

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Schiedea stellarioides* (Iaulihilihi)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 2020. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

### **Lead Region/Field Office:**

Interior Region 12/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, Conservation & Restoration Team 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 2021. The review was based on a review of current, available information since the last 5-year review for *Schiedea stellarioides* (USFWS 2017). The evaluation by Daniel Adamski, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Conservation and Restoration Team 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 (<https://ecos.fws.gov/ecp/species/418>).

### **Review Analysis:**

Please refer to the previous 5-year reviews for *Schiedea stellarioides* published in the Federal Register on August 27, 2010 (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1629.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1629.pdf)) and September 18, 2017 (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2511.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2511.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. stellarioides*.

This short-lived perennial, weakly erect to decumbent (growing along the ground) subshrub in the Caryophyllaceae (pink) family is endangered and is known from the island of Kaua‘i. The status and trends for *Schiedea stellarioides* are provided in the tables below.

New Status Information:

- Currently, three populations of *Schiedea stellarioides*, totaling 221 individuals, are known. Two small populations are from Kawai‘iki to Kaluahaulu ridge, and one large population with approximately 200 individuals is along the ridge between Wai‘alae and Nāwaimaka valleys on Kaua‘i (Kishida and Perlman 2017a; Kishida et.al. 2018; Perlman et al. 2019; Perlman and Wood 2019).

New Threats:

- None.

New Management Actions:

- Monitoring and surveys— The Plant Extinction Prevention Program (PEPP) monitors *Schiedea stellarioides* (PEPP 2021).
- Collection and propagation for genetic storage and reintroduction—
  - The Plant Extinction Prevention Program (PEPP) collects leaves and fruit of *Schiedea stellarioides* (Perlman et. al. 2019).
  - National Tropical Botanical Garden (NTBG) reported 9 individuals in cultivation representing 2 founders and 270 seeds in storage representing 2 founders (NTBG 2021).
  - Kōke‘e Mid-elevation Nursery (KMEN) reported 9 individuals in cultivation representing 4 founders (KMEN 2021).
  - Lyon Arboretum reports over 4,000 seeds in storage representing 34 founders (Nāwaimaka, 30 founders; Kawai‘iki, 4 founders) (Lyon Arboretum 2022).
- Reintroduction and translocation—A total of 26 individuals were reintroduced at two fenced exclosures in 2017 (Kishida and Perlman 2017b; Williams 2017). An additional 303 individuals were reintroduced at a fenced exclosure in Kawai‘iki (Perlman 2019).

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	500–1,000	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	500-1,000	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially

			3 populations with 50 mature individuals each	No
2003 (critical habitat)	1,500	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2010 (5-year review)	< 200	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
<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>
2017 (5-year review)	100	0	All threats managed in all 3 populations	Partial
			Reproduction (i.e., viable seeds, seedlings, saplings) at all three populations	Partial
			Complete genetic storage	Partial, near completion
			3 populations with 50 mature individuals each	Partial
2022 (5-year review)	221	329	All threats managed in all 3 populations	No
			Complete genetic storage	Partial
			Natural reproduction at all three populations	Unknown
			3 populations with 50 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 *Schiedea stellarioides* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	None
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Degradation and destruction by landslides	A	Ongoing	None
Fire destruction or degradation of habitat	A	Ongoing	None
Predation and herbivory by rodents	C	Ongoing	None
Predation and herbivory by snails and slugs	C	Ongoing	None
Human disturbance—Fire mortality and reduced viability	E	Ongoing	None

**Synthesis:**

Currently, there are approximately 221 wild individuals of *Schiedea stellarioides* on Kaua‘i. Most are in one population. Seed collections, propagation, and outplanting are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Kaua‘i Islandwide Recovery Plan (USFWS 2021) 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 stellarioides* is a short-lived perennial, weakly erect to decumbent 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 Kaua‘i 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. Genetic storage goals have not been met (Table 1), there are no single populations totaling at least 50 reproducing individuals, and all threats are not being managed (Table 1, Table 2). Therefore, *Schiedea stellarioides* 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 2017. Thus, the following recommendations for future actions are reiterated and updated for the 5-year review for 2022.

- Surveys and inventories— Continue surveys for populations of *Schiedea stellarioides* in areas of potentially suitable habitat and monitor known populations.
- Ungulate monitoring and control—Construct and continue to maintain fenced exclosures to protect individuals from the negative impacts of browsing ungulates and construct and maintain fenced exclosures around all populations.
- Invasive nonnative plant monitoring and control—Continue control of established ecosystem-altering nonnative invasive plant species, and those that compete with *S. stellarioides*.
- Site and habitat protection—Develop and implement effective 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 reintroduction of this species in the future due to the impacts of climate change.
- Predator and herbivore monitoring and control—Implement effective control methods for rodents.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for reintroduction.
- Reintroduction and translocation—Continue to reintroduce individuals into suitable habitat within historic range that is being managed for known threats to this species to build resiliency and redundancy to reduce the impacts from climate change, stochastic events, reduced viability due to small population sizes, and other threats.
- Population biology research—
  - Determine which species may act as pollinators and which may assist with fruit dispersal.
  - Conduct genetic studies to determine genetic variation within and between populations and plan an effective breeding program.

- 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:**

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

[KMEN] Kōke‘e Mid-elevation Nursery. 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.

Kishida, W., and S. Perlman. 2017a. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Schiedea stellarioides*, Pacific Islands Fish and Wildlife Office.

Kishida, W., and S. Perlman. 2017b. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Schiedea stellarioides*, Pacific Islands Fish and Wildlife Office.

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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. 2020. 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.

Perlman, S., and K. Wood. 2019. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Schiedea stellarioides*, Pacific Islands Fish and Wildlife Office.

Perlman, S., K. Wood, and S. Walsh. 2019. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Schiedea stellarioides*, Pacific Islands Fish and Wildlife Office.

[PEPP] Plant Extinction Prevention Program. 2021. Fiscal year 2021 interim performance report (October 1, 2020-September 30, 2021) cooperative agreements F18AC00502 and F19AC00532, US Fish and Wildlife Service CFDA Program #15.657, Endangered species conservation—recovery implementation funds, University of Hawaii at Manoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program.

[USFWS] U.S. Fish and Wildlife Service. 2010. *Schiedea stellarioides* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/1629.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/1629.pdf).

[USFWS] 2017. *Schiedea stellarioides* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2511.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2511.pdf).

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[USFWS] 2021. Kaua‘i Islandwide Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 65 pp. + appendices.

Williams, A. 2017. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Schiedea stellarioides*, Pacific Islands Fish and Wildlife Office.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Schiedea stellarioides* (laulihilihi)

**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\_\_\_\_\_