5-YEAR REVIEW

Short Form Summary

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

Current Classification: Threatened

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:

Daniel 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 rockii* (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/5215*).

Review Analysis:

Please refer to the previous 5-year reviews for *Tetramolopium rockii* published in the Federal Register on September 20, 2011. (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1814.pdf*) and October 23, 2018 (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2667.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 *T. rockii*.

This short-lived perennial shrub in the Asteraceae (sunflower) family is threatened and endemic to Moloka‘i. The status and trends for *Tetramolopium rockii* are provided in the tables below.

New Status Information:

- At the time of the previous review in 2018, there were at least 10,000 individuals of *Tetramolopium rockii var. rockii*, and 2,000 individuals of *Tetramolopium rockii* var. *calcisabulorum* (USFWS 2018). Currently, there are approximately 7,000-10,000 individuals of *Tetramolopium rockii* var. *rockii*, and 1,000-2,000 of *Tetramolopium rockii* var. *calcisabulorum* along the northwest coast of Molokaʻi from Kaʻa Gulch to Kahinaʻakalani, and from ʻĀlau to Makaliʻi in the Kalaupapa National Historical Park (Bakutis, pers. comm. 2023).
- Currently, there are approximately two known founder lines represented in *ex situ* storage and propagation collections, as well as additional founders of unknown origins from Molokaʻi. These collections include seeds in seed banks (Lyon Arboretum 2022; National Tropical Botanical Garden (NTBG) 2022).

New Threats:

- None

New Management Actions:

- Population monitoring and surveys—The Plant Extinction Prevention Program on Molokaʻi surveys for wild individuals of *Tetramolopium rockii* (Bakutis, pers. comm. 2023).
- Ungulate monitoring and control—A portion of the population at Moʻomomi Preserve area is fenced; however, axis deer are still present within the fenced area and heavy impacts the habitat have recently been observed (Bakutis, pers. comm. 2023).
- Collection and propagation for genetic storage and reintroduction—
  - The Lyon Arboretum Seed Laboratory reports 2,700 seeds in storage from a cultivated plant that originated from Moʻomomi Preserve on Molokaʻi (Lyon Arboretum 2022).
  - NTBG reports 2,100 seeds in storage from two founders from Moʻomomi, 226 seeds from one founder from Kalaupapa, and an unknown number of seeds in storage from two additional founders (NTBG 2022). However, a majority of the seeds have been in storage for over 30 years, and the viability of the seeds is unknown.

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1992 (listing)	174,000	0	Protected from all threats	No

			Total number of individuals sustained or exceeded for five years	No
			Species-specific recovery no longer required	No
2011 (5-year review)	1,000's	0	Protected from all threats	Partially
			Total number of individuals sustained or exceeded for five years	Unknown
			Species-specific recovery no longer required	No
Date	**No. wild individuals**	**No. outplanted**	***Preventing Extinction Criteria identified by HPPRCC**	***Preventing Extinction Criteria Completed?**
2018 (5-year review)	1,000's	0	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all X populations	No
			Complete genetic storage	Partially
			3 populations with 150 mature individuals each	Yes
2023 (5-year review)	8,000-12,000	0	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	Yes

* 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 rockii* 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 Mo‘omomi PR and Kalaupapa NHP
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control at Mo‘omomi PR and Kalaupapa NHP
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Predation and herbivory by feral ungulates	C	Ongoing	Partial, fencing at Mo‘omomi PR and Kalaupapa NHP
Predation and herbivory by rats	C	Ongoing	None

Synthesis:
Currently, there are approximately 7,000-10,000 individuals of *Tetramolopium rockii* var. *rockii*, and 1,000-2,000 of *Tetramolopium rockii* var. *calcisabulorum* on Moloka‘i, a slight decline from previous estimates in 2018. Seed collections are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the Moloka‘i Plant Cluster (USFWS 1996) 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 rockii is a short-lived perennial climbing 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 Moloka‘i 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 150 mature, reproducing individuals per population.

The preventing extinction goals for the species have not been met (Table 1). Although there are at least three subpopulations with greater than 150 individuals, it is unknown how many individuals matured, all threats are no being managed, and genetic storage is not complete (Table 2). Therefore, *Tetramolopium rockii* meets the definition of Threatened as it is likely to become an endangered species within the foreseeable future throughout all of a significant portion of 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 updated or reiterated for the 5-year review for 2023.

- Surveys and monitoring— Survey for additional populations of *Tetramolopium rockii* at historical populations and 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 at historical populations within and around all wild populations.
- 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 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 attempts at 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.

[USFWS] U.S. Fish and Wildlife Service. 1996. Recovery plan for the Molokai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 153 pages.

[USFWS] 2011. *Tetramolopium rockii* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/1814.pdf.*

[USFWS] 2018. *Tetramolopium rockii* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/2667.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.

Personal Communication:

Bakutis, A. 2023. Moloka‘i Coordinator, Plant Extinction Prevention Program, Moloka‘i, Hawai‘i. E-mail to Lauren Weisenberger, U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, dated May 30, 2023. Subject: 5-year review questions for *Tetramolopium rockii* .

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Tetramolopium rockii* (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**

LAUREN WEISENBERGER Digitally signed by LAUREN WEISENBERGER Date: 2023.08.17 18:49:54 -10'00'

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