5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Trematolobelia singularis* (no common name)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 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.

Lead Region/Field Office:

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

Name of Reviewer(s):

Christian Torres-Santana, Pacific Islands Fish and Wildlife Office, Student Trainee Biologist
Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species

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 (USFWS) beginning on March 7, 2008. The review was based on the proposed rule and final critical habitat designation for *Trematolobelia singularis* and other species from the island of Oahu, as well as a review of current, available information (USFWS 2003). The Bernice P. Bishop Museum provided an initial draft of portions of the five-year review and they also provided recommendations for conservation actions needed prior to the next five-year review. The evaluation of the status of the species was prepared by our 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 before submission to the Field Supervisor for approval.

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).

Application of the 1996 Distinct Population Segment (DPS) Policy:

This Policy does not apply to plants.

Review Analysis:

Please refer to the final critical habitat designation for *Trematolobelia singularis* published in the Federal Register on June 17, 2003 (USFWS 2003) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species' biological status have come to light since listing to warrant a change in the Federal listing status of *T. singularis*.

At the time of Federal listing, approximately 65 plants were known from three populations from Moanalua-Tripler Ridge summit to Puu Keahiakahoe, Konahuanui, and Puu Lanipo, all in the southern Koolau Mountains of Oahu (USFWS 1996). In 2003, the USFWS critical habitat designation reported a total of 165 individuals occurring within 3 populations. Currently, the totals are 133 mature individuals and more than 50 immature individuals and seedlings in 4 populations (Plant Extinction Prevention Program 2008). The Konahuanui population is comprised of 35 mature individuals and no immature individuals or seedlings. The Waiawa population has 35 mature individuals and 20 or more immature individuals and seedlings. A third population on Wailupe summit was discovered in 2006, and has 8 mature individuals and 2 immature individuals. A fourth population on Moanalua summit consisting of 35 mature individuals and 25 or more immature individuals and seedlings was discovered in 2007. All populations are healthy, with flowering and fruiting individuals. New populations of *Trematolobelia singularis* continue to be discovered, but extant population numbers continue to decline despite the observation of seed set and seedling recruitment (Plant Extinction Prevention Program 2008; USFWS 2008). Little is known about the biology and life history of *Trematolobelia singularis*, or the genetic variation within the extant populations (USFWS 1996, 1998, 2003).

The main threats to *Trematolobelia singularis* include habitat degradation by feral pigs (*Sus scrofa*) (Factors A and D), predation of the fleshy fruit by introduced rats (*Rattus* spp.) and invertebrate species such as slugs (Factor C), which are a potential threat to the viability of the species. Other threats include competition by the introduced invasive plant species *Clidemia hirta* (Koster's curse) (Factor E), and/or reduced reproductive vigor due to the small number of extant populations (Factor E) (USFWS 1996, 1998, 2003). The Moanalua population occurs close to electrical towers and hiking trails, and may be impacted by human traffic (Factor E) (Plant Extinction Prevention Program 2008).

In addition to all of the other threats, species such as *Trematolobelia singularis* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes, landslides, flooding and disease outbreaks (Factor E). When considered on their own, the natural processes associated with being a single island endemic do not affect *T. singularis* to such a degree that it is threatened or endangered with extinction in the foreseeable future, but these natural processes can exacerbate the threat from anthropogenic factors, such as habitat loss for human development or predation by introduced species (Factor E) (USFWS 1996, 1998).

To safeguard existing genetic material, propagation for genetic storage and reintroduction is occurring at several facilities. The Center for Conservation Research and Training Seed Storage Laboratory (2008) has over 20,000 seeds in storage from 17 different individuals, representing all 4 populations. The University of Hawaii's Lyon Arboretum Micropropagation Laboratory (2008) has 8 individuals in micropropagation from 3 of the 4 populations. National Tropical Botanical Garden (2008) has 2,700 seeds in storage.

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. *Trematolobelia singularis* is a short-lived perennial, and to be considered stabilized, which is the first step in recovering the species, 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 as no population has more than 50 mature individuals and the threats are not currently being managed (see Table 1). Therefore, *Trematolobelia singularis* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Continue collection of genetic resources for storage, future propagation, and reintroducing into protected suitable habitat within historical range.
- Construct exclosure fences to protect individuals from the negative impacts of feral pigs, and eradicate introduced invasive plant species within the exclosures.
- Augment current natural populations to increase numbers of individuals.
- Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Survey geographical and historical range for a thorough current assessment of the species.
- Determine and implement adequate rat and slug control methods.
- Assess genetic variability within extant populations.
- Study *Trematolobelia singularis* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.

References:

Center for Conservation Research and Training Seed Storage Facility. 2008. Seed conservation lab database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Harold L. Lyon Arboretum Micropropagation Laboratory. 2007. Micropropagation database. University of Hawaii at Manoa. Unpublished.

National Tropical Botanical Garden. 2008. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished.

Plant Extinction Prevention Program. 2008. Section 6 annual performance report for endangered plant restoration and enhancement - Plant Extinction Prevention (formerly Genetic Safety Net), Fiscal Year 2008 (July 1, 2007 – June 30, 2008). Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife. 113 pages. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered status for twenty-five plant species from the Island of Oahu, Hawaii; final rule. Federal Register 61(198):53089 -53108.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, OR. 270 pages, plus appendices.

[USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants: final designation or nondesignation of critical habitat for 101 plant species from the island of Oahu, HI: final rule. Federal Register 68(116):35949-35998.

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

Table 1. Status of *Trematolobelia singularis* from listing through 5-year review.

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 – Listing	~ 65	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Unknown
1998 – recovery plan	~ 165	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially
2003 – critical habitat	~ 165	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially
2008 – 5-yr review	133	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

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SIGNATURE PAGE for 5-YEAR REVIEW of *Trematolobelia singularis*

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

Acting Field Supervisor, Pacific Islands Fish and Wildlife Office

Patrick Sousa

Date 6/2/09