

Tetramolopium lepidotum ssp. lepidotum
(No common name)

**5-Year Review
Summary and Evaluation**

**U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii**

5-YEAR REVIEW

Species reviewed: *Tetramolopium lepidotum* ssp. *lepidotum* (No common name)

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5-YEAR REVIEW
***Tetramolopium lepidotum* ssp. *lepidotum*/No common name**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

Region 1, Endangered Species Program, Division of Recovery, Jesse D'Elia, (503) 231-2071

Lead Field Office:

Pacific Islands Fish and Wildlife Office, Gina Shultz, Deputy Field Supervisor, (808) 792-9400

Cooperating Field Office(s):

N/A

Cooperating Regional Office(s):

N/A

1.2 Methodology used to complete the review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) beginning on March 8, 2007. The Bernice P. Bishop Museum provided most of the updated information on the current status of *Tetramolopium lepidotum* susp. *lepidotum* and also provided recommendations for conservation actions needed prior to the next 5-year review. The evaluation of the status of the species was prepared by the lead PIFWO biologist and reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species, and Deputy Field Supervisor, before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

USFWS. 2007. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 71 species in Oregon, Hawaii, Commonwealth of the Northern Mariana Islands, and Territory of Guam. Federal Register 72(45):10547-10550.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1991. Endangered and threatened wildlife and plants; Determination of endangered status for 26 plants from the Waianae mountains, Island of Oahu, Hawaii; final rule. Federal Register 56(209) 55770-55786.

Date listed: October 29, 1991

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

1.3.3 Associated rulemakings:

USFWS. 2003. Endangered and threatened wildlife and plant; final designations or nondesignations of critical habitat for 101 plant species from the Island of Oahu, HI; final rule. Federal Register 68(116) 35949-36406.

1.3.4 Review History:

Species status review [FY 2008 Recovery Data Call (September 2008)]: Stable

Recovery achieved:

1 (0-25%) (FY08 Recovery Data Call)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

3

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Recovery Plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages; plus appendices.

Date issued: August 10, 1998

Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Yes
 No

2.1.2 Is the species under review listed as a DPS?

Yes
 No

2.1.3 Was the DPS listed prior to 1996?

Yes
 No

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes
 No

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes
 No

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

Yes
 No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes
 No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

Yes

___ *No*

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery?

 X *Yes*

___ *No*

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

A synthesis of the threats (Factors A, C, D, and E) affecting this species is presented in section 2.4. Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for the Oahu plants (USFWS1998), based on whether the species is an annual, or short-lived perennial (fewer than 10 years), or a long-lived perennial. *Tetramolopium lepidotum* ssp. *leptidotum* is a short-lived perennial, and to be considered stable, the taxon must be managed to control threats (*e.g.* fenced, weeding, etc.) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

This recovery action has been partially met.

For downlisting, a total of five to seven populations of each taxon should be documented on Oahu and at least one other island where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 300 mature individuals per population for short-lived perennials. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery action has not been met.

A total of eight to ten populations of each taxon should be documented on Oahu and at least one other island where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 300 mature individuals per population for short-lived

perennials. Each population should persist at this level for a minimum of five consecutive years.

This recovery action has not been met.

2.3 Updated Information and Current Species Status

In addition to the status summary table below, information on the species' status and threats was included in the final critical habitat rule referenced above in section 1.3.3 ("Associated Rulemakings") and in section 2.4 ("Synthesis") below, which also includes any new information about the status and threats of the species.

Table 1. Status of *Tetramolopium lepidotum* ssp. *lepidotum* from listing through 5-year review.

Date	No. wild individuals	No. Outplanted	Stability criteria identified in Recovery Plan	Downlisting criteria completed?
1994 (listing)	15	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 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 25 mature individuals each	No
2003 (critical habitat)	< 100	3	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	No
2008 (5-year review)	~ 250	6	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No

2.3.1 Biology and Habitat [see note in section 2.3]

2.3.1.1 New information on the species' biology and life history:

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

2.3.1.4 Taxonomic classification or changes in nomenclature:

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

2.3.1.7 Other:

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms) [see note in section 2.3]

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

2.3.2.3 Disease or predation:

2.3.2.4 Inadequacy of existing regulatory mechanisms:

2.3.2.5 Other natural or manmade factors affecting its continued existence:

2.4 Synthesis

Historically, *Tetramolopium lepidotum* ssp. *lepidotum* was found along almost the entire length of the Waianae Mountains, and was last seen on Lanai in 1928 (USFWS 1991). At the time of Federal listing, approximately 15 plants were known at five locations. Currently, about 250 individuals, consisting of 75 mature and 175 seedlings, are within a single population located along the Ekahanui crestline (The Nature Conservancy 2006; USFWS 2008). The Nature Conservancy of Hawaii surveyed historical locations of the taxon in 2006, but only found new individuals at the extant Ekahanui crestline area (The Nature Conservancy 2006). Six individuals, resulting from previous outplantings, are also known to occur near a fenced enclosure within Honouliuli Preserve (USFWS 1998, 2008).

