

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Schiedea hookeri* (no common name)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2021. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 77 Species in Oregon, Washington, Idaho, and Hawaii. Federal Register 86(120): 33726–33728, June 25, 2021.

### **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, Acting Recovery Team Coordinator, 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 2022. The review was based on a review of current, available information since the last 5-year review for *Schiedea hookeri* (USFWS 2018). The evaluation by Daniel Adamski, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, Acting Recovery Team Coordinator, PIFWO.

### **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/1705>).

### **Review Analysis:**

Please refer to the previous 5-year reviews for *Schiedea hookeri* published in the Federal Register on September 20, 2011, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1809.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1809.pdf)) and October 23, 2018, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2660.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2660.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. hookeri*.

This long-lived perennial sprawling herb in the Caryophyllaceae (pink) family is endangered and is known from the islands of Maui and O‘ahu in the Wai‘anae Mountains. No individuals have been observed on Maui since its first collection in the 1800s. The status and trends for *Schiedea hookeri* are provided in the tables below.

#### New Status Information:

- The most recent population estimates for *Schiedea hookeri* are from 2016, when the International Union for Conservation of Nature (IUCN) species assessment reported eight populations and approximately 500 individuals on O‘ahu (Bruegmann et. al. 2016). The IUCN estimates the total number of individuals is likely declining (IUCN 2022), and there are no more recent population size estimates. There has only been one reported population monitoring and seed collection since 2016, where one individual was observed at Kaluakauila on O‘ahu (Togikawa and Loomis, 2020).
- Currently, there are approximately 15 founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks, explants in tissue culture, and plants in a nursery or living collection.

#### New Threats:

- None

#### New Management Actions:

- Monitoring and surveys—The Plant Extinction Prevention Program (PEPP) monitors individuals and collects seeds while conducting rare plant surveys on O‘ahu (Togikawa and Loomis 2020).
- Ungulate monitoring and management—Fencing is monitored and maintained by the Army Natural Resource Program (ANRP) at several management units on O‘ahu, including Kaluakauila and Palikea (ANRP 2022).
- Invasive nonnative plant management—The ANRP controlled nonnative plants at several management units on O‘ahu, including Kaluakauila and Palikea (ANRP 2022).
- Control of predation and herbivory by rats— The ANRP controlled rats at several management units on O‘ahu, including Palikea (ANRP 2022).
- Collection and propagation for genetic storage and reintroduction—
  - The Lyon Arboretum Micropropagation Laboratory reports 100 explants in micropropagation representing nine founders from Palikea (Lyon Arboretum 2022).
  - Lyon Arboretum Seed Conservation Laboratory reports 223 seeds in storage representing one founder from Palikea (Lyon Arboretum 2022).
  - National Tropical Botanical Garden (NTBG) reports 1,279 seeds in storage representing five founders from O‘ahu (NTBG 2022).
  - O‘ahu Rare Plant Nursery (ORPN) reports one plant in cultivation (ORPN 2022).
  - Waimea Arboretum Nursery reports five individuals in cultivation and eight individual plants in garden collections representing one founder plant from Kaluakauila on O‘ahu (Waimea Arboretum 2021).

**Table 1. Status and trends of *Schiedea hookeri* from listing through current 5-year review.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Stability Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1996 (listing)	220-330	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	No
			5-7 populations with 100 mature individuals each	No
2011 (5-year review)	ca 500	0	All threats managed in all 5-7 populations	Partially
			Complete genetic storage	Partially
			5-7 populations with 100 mature individuals each	No
<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>
2018 (5-year review)	< 500	0	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2023 (5-year review)	< 500	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially

			Natural reproduction at all 3 populations	No / Unknown
			3 populations with 50 mature individuals each	Partially

