mature individuals and 7 immature individual plants. All individuals are provided protection by fencing and nonnative plant control. Seed collections, propagation, and outplanting are ongoing. This is a substantial decline over the last five years, when 147 individuals were observed.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Lāna‘i Plant Cluster Recovery Plan (USFWS 1995), 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.

Tetramolopium remyi 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 Lāna‘i and Mauna Kahālāwai on Maui, where they now occur or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds and seedlings) with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. Although genetic storage is almost complete (Table 1), there is only a single population, over a 90% decline in population size, and all threats are not being managed (Table 1, Table 2). Therefore, *Tetramolopium remyi* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

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 reiterated for the 5-year review for 2023.

- Surveys and monitoring—Survey for additional populations of *Tetramolopium remyi* in areas of potentially suitable habitat.
- Ungulate monitoring and control—Continue to maintain fenced exclosures to protect individuals from the negative impacts of browsing by ungulates.
- Invasive nonnative plant monitoring and control—Continue control of established ecosystem-altering nonnative invasive plant species, and those that compete with *Tetramolopium remyi* within and around all wild and translocated populations.
- Fire prevention and control—Continue to develop and implement fire prevention management plans and monitor populations after fire occurrence.
- Climate change adaptation strategy—Research suitability of habitat for viability of species, including where to conduct translocations in the future due to the impacts of climate change, including increasing temperatures, periods between rain events, and frequency and intensity of hurricanes. Additional management

actions may be needed, such as locating microsites that overlap with current and future climate envelopes for translocation efforts.

- Predator and herbivore monitoring and control—Determine and implement effective methods for rodents and slugs around wild and translocated populations.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for reintroduction.
- Build resiliency, redundancy, and representation — Increase species' viability through habitat restoration, threat control, and reintroduction and translocation. Continue reintroduction into suitable habitat that is being managed for known threats to this species to reduce impacts of erosion, treefall, flooding, and hurricanes.
- 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:

- [HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.
- 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.
- [NTBG] National Tropical Botanical Garden. 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.
- [ORPF] Olinda Rare Plant Facility. 2023. 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.
- [PEPP] 2022. Plant Extinction Prevention Program fiscal year 2022 interim performance report (October 1, 2021-September 30, 2022), Cooperative Agreement F19AC00532 (Interim report), U.S. Fish and Wildlife Service CFDA Program #15.657 Endangered Species Conservation—Recovery Implementation Funds, University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 50 pp.
- Pūlama Lāna‘i. 2021. Pūlama Lāna‘i report to Department of Forestry and Wildlife Hawai‘i, Threatened and Endangered Species Report.
- [USFWS] U.S. Fish and Wildlife Service. 1995. Lanai plant cluster recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. 138 pages.
- [USFWS] 2012. *Tetramolopium remyi* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/tess/species_nonpublish/1813.pdf.
- [USFWS] 2018. *Tetramolopium remyi* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/tess/species_nonpublish/2666.pdf.
- [USFWS] 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.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Tetramolopium remyi* (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

For Field Supervisor, Pacific Islands Fish and Wildlife Office

_____ Date _____