5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Schiedea trinervis* (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 *Schiedea trinervis* (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/1324*).

Review Analysis:

Please refer to the previous 5-year reviews for *Schiedea trinervis* published in the Federal Register on July 21, 2009, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1363.pdf*); August 13, 2013, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2099.pdf*), and on September 30, 2019, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2896.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 *S. trinervis*.

This short-lived perennial subshrub in the Caryophyllaceae (carnation) family is endangered and is known from the island of O‘ahu. The status and trends for *Schiedea trinervis* are provided in the tables below.

New Status Information:

- There is one large wild meta-population unit on Oʻahu. Over the past 5 years, only 72 wild individuals have been observed, and only an additional 224 individuals have been observed in the last 10 years. However, the majority of plants and locations within this meta-population have not been observed in over 10 years, and their current status is unknown. With no population decline, there could be an estimated total of 653 wild individuals in the Waiʻanae mountains at Kalena to East Makaleha (Army Natural Resources Program on Oʻahu [ANRPO] 2023a), of which 280 are mature plants and 373 are immature plants. Seedlings were present at many of these sites. Unfortunately, it is difficult to determine whether census data represents surveys that have been repeated across the same location or expanded locations where new plants were located, and therefore population trends are difficult to assess at this time.
- Additionally, 132 of the 157 plants reintroduced to Kaʻala in 2020 persisted in 2022, and an additional 230 indiviudals that have recruited naturally at this reintroduction site, including 11 that have matured (ANRPO 2023b, Appendix 4-1).
- Currently, there are approximately 91 founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks, explants in tissue culture, vegetative material, and plants in a nursery or living collection (ANRPO 2023b, Appendix 4-3).

New Threats:

- None

New Management Actions:

- Monitoring and surveys— The ANRPO monitors individuals of *Schiedea trinervis* in the Waiʻanae mountains of Oʻahu (ANRPO 2023b, Appendix 4-1).
- Ungulate monitoring and management—Ungulates are controlled and fencing is maintained by ANRPO at wild and reintroduced populations in the Kalena to East Makaleha population unit (ANRPO 2023b, Appendix 4-2).
- Invasive nonnative plant management— The ANRPO controls non-native plants at wild and reintroduced populations in the Kalena to East Makaleha population unit (ANRPO 2023b, Appendix 4-2).
- Control of predation and herbivory by rats— The ANRPO controls rats using Goodnature™ A24 rat traps. ANRPO reported control the Kalena to East Makaleha population unit (ANRPO 2023a, p.207–208).
- Collection and propagation for genetic storage and reintroduction—
    - ANRPO reports 91 total founder plants in seed storage with at least 10 viable seeds, and of these, 89 founders in storage have at least 50 viable seeds. (ANRPO 2023b, Appendix 4-3).
    - Lyon Arboretum Micropropagation Laboratory reports 265 explants in micropropagation representing 2 founders, and the Lyon Seed Conservation Laboratory reports 2714 seeds in storage from one founder and two cultivated individuals (Lyon Arboretum 2022, 2023).

    - The Oahu Nursery reports 5 individual plants in propagation, representing one founder (Oahu Nursery 2023).
- Reintroduction/ Augmentation/ Introduction—
    - A total of 516 reintroduced individuals survive across all reintroduction sites, of which 122 are mature individuals (ANRPO 2023b, Appendix 4-1).

Table 1. Status and trends of *Schiedea trinervis* 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?
1991 (Listing)	8	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2009 (5-year review)	169	43	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially, only one population
2013 (5-year review)	200	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	Partially, only one population

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2019 (5-year review)	ca 300 mature	0	All threats managed in all 3 populations	Partial
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	Partial
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	Partial, one population >50
2024 (5-year review)	300 to 653	127 mature, 220 immature, plus recruitment and regeneration	All threats managed in all 3 populations	Partial
			Complete genetic storage	Yes
			Natural reproduction at all 3 populations	Yes, recruitment at wild subpopulations
			3 populations with 50 mature individuals each	Partial, more surveys needed

* 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 *Schiedea trinervis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control in one area
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Predation and herbivory by invertebrates—Slugs, snails, black twig borer	C	Ongoing	None
Competition with established invasive plant species	E	Ongoing	Partial nonnative plant control in one area
Military training activities	E	Ongoing	Partial, fencing in some areas of population unit

Synthesis:
Currently there are estimated to be 300 to 653 total wild individuals of *Schiedea trinervis* on Oʻahu in a single meta-population, with mature, immature, and seedlings. More population monitoring is needed to better understand population trends. Individuals are provided protection by fencing, nonnative plant control, rat control, and ungulate control. Seed collections, propagation, and outplanting are ongoing. The reintroduction has both recruitment and regeneration (recruited seedlings grow and mature).

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.

Schiedea trinervis is a short-lived perennial subshrub. 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 O‘ahu 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 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have mostly been met. Genetic storage is complete (Table 1), and although there are not three populations totaling at least 50 reproducing individuals, there is one large meta-population with over 150 mature individuals, for this narrow endemic species. However, all threats are not being managed (Table 1, Table 2). The evaluation of interim stabilization goals for this species are not currently met, as population monitoring is not thorough, all threats are not controlled, and there is not a large enough population size for the species. Therefore, *Schiedea trinervis* 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 monitoring—
  - Continue monitoring populations of *Schiedea trinervis* and survey for new locations in areas of potentially suitable habitat.
  - Determine suitable locations for translocations.
- Ungulate monitoring and control—Continue to maintain fenced exclosures and construct new fences 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 *S. trinervis*.
- Site and habitat protection—Develop and implement effective threat control measures to reduce the impact of invasive plants.
- Fire prevention and control—Continue to 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. 2023a. 2023 status report for the Makua and Oahu implementation plans. 255 pp.

[ANRPO] 2023b. 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.

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, Hawaiʻi.

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Oahu Nursery. 2023. 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, Hawaiʻi.

[U.S. Fish and Wildlife Service] 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] 2009. *Schiedea trinervis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc1363.pdf*.

[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.

[USFWS] 2013. *Schiedea trinervis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc2099.pdf*.

[USFWS] 2019. *Schiedea trinervis*. 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc2896.pdf.*

[USFWS] 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.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Schiedea trinervis* (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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