

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Schiedea nuttallii* (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 nuttallii* (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/7801>).

### **Review Analysis:**

Please refer to the previous 5-year reviews for *Schiedea nuttallii* published in the Federal Register on July 21, 2009, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1372.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1372.pdf)); August 13, 2013, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2098.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2098.pdf)), and on September 30, 2019, (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/3177.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/3177.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. nuttallii*.

This short-lived perennial subshrub in the Caryophyllaceae (carnation) family is endangered and known from the islands of O‘ahu, Moloka‘i (not extant), and Maui (not extant). As discussed in the previous five-year reviews, the Kaua‘i populations of *Schiedea nuttallii* are now recognized as the taxa *S. perlmanii* (at Mt. Hā‘upu and

Moloa‘a) and *S. kauaiensis* (Limahuli) (Wagner et al. 2005). We include discussion of the status of *S. perlmanii* in this review until the taxonomic change is published in the Federal Register.

New Status Information:

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- Currently, there is one population (Kahanahāiki to Pahole) totaling 8 mature and 3 immature individuals, with seedlings observed during recent monitoring (Army Natural Resources Program on O‘ahu [ANRPO] 2023a, Appendix 4-1).
- Currently, there are approximately 52 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).

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- In 2020, there were two populations (Mt. Hā‘upu and Moloa‘a) totaling fewer than 60 individuals (Clark 2020). Currently, there are 32 mature individuals at two populations on Kaua‘i (Heintzman pers. comm., 2024).
- Currently, there are approximately four 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 (Lyon Arboretum 2023; National Tropical Botanical Garden [NTBG] 2023; Kaua‘i Mid-Elevation Nursery [KMEN] 2023).

New Threats:

- None

New Management Actions:

- Monitoring and surveys— Plant Extinction Prevention Program (PEPP) monitors *Schiedea perlmanii* on Kaua‘i (PEPP 2023). The ANRPO monitors individuals of *Schiedea nuttallii* in the Wai‘anae mountains of O‘ahu (ANRPO 2023b, Appendix 4-1).
- Ungulate monitoring and management—Fencing is monitored and maintained at in all three population units and ungulates are controlled (Kahanahāiki to Pahole, Kapuna to Ke‘awapilau, and Mākaha) (ANRPO 2023a, Appendix 4-2).
- Invasive nonnative plant management— The ANRPO controls non-native plants across all three population units (Kahanahāiki to Pahole, Kapuna to Ke‘awapilau, and Mākaha) (ANRPO 2023b, Appendix 4-2).
- Control of predation and herbivory by rats— The ANRPO controls rats using Goodnature™ A24 rat traps. ANRPO reported control in all three population units (Kahanahāiki to Pahole, Kapuna to Ke‘awapilau, and Mākaha) (ANRPO 2023b, Appendix 4-2).
- Control of predation by nonnative invertebrates— The ANRPO utilizes Ferroxx® to control slugs around individuals of *S. nuttallii* in two population units (Kahanahāiki to Pahole and Kapuna to Ke‘awapilau) (ANRPO 2023a, p.244).
- Collection and propagation for genetic storage and reintroduction—

- ANRPO reports 47 total *S. nuttallii* founder plants in seed storage with at least 10 viable seeds, and of these, 25 founders in storage have at least 50 viable seeds. These founders are from Kahanahāiki to Pahole, and Kapuna to Ke‘awapilau population units (ANRPO 2023b, Appendix 4-3).
- Lyon Arboretum Seed Conservation Laboratory reports 69 seeds in storage representing one *S. perlmanii* founder (Lyon Arboretum 2023).
- Lyon Arboretum Micropropagation Laboratory reports 352 *S. nuttallii* explants in storage representing 24 founders from Kahanahāiki to Pahole, and 72 *S. perlmanii* explants in storage representing two founders (Lyon Arboretum 2023).
- NTBG reports 4 seeds in storage from one *S. perlmanii* founder with unknown viability, and four plants in propagation representing three founders.
- Reintroduction/ Augmentation/ Introduction—
  - ANRPO reports reintroductions of *S. nuttallii* between 2020 and 2023 across three population units (Kahanahāiki to Pahole, Kapuna to Ke‘awapilau, and Mākaha). Currently, 390 total reintroduced individuals survive across all reintroduction sites, of which, 324 are mature individuals (ANRPO 2023b, Appendix 4-1).

