

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Schiedea kaalae* (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 kaalae* (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/6690>).

### **Review Analysis:**

Please refer to the previous 5-year reviews for *Schiedea kaalae* published in the Federal Register on January 18, 2008, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1161.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1161.pdf)); August 13, 2013, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2096.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2096.pdf)), and on September 30, 2019, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2893.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2893.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. kaalae*.

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 kaalae* are provided in the tables below.

#### New Status Information:

- Currently, there are two wild population units on O‘ahu. There are eight wild individuals in the Wai‘anae mountains at South ‘Ēkahanui (Army Natural Resources Program on O‘ahu [ANRPO] 2023a), and one wild individual in the Ko‘olau mountains at Kahana (Lee 2023). Individuals at wild populations in the Ko‘olau mountains at Makaua were observed dead in 2022 (Ching-Harbin et. al., 2022a, 2022b.) Additionally, 526 total reintroduced individuals survive across six population units, four of which are in the Wai‘anae mountains, and two population units in the Ko‘olau mountains (ANRPO 2023b, Appendix 4-1; Ching-Harbin and Lee 2023).
- Currently, there are approximately 39 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 kaalae* in the Wai‘anae mountains of O‘ahu (ANRPO 2023b, Appendix 4-1), and the Plant Extinction Prevention Program (PEPP) monitors and collects fruit capsules from individuals of *Schiedea kaalae* in the Ko‘olau mountains (PEPP 2023).
- Ungulate monitoring and management—Ungulates are controlled and fencing is maintained by ANRPO at wild and reintroduced populations in ‘Ēkahanui, Pahole-Kapuna, Kaluaa-Wai‘eli, and Makaua (ANRPO 2023b, Appendix 4-2). Fencing is also monitored and maintained by PEPP at Kahana (PEPP 2023).
- Invasive nonnative plant management— The ANRPO controls non-native plants at wild and reintroduced populations in South ‘Ēkahanui, Pahole-Kapuna, Kaluaa-Wai‘eli, and Makaua (ANRPO 2023b, Appendix 4-2). Non-native plants are also controlled by PEPP at Kahana and Makaua (PEPP 2023; Ching-Harbin and Lee 2023).
- Control of predation and herbivory by rats— The ANRPO controls rats using Goodnature™ A24 rat traps. ANRPO reported control in two population units (‘Ēkahanui and Kaluaa-Wai‘eli), with a total of 336 traps used to protect individuals of *S. kaalae* (ANRPO 2023a, p.207–208). Additionally, PEPP controls rats at one reintroduction site in the Ko‘olau mountains, protecting 9 individual plants (PEPP 2023).
- Control of predation by nonnative invertebrates— The ANRPO utilizes Ferroxx® to control slugs around individuals of *S. kaalae* at both wild and reintroduction sites (four total population units in the Wai‘anae mountains (ANRPO 2023a, p.244). Additionally, PEPP controls slugs at one reintroduction site in the Ko‘olau mountains, protecting 9 individual plants (PEPP 2023).
- Collection and propagation for genetic storage and reintroduction—

- ANRPO reports 24 total founder plants in seed storage with at least 10 viable seeds, and of these, 20 founders in storage have at least 50 viable seeds. (ANRPO 2023b, Appendix 4-3).
- Lyon Arboretum Micropropagation Laboratory reports 1775 explants in micropropagation representing 34 founders, and the Lyon Seed Conservation Laboratory reports 144 seeds in storage from four founders (Lyon Arboretum 2022, 2023).
- The O‘ahu Nursery reports 35 individual plants in propagation, representing a total of 10 founders (Oahu Nursery 2023).
- Reintroduction/ Augmentation/ Introduction—
  - PEPP reports a total of 60 individuals planted at two reintroduction sites in 2022 and 2023 (PEPP 2023). A total of 526 reintroduced individuals survive across all reintroduction sites, of which 360 are mature individuals (ANRPO 2023b, Appendix 4-1; PEPP 2023).

**Table 1. Status and trends of *Schiedea kaalae* 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.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. Outplanted</b>	<b>Stability Goals identified in Recovery Plan</b>	<b>Stability Goals Completed?</b>
<b>1991 (Listing)</b>	<100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
<b>2008 (5-year review)</b>	40	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	No
<b>2013 (5-year review)</b>	29	402 mature, and 42 immature	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial

			3 populations with 50 mature individuals each	No
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**Table 1b.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>*Preventing Extinction Criteria identified by HPPRCC</b>	<b>*Preventing Extinction Criteria Completed?</b>
<b>2019 (5-year review)</b>	12 mature	Thousands planted; >500	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	No
<b>2024 (5-year review)</b>	9 mature	360 mature, 166 immature	All threats managed in all 3 populations	Partial
			Complete genetic storage	Yes
			Natural reproduction at all 3 populations	Partial, seedlings observed at one population
			3 populations with 50 mature individuals each	No

\* 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 kaalae* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, five exclosures constructed
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control within five exclosures
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Ungulate predations and herbivory	C	Ongoing	Yes, five exclosures ungulate free
Predation and herbivory by rats	C	Ongoing	Partial, control in three areas
Predation and herbivory by invertebrates—Slugs, snails, black twig borer	C	Ongoing	Partial, slug control in four areas
Competition with established invasive plant species	E	Ongoing	Partial, nonnative plant management in six areas
Reduced viability due to low numbers	E	Ongoing	Partial, propagation, seed storage, and reintroduction are ongoing

**Synthesis:**

Currently there are 9 mature wild individuals of *Schiedea kaalae* on O‘ahu. Individuals are provided protection by fencing, nonnative plant control, rat control, slug control, and ungulate control. Seed collections, propagation, and outplanting are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the O‘ahu Plants (USFWS 1998) and have been updated according to the draft revised recovery objective guidelines developed by the Hawai‘i 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 kaalae* 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 not been met. Although genetic storage is complete (Table 1), there are no populations totaling at least 50 reproducing individuals, and all threats are not being managed (Table 1, Table 2). Therefore, *Schiedea kaalae* 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—
  - Monitor known populations of *Schiedea kaalae*
  - Determine suitable locations for reintroductions.
- 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. kaalae*.
- Site and habitat protection—Develop and implement effective threat control measures to reduce the impact of small population size.
- 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:**

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- [ANRPO] 2023b. Appendices to the Status report for the Mākua and O‘ahu Implementation Plans, Army Natural Resources Program, O‘ahu, Office of the Vice President for Research and Innovation, University of Hawai‘i.
- Ching-Harbin, S., M. Keir, and J. Lee. 2022a. Hawai‘i 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 F19AC00532 (Interim Report), September 22, 2022, UH Mānoa, PCSU, PEPP. 611 pp.
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- [USFWS] 1999. Recovery Plan for the Multi-Island Plants. 2006 pp. + appendices.
- [USFWS] 2008. *Schiedea kaalae* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
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- [USFWS] 2013. *Schiedea kaalae* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
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**U.S. FISH AND WILDLIFE SERVICE**  
SIGNATURE PAGE for 5-YEAR REVIEW of *Schiedea kaalae* (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

**For Field Supervisor, Pacific Islands Fish and Wildlife Office**

\_\_\_\_\_ Date \_\_\_\_\_