Tetramolopium lepidotum ssp. *lepidotum* is a short-lived perennial, with a two- to four-year lifespan (The Nature Conservancy 2006). The taxon is very easy to propagate (Lilleeng-Rosenberger 2005; The Nature Conservancy 2006). Peak flowering occurs in the spring, with achenes maturing between December and March (The Nature Conservancy 2006). The taxon is capable of self-fertilization, with high rates of viable seed set. Seeds have the potential for being wind-dispersed, but tend to fall near the parent plants. Recruitment has been observed where seeds have good soil contact on bare ground (The Nature Conservancy 2006). Mini-ledges and small rock outcrops occupy most of the preferred micro-habitat for the species. Northernmost facing cliff areas, notably the wettest areas have the greatest recruitment at the Ekahanui crestline.

While there have been a number of genetic studies that include *Tetramolopium lepidotum* ssp. *lepidotum* (e.g., (Lowrey and Crawford 1985; Lowrey *et al.* 2001; Okada *et al.* 1997), there have not been any extensive studies of the genetic variation within the taxon.

The primary threat to the habitat of the taxon is competition from invasive introduced plant species such as *Melinis minutiflora* (molasses grass), and secondarily from *Conyza bonariensis* (horsetail weed), *Schinus terebinthifolius* (Christmasberry) and *Erigeron karvinskianus* (daisy fleabane) (Factor E) (The Nature Conservancy 2006). Feral ungulates, namely goats (*Capra hircus*) and pigs (*Sus scrofa*) also continue to threaten the taxon and its surrounding habitat through their degradation of habitat (Factors A and D). Young seedlings of the taxon are susceptible to scales spread by various species of ants (Factor C) (The Nature Conservancy 2006). The only extant population of *Tetramolopium lepidotum* ssp. *lepidotum* is susceptible to rockslides and large landslides

(Factor E) (The Nature Conservancy 2006). Drought is a major limiting factor for recruitment and survival of mature plants (Factor E). Fire is a low threat risk given the remote location, moisture level and ongoing grass control in the area (Factor E).

The National Tropical Botanical Garden (2008) has only 250 seeds in storage.

The stabilization and recovery goals for this species have not been met, as only one population of 250 individuals is known and not all threats are being managed. Therefore, *Tetramolopium lepidotum* ssp. *lepidotum* meets the definition of endangered as it remains in danger of extinction throughout its range.

3.0 RESULTS

3.1 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number: N/A

Brief Rationale:

3.3 Listing and Reclassification Priority Number: N/A

Reclassification (from Threatened to Endangered) Priority Number: _____

Reclassification (from Endangered to Threatened) Priority Number: _____

Delisting (regardless of current classification) Priority Number:

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Continue collection of genetic resources for storage, future propagation and reintroducing into protected suitable habitat within historical range.

- Establish additional populations within protected historical range and suitable habitat.
- Expand enclosure fences to protect all individuals from the negative impacts of feral ungulates, and eradicate introduced invasive plant species within the enclosures.
- Determine impacts from and control methods for ant predation.
- Survey geographical and historical range for a thorough current assessment of the species.
- Assess genetic variability within wild and outplanted individuals.

5.0 REFERENCES

- Lilleeng-Rosenberger, K. E. 2005. Growing Hawaii's Native Plants. Mutual Publishing, Honolulu, HI.
- Lowrey, T.K., and D.J. Crawford. 1985. Allozyme divergence and evolution in *Tetramolopium* (Compositae: Astereae) on the Hawaiian Islands. *Systematic Botany* 10:64-72.
- Lowrey, T.K., C.J. Quinn, R.K. Taylor, R. Chan, R.T. Kimball, and J.C. De Nardi. 2001. Molecular and morphological reassessment of relationships within the *Vittadinia* group of Astereae (Asteraceae). *American Journal of Botany* 88:1279-1289.
- National Tropical Botanical Garden. 2008. 2008 report on controlled propagation of listed and candidate species, as designated under the U.S. endangered species act. National Tropical Botanical Garden, Lawai, HI. Unpublished.
- Okada, M., R. Whitkus, and T.K. Lowrey. 1997. Genetics of adaptive radiation in Hawaiian and Cook Islands species of *Tetramolopium* (Asteraceae; Astereae). I. Nuclear RFLP marker diversity. *American Journal of Botany* 84:1236-1246.
- The Nature Conservancy. 2006. Landowner Incentive Program, 2006 final report; rare plant reintroduction and management, Honouliuli Preserve. Honolulu, Hawaii. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; Determination of endangered status for 26 plants from the Waianae mountains, Island of Oahu, Hawaii; final rule. *Federal Register* 56(209) 55770-55786.

[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. 2003. Endangered and threatened wildlife and plants; final designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, HI; final rule. Federal Reg. 68:35950–36406.

[USFWS] U.S. Fish and Wildlife Service. 2008b. Rare plant tracking database. Pacific Islands Fish and Wildlife Office, Honolulu, HI. Accessed on April 28, 2008. Unpublished.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Tetramolopium lepidotum* ssp. *lepidotum*
(No common name)

Current Classification: _____

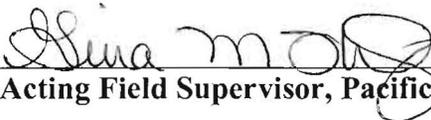
Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

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Marie Bruegmann, Plant Recovery Coordinator
Marilet Zablan, Recovery Program Leader and acting Assistant Field
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Gina Shultz, Deputy Field Supervisor

Approved  Date 21 July 2009
Acting Field Supervisor, Pacific Islands Fish and Wildlife Office