**Table 1. Status and trends of *Schiedea nuttallii* 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>1996 (listing)</b>	25	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
<b>2009 (5-year review)</b>	26	203	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially, no regeneration
<b>2013 (5-year review)</b>	11	225	All threats managed in all 3 populations	Partially

			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	Partially, no regeneration

**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>2020 (5-year review)</b>	9 mature, 1 immature	254 survive; 435 planted	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all X populations	Yes
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No
2024 (5-year review)	11 O‘ahu, 32 Kaua‘i	390 (O‘ahu)	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			Natural reproduction at all 3 populations	Partial
			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 nuttallii* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Yes, all populations fenced
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control around populations
Destruction and degradation of habitat by landslides and erosion	A	Ongoing	None
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Degradation and destruction by fire	A	Ongoing	Partial, fire management (fuel breaks) part of Army INRMP
Ungulate predation or herbivory	C	Ongoing	Partial, all populations fenced
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 two areas
Military activities	E	Ongoing	Partial, management plan implementation
Lack of pollinators	E	Ongoing	Partial, research ongoing
Human disturbance from increased visitation	E	Ongoing	Partial, fencing as a deterrent
Reduced viability due to low numbers	E	Ongoing	Partial, propagation, seed storage, and reintroduction are ongoing

**Table 3. Threats to *Schiedea perlmanii* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Degradation and destruction of habitat by feral ungulates	A	Ongoing	None
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	None

Destruction and degradation of habitat by landslides and erosion	A	Ongoing	None
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Degradation and destruction by fire	A	Ongoing	None
Ungulate predation or herbivory	C	Ongoing	None
Predation and herbivory by invertebrates—Slugs, snails, black twig borer	C	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, propagation and seed storage are ongoing

**Synthesis:**

Currently there are 11 wild individuals of *Schiedea nuttallii* on O‘ahu, of which 8 are mature individuals and 3 are immature. Individuals are provided protection by fencing, nonnative plant control, rat control, slug control, and ungulate control. Seed collections, propagation, and outplanting are ongoing. Some recruitment has been observed. There are 32 mature individuals of *S. perlmanii* at two locations on Kaua‘i.

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 nuttallii* 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. Genetic storage is partially 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 nuttallii* 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 updated or reiterated for the 5-year review for 2024.

- Surveys and monitoring—
  - Continue monitoring populations of *Schiedea nuttallii* in areas of potentially suitable habitat, and survey both species for a thorough assessment of the species' status.
  - Determine suitable locations for reintroductions.
- Ungulate monitoring and control— —Fence remaining populations on Kaua'i and continue to maintain fenced exclosures on O'ahu to protect individuals from the negative impacts of browsing by ungulates.
- Invasive nonnative plant monitoring and control— Continue to control established ecosystem-altering nonnative invasive plant species, and those that compete with both species.
- 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.
- Federal Register updates—Revise the listed entity to reflect the currently accepted taxonomy for *Schiedea perlmanii*.

**References:**

- [ANRPO] Army Natural Resource Program on O‘ahu. 2023a. 2023 status report for the Makua and Oahu implementation plans. 255 pp.
- [ANRPO] Army Natural Resource Program on O‘ahu. 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.
- [HBMP] Hawaii Biodiversity and Mapping Program. 2010. Plant species GIS data and Access database.
- [HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.
- [KMEN] Kaua‘i Mid-Elevation 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, Hawai‘i.
- Lyon Arboretum. 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, Hawai‘i.
- [NTGB] National Tropical Botanical Garden. 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, Hawai‘i.
- [USFWS] U.S. Fish and Wildlife Service. 1999. Recovery Plan for the Multi-Island Plants. 2006 pp. + appendices.
- [USFWS] 2009. *Schiedea nuttallii* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
[https://ecos.fws.gov/docs/five\\_year\\_review/doc1372.pdf](https://ecos.fws.gov/docs/five_year_review/doc1372.pdf).
- [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] U.S. Fish and Wildlife Service. 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 nuttallii* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
[https://ecos.fws.gov/docs/five\\_year\\_review/doc2098.pdf](https://ecos.fws.gov/docs/five_year_review/doc2098.pdf).

[USFWS] 2019. *Schiedea nuttallii* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
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**Personal Communication**

Heintzman, S. 2024. Kaua‘i Plant Extinction Prevention Coordinator. Email regarding the status of *Schiedea perlmanii* on Kaua‘i. 8 Aug 2024.

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

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

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Date\_\_\_\_\_