# 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. 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands . Federal Register 87(90): 28031–28034, May 10, 2022.

**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, PIFWO
Megan Laut, Recovery Program 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 2023. The review was based on a review of current, available information since the last 5-year review for *Trematolobelia singularis* (USFWS 2019). The evaluation by Daniel Adamski, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Recovery Program 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/2537*).

**Review Analysis:**

Please refer to the previous 5-year reviews for *Trematolobelia singularis* published in the Federal Register on June 2, 2009, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1367.pdf*), on August 15, 2013, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2104.pdf*), on September 30, 2019, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2900.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. singularis*.

This short-lived perennial shrub in the Campanulaceae (bellflower) family is endangered and endemic to O‘ahu. The current status and trends for *Trematolobelia singularis* are provided in the tables below.

New Status Information:

- Currently, there is only one population (Eleao-Waimano Summit) totaling approximately 22 individuals that has been monitored in the past 10 years. (Keir 2016; Togikawa et. al. 2022; PEPP 2023). There are four additional populations of *Trematolobelia singularis* when last monitored had an additional 133 to 153 individuals at the Waiāhole to Waiawa summit, Moanalua, Kōnāhuanui, and Wailupe to Hawaiiloa summit, but their current status is unknown (Togikawa et. al. 2022; Plant Extinction Prevention Program [PEPP] 2023).
- Currently, approximately 15 founder lines are represented in *ex situ* storage, including seeds in seed banks, explants in micropropagation, and plants in a nursery or living collection (Lyon Arboretum 2023; Oʻahu Nursery 2023).

New Threats:

- None

New Management Actions:

- Monitoring and surveys— Plant Extinction Prevention Program (PEPP) monitors individuals of *Trematolobelia singularis* in the Koʻolau mountains of Oʻahu (Togikawa et. al. 2022; PEPP 2023).
- Ungulate monitoring and management — Fences and ungulates are monitored by the Army Natural Resources Program on Oʻahu [ANRPO], protecting individuals of *Trematolobelia singularis* in the Koʻolau mountains of Oʻahu (ANRPO 2023, Appendix 4-2).
- Control of predation and herbivory by rats— PEPP controls rats around one population of *Trematolobelia singularis* using rat traps (Togikawa et. al. 2022).
- Slug control— PEPP controls slugs around one population of *Trematolobelia singularis* with applications of molluscicide (Togikawa et. al. 2022).
- Collection and propagation for genetic storage and reintroduction—
    - PEPP collected approximately 30 fruits from three individuals at Waiāhole to Waiawa summit to be used for *ex situ* storage (Togikawa et. al. 2022).
    - Lyon Arboretum Micropropagation Laboratory reports 37 explants in micropropagation representing two founders, and Lyon Arboretum Seed Conservation Laboratory reports over 28,000 seeds in storage representing 15 founders (Lyon Arboretum 2023).
    - The Oʻahu Nursery reports 145 individual plants in propagation representing three founders (Oʻahu Nursery 2023).

**Table 1. Status and trends of *Trematolobelia singularis* from listing through current 5-year review. Table 1a shows progress according to Interim Stabilization Goals; Table 1b shows progress according to Preventing Extinction Goals**.

**Table 1a.**

| Date | No. wild individuals | No. Outplanted | Stability Goals identified in Recovery Plan | Stability Goals Completed? |
|---|---|---|---|---|
| **1996 (Listing)** | 165 | 0 | All threats managed in all 3 populations | No |
| | | | Complete genetic storage | No |
| | | | 3 populations with 50 mature individuals each | Unknown |
| **2009 (5-year review)** | 133 | 0 | All threats managed in all 3 populations | No |
| | | | Complete genetic storage | Partial |
| | | | 3 populations with 50 mature individuals each | Partial |
| **2013 (5-year review)** | 20 Mature, 92 Immature, total of 112 | 0 | All threats managed in all 3 populations | No |
| | | | Complete genetic storage | Partial |
| | | | 3 populations with 50 mature individuals each | No |

**Table 1b.**

| Date | No. wild individuals | No. outplanted | *Preventing Extinction Criteria identified by HPPRCC | *Preventing Extinction Criteria Completed? |
|---|---|---|---|---|
| **2019 (5-year review)** | 133 | 0 | All threats managed in all 3 populations | No |
| | | | Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations | No |
| | | | Complete genetic storage | Partial |
| | | | 3 populations with 50 mature individuals each | Partial |
| **2024 (5-year review)** | ≥22 | 0 | All threats managed in all 3 populations | Partial |
| | | | Complete genetic storage | Partial |
| | | | Natural reproduction at all 3 populations | Unknown |
| | | | 3 populations with 200 mature individuals each | Partial |