\* 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 hookeri* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
<b>Degradation and destruction of habitat by feral ungulates</b>	A	Ongoing	Partial, one population fenced
<b>Established ecosystem altering invasive plant species degradation of habitat</b>	A	Ongoing	Partial, one population fenced
<b>Climate change degradation or loss of habitat, including hurricanes</b>	A	Ongoing	None
<b>Degradation and destruction by landslides</b>	A	Ongoing	None
<b>Degradation and destruction by fire</b>	A	Ongoing	Partial, fire management plan for Army management units
<b>Predation and herbivory by feral ungulates</b>	C	Ongoing	Partial, one population fenced
<b>Predation and herbivory by rats</b>	C	Ongoing	Partial, control in one population
<b>Predation and herbivory by invertebrates—Slugs, snails, black twig borer</b>	C	Ongoing	None

**Synthesis:**

Currently there are fewer than 500 wild individuals or fewer of *Schiedea hookeri* on O‘ahu. Individuals are provided protection by fencing, rat control, and nonnative plant control. Seed collections and propagation are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the Multi-Island Plants (USFWS 1999) 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 hookeri* is a long-lived perennial sprawling herb. 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 Maui and O‘ahu where they now occur or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds and 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 partially complete (Table 1), there are no populations totaling at least 50 reproducing individuals, there has been little monitoring of this species over the last five years, and all threats are not being managed (Table 1, Table 2). Therefore, *Schiedea hookeri* 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 2018. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2023.

- Surveys and monitoring—Survey for additional populations of *Schiedea hookeri* in areas of potentially suitable habitat.
- 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 *Schiedea hookeri* within and around all wild populations.
- Fire prevention and control—Continue to develop and implement fire prevention management plans and monitor populations after fire occurrence.
- 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 frequency and intensity of hurricanes. Additional management

actions may be needed, such as locating microsites that overlap with current and future climate envelopes for translocation efforts.

- Predator and herbivore monitoring and control—Continue to determine and implement effective methods for control of rodents and slugs around wild populations.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for reintroductions.
- Build resiliency, redundancy, and representation — Increase species' viability through habitat restoration, threat control, and reintroduction and translocation. Initiate reintroductions into suitable habitat that is being managed for known threats to this species to reduce impacts of landslides and hurricanes.
- 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:

[ANRP] Army Natural Resource Program. 2022. 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.

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

[IUCN] International Union for Conservation 2016. Bruegmann, M., Caraway, V.L., Chau, M., Gon, S.M., Keir, M., Kwon, J., Sugii, N., Weisenberger, L. & Yoshioka, J.M. 2016. *Schiedea hookeri*. The IUCN Red List of Threatened Species 2016: e.T80218194A80218200.  
<https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T80218194A80218200.en>.

IUCN. 2022. The IUCN Red List of Threatened Species. Version 2022-2.  
<https://www.iucnredlist.org>. Accessed on 25 April 2023.

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, Hawai‘i.

[NTBG] National Tropical Botanical Garden. 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, Hawai‘i.

- [ORPN] O‘ahu Rare Plant Nursery. 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, Hawai‘i.
- Togikawa, K. and A. Loomis. 2020. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form in PEPP 2022: Plant Extinction Prevention Program, FY 2022 Annual Report (Oct 1, 2021-Sep 30, 2022), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F19AC00532 (Interim Report), December 29, 2022, UH Mānoa, PCSU, PEPP. 74 pp. BioPacifica database record for *Schiedea hookeri*, Pacific Islands Fish and Wildlife Office.
- Waimea Arboretum. 2021. 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, Hawai‘i.
- [USFWS] U.S. Fish and Wildlife Service. 1999. Recovery plan for multi-island plants. U.S. Fish and Wildlife Service, Portland, Oregon. 206 pages + appendices.
- [USFWS] 2011. *Schiedea hookeri* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
[https://ecos.fws.gov/docs/tess/species\\_nonpublish/1809.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1809.pdf).
- [USFWS] 2018. *Schiedea hookeri* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
[https://ecos.fws.gov/docs/tess/species\\_nonpublish/2660.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2660.pdf).
- [USFWS] 2021. Endangered and Threatened wildlife and plants; initiation of 5-year status reviews for 77 Species in Oregon, Washington, Idaho, and Hawaii. Federal Register 86(120): 33726–33728, June 25, 2021.

**U.S. FISH AND WILDLIFE SERVICE**

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

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