

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Tetramolopium lepidotum* subsp. *lepidotum*
(no common name)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 58 species in Washington, Oregon, California, and Hawaii. Federal Register 75(226):71726-71729.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawaii

Name of Reviewer(s):

Jiny Kim, Fish and Wildlife Biologist, PIFWO

Daniel Clark, Oahu, Kauai, Northwest Hawaiian and American Samoa Islands Team
Manager, PIFWO

Marie Brueggemann, Plant Recovery Coordinator, PIFWO

Recovery Program Lead, PIFWO

Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on January 31, 2012. The review was based on a review of current, available information since the last five-year review for *Tetramolopium lepidotum* subsp. *lepidotum* (USFWS 2009). The National Tropical Botanical Garden provided an initial draft of portions of the five-year review and recommendations for conservation actions needed prior to the next five-year review. The document was reviewed by the Fish and Wildlife Biologist, Islands Team Manager, and Plant Recovery Coordinator, followed by the Recovery Program Lead. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

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 *Tetramolopium lepidotum* subsp. *lepidotum* published on July 21, 2009 (available at http://ecos.fws.gov/docs/five_year_review/doc2431.pdf) for a complete review of the species' status, threats, and management efforts. No new information regarding the species' biological status have come to light since listing to warrant a change in the Federal listing status of *T. lepidotum* subsp. *lepidotum*.

This short-lived shrub is endangered and occurs on Oahu. The current status and trends for *Tetramolopium lepidotum* subsp. *lepidotum* are provided in the tables below.

New status information:

- The population at Ekahanui has 40 mature and 90 immature wild individuals (Oahu Army Natural Resources Program [OANRP] 2012).
- The population in Puu Kumakalii has 17 mature wild individuals (OANRP 2012).

Overall, this represents a decline from the approximately 250 individuals reported in the last five year review to 147 individuals currently.

New threats:

- Climate change - Climate change may also pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) funded climate modeling that will help resolve these spatial limitations. High spatial resolution climate outputs are expected in 2013.

New management actions:

- Captive propagation for genetic storage and reintroduction
 - The Harold L. Lyon Arboretum (2012) has 122,020 *Tetramolopium lepidotum* subsp. *lepidotum* seeds from 23 separate accessions in storage.
 - The National Tropical Botanical Garden (NTBG) has a number of seed accessions in storage from collections made in the 1990s, most recently from 1998. Seed viability of these collections is unknown. More recent collections have been grown in the nursery from subsequent generations of plants sown and grown in the nursery for a number of years, but as *Tetramolopium lepidotum* subsp. *lepidotum* behaves like an annual, repeated successive propagations have been more difficult over time and likely have selected for plants more suited to the nursery than their natural habitat. There are no plants remaining in the nursery at this time (NTBG 2011; M. Clark, NTBG, pers. comm. 2012.)

Synthesis:

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Oahu (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial.

Tetramolopium lepidotum subsp. *lepidotum* is a short lived perennial, and to be considered stable, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (at other than the plant's natural location, such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on the island of Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The stabilization goals for this species have not been met (see Table 1), since no wild population contains 50 or more mature individuals. In addition, all threats are not being sufficiently managed (Table 2). Therefore, *Tetramolopium lepidotum* subsp. *lepidotum* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Captive propagation for genetic storage and reintroduction - Collect cuttings or seed from tagged individuals, keeping close track of the maternal source for use in *ex situ* propagation.
- Reintroduction / translocation
 - While surveying for new populations or reintroduced populations, determine which sites are least invaded by invasive introduced plant species and which appear to have the highest likelihood of maintaining new reintroductions.
 - Reintroduce the species back into its known historical range.
- Ungulate exclosures – Construct, maintain, and monitor ungulate-proof exclosures around each population.
- Ecosystem-altering invasive plant species control – Control invasive introduced plant species around all populations.
- Predator / herbivore control – Implement effective control methods for rodents.
- Surveys / inventories – Survey geographical and historical range for a thorough current assessment of the species status.
- Site / area / habitat protection – Develop and implement effective measures to reduce the impact of landslides and flooding and military activities.
- Fire protection – Develop and implement fire management plans for all wild and reintroduced populations.
- Alliance and partnership development - Initiate planning and contribute to implementation of ecosystem-level management and restoration to benefit this species.
- Genetic research - Implement genetic studies to assess viability of remaining populations.
- Population biology research – Study *Tetramolopium lepidotum* subsp. *lepidotum* with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.
- Threats research – Assess the modeled effects of climate change on this species, and use the results to determine future landscape needed for the recovery of the species.

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

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1994 (listing)	15	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	44-63	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	<100	3	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 50 mature individuals each	No
2009 (5-yr review)	~250	6	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2013 (5-yr review)	57 mature, 90 immature – total 147	0	All threats managed in all 3 populations	Partially (see Table 2)
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No

Table 2. Threats to *Tetramolopium lepidotum* subsp. *lepidotum* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – Degradation of habitat by goats and pigs	A, D, E	Ongoing	Partially
Established ecosystem-altering invasive plant species	A, E	Ongoing	Partially
Scale insects spread by ants	C	Ongoing	No
Rockslides, and landslides	A, E	Ongoing	No
Drought	E	Ongoing	No
Low numbers	E	Ongoing	No
Climate change	A, E	Increasing	No

References:

See previous 5-year review for a full list of references (USFWS 2009). Only references for new information are provided below.

Harold L. Lyon Arboretum. 2012. Micropropagation database and seed storage databases. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

[NTBG] National Tropical Botanical Garden. 2011. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act, 15 pages. Unpublished.

[OANRP] Oahu Army Natural Resources Program. 2012. Oahu implementation plan - population unit status; *Tetramolopium lepidotum* subsp. *lepidotum*, 1page. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages, plus appendices.

[USFWS] U.S. Fish and Wildlife Service. 2009. *Tetramolopium lepidotum* subsp. *lepidotum* (no common name) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 10 pages. Available online at http://ecos.fws.gov/docs/five_year_review/doc2431.pdf.

Personal Communications

Clark, Margaret. 2012. Seed Bank Manager, National Tropical Botanical Garden. Memo to the Record, dated December 18, 2012. Subject: *Tetramolopium lepidotum* subsp. *lepidotum*.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Tetramolopium lepidotum* subsp.
lepidotum (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

acting deputy

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Date *2013-08-15*