* 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 *Trematolobelia singularis* and ongoing conservation efforts**.

| Threat | Listing factor | Current Status | Conservation/ Management Efforts |
|---|---|---|---|
| Degradation and destruction of habitat by feral ungulates | A | Ongoing | Partial, fencing, and ungulate exclosures |
| Established ecosystem altering invasive plant species degradation of habitat | A | Ongoing | None |
| Climate change degradation or loss of habitat, including hurricanes | A | Ongoing | None |
| Fire destruction and degradation of habitat | A | Ongoing | None |

| | | | |
|---|---|---|---|
| Landslides destruction and degradation of habitat | A | Ongoing | None |
| Ungulate predation and herbivory | C | Ongoing | Partial, fencing, and ungulate exclosures |
| Rodent predation and herbivory | C | Ongoing | Partial, control at one population |
| Invertebrate predation and herbivory | C | Ongoing | Partial, control at one population |
| Competition with established invasive plants | E | Ongoing | None |
| Human disturbance—Hikers and military activity | E | Ongoing | Partial, some fencing |
| Low numbers | E | Ongoing | Partial, some seed collections and propagation |

**Synthesis:**
Currently there are at least 22 wild individuals of *Trematolobelia singularis* in a single population on Oʻahu. There are four other populations with unknown numbers of individuals that have not been monitored in at least 10 years, and at the time estimated to be approximately 150 individuals. Some individuals are provided protection by fencing, rat control, slug control, and ungulate control. Seed collections and propagation are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the Oʻahu Plants (USFWS 1998) and have been updated according to the draft revised recovery objective guidelines developed by the Hawaiʻi 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.

*Trematolobelia singularis* is a short-lived perennial shrub. It is also monocarpic, so when a branch reproduces, it dies after seed dispersal. As individuals in this species are primarily single-stemmed, we have adjusted the goals for the number of reproducing individuals established for other monocarpic species. Therefore, 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 Oʻahu where they now

occur or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, seedlings) with a minimum of 200 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. Genetic storage is not complete (Table 1), all threats are not being managed (Table 1, Table 2), and there are not three populations totaling at least 200 individuals. Therefore, *Trematolobelia singularis* 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 2019. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2024.

- Surveys and inventories—
  - Continue to monitor known populations of *Trematolobelia singularis*.
  - Determine suitable locations for reintroductions.
- Ungulate monitoring and control—Construct fenced exclosures to protect individuals from the negative impacts of browsing by ungulates.
- Invasive nonnative plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species, and those that compete with *Trematolobelia singularis*.
- Site and habitat protection—Develop and implement effective threat control and habitat protection measures to reduce the impact of landslides, hikers, and military activities.
- Fire prevention and control—Develop and implement fire prevention management plans.
- 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 increasing frequency and intensity of hurricanes. Additional management actions may be needed, such as locating key microsites that overlap with current and future climate envelopes for translocation efforts.
- Predator and herbivore monitoring and control—Determine and continue to implement effective methods to control rats and slugs.
- 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 into suitable habitat that is being managed for known threats to this species to reduce impacts of climate change degradation and nonnative plant competition.
- 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:**

[ANRPO] Army Natural Resource Program on Oʻahu. 2023. Appendices to the Status report for the Mākua and Oʻahu Implementation Plans, Army Natural Resources Program, Oʻahu, Office of the Vice President for Research and Innovation, University of Hawaiʻi.

[HBMP] Hawaii Biodiversity and Mapping Program. 2010. Plant species GIS data and Access database.

[HPPRCC] Hawaiʻi and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

Keir, M. 2016. Trematolobelia singularis. The IUCN Red List of Threatened Species 2016: e.T80221174A80221198. http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T80221174A80221198.en.

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Togikawa, K; S. Ching-Harbin; J. Serrano; M. Thomas; D. Sischo; M. Tsuneshige; C. Schmidt. 2022. Hawaiʻi Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2023: Plant Extinction Prevention Program, FY 2023 Annual Report (Oct 1, 2022-Sep 30, 2023), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F22AC02205 (Interim Report), January 22, 2022, UH Mānoa, PCSU, PEPP. 21 pp.

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[USFWS] 2012. Endangered and threatened wildlife and plants; Endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Department of the Interior, Federal Register 77 (181): 57648–57862, September 18, 2012.

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

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