5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Silene hawaiiensis* (no common name)

Current Classification: Threatened

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2023. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 133 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands . Federal Register 88(56): 17611–17614, March 23, 2023.

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 *Silene hawaiiensis* (USFWS 2020). 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/4189*).

Review Analysis:

Please refer to the previous 5-year reviews for *Silene hawaiiensis* published in the Federal Register on August 27, 2010 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1656.pdf*), and on August 25, 2015 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2306.pdf*), and on September 30, 2020 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3179.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 *Silene hawaiiensis*.

This perennial shrub in the Caryophyllaceae (pink) family is threatened and found on the island of Hawai‘i. The status and trends for *Silene hawaiiensis* are provided in the tables below.

New Status Information:

- Currently, there are approximately 9,560 wild individuals of *Silene hawaiiensis*: 7,560 wild individual plants in five populations at Pōhakuloa Training Area (PTA) and estimated thousands of plants in five populations at Hawai‘i Volcanoes National Park (HVNP) on the island of Hawai‘i. (HVNP 2024; U.S. Army Garrison-Hawai‘i [USAG-HI] 2024).
- Currently, there are 88 founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks and plants in a nursery or living collection (National Tropical Botanical Garden [NTBG] 2023; Volcano Rare Plant Propagation Facility [VRPPF] 2024; USAG-HI 2024).
- The Leilani wildfire occurred at PTA in July and August of 2022, and burned 1,713 ha (4,233 ac) A post fire survey found 48 individuals *Silene hawaiiensis* plants and three seedlings in one plot, and all individual occurrences were found in no/low burn severity areas. Since *S. hawaiensis* was also found in only one plot before the fire, differences in pre-fire and post-fire abundance changes could not be determined. However, *S. hawaiensis* can regenerate from a large fleshy taproot, and could be resilient to low-intensity fire (USAG-HI 2024).
- Three individual plants were extirpated in December 2022, due to the Mauna Loa eruption and lava flow.

New Threats:

- None

New Management Actions:

- Monitoring and surveys— The Center for Environmental Management of Military Lands (CEMML) monitors fences, monitors plants, and collects seeds of wild *Silene hawaiiensis* at PTA and the National Park Service monitors plants and fences at HVNP (HVNP 2024; USAG-HI 2024).
- CEMML conducted weed control across 10.7 ha (26.4 ac) around *Silene hawaiiensis* plants and maintains fuel breaks across PTA to protect plants from wildfires and the National Park Service controls invasive plants at HVNP (HVNP 2024; USAG-HI 2024).
- Collection and propagation for genetic storage and reintroduction—
    - PTA Rare Plant Propagation Facility (PTA RPPF) reports 11,425 seeds in storage representing 88 wild founder plants, and 28,520 seeds in storage from propagated plants. An additional 11 potted plants from one founder are also maintained at the PTA RPPF (USAG-HI 2024).
    - NTBG reports 675 seeds in storage representing one founder from a 1992 collection; viability is unknown (NTBG 2023).

- Reintroduction/ Augmentation/ Introduction—A total of 83 plants have been reintroduced at PTA between 2004 and 2014, and currently four reintroduced individuals remain at one site (USAG-HI 2024). In addition, VRPF reported 34 individuals were reintroduced in 2024 at Pu‘uwa‘awa‘a (VRPF 2024).

Table 1. Status and trends of *Silene hawaiiensis* 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?
1994 (Listing)	>3,000	0	All threats managed in the 5 largest populations	Partially
			Complete genetic storage	No
			8 to 10 populations with 300 mature individuals each	No
			Populations naturally reproducing, stable, and increasing in number	Unknown
			Populations stable for 5 consecutive years	Unknown
2010 (5-year review)	ca 8,360	0	All threats managed in the 5 largest populations	Partially

			Complete genetic storage	Partially
			8 to 10 populations with 300 mature individuals each	Partially
			Populations naturally reproducing, stable, and increasing in number	No
			Populations stable for 5 consecutive years	No
2015 (5-year review)	2,100 –4,870	ca 162 (30 natural recruits)	All threats managed in the 3 largest populations	Partially
			Complete genetic storage	Partially
			3 populations with 300 mature individuals each	Partially
			Populations naturally reproducing, stable, and increasing in number	No
			Populations stable for 5 consecutive years	No

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Targets identified by HPPRCC	*Preventing Extinction Targets Completed?
2020 (5-year review)	ca 2,644+	ca 407, <245 survive	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	Unknown
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2025 (5-year review)	ca 9,560	34 planted, 38 survive	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	Partially
			3 populations with 50 mature individuals each	Yes

* 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 *Silene hawaiiensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate destruction and degradation of habitat and herbivory	A, C, D	Ongoing	Partial, enclosures constructed at PTA and HVNP
Established ecosystem altering invasive plant	A, E	Ongoing	Nonnative plant control at PTA and HVNP

species degradation of habitat			
Drought destruction and degradation of habitat	A	Ongoing	None
Fire destruction and degradation of habitat	A	Ongoing	Partial, non-native plant control and firebreaks at PTA and fire management plan for HVNP
Lava flow and volcanic destruction and degradation of habitat	A	Ongoing	None
Climate change degradation and destruction of habitat	A	Ongoing	None
Collection impacts	B	Ongoing	None
Invertebrate predation and herbivory	C	Ongoing	None
Lack of adequate hunting regulations	D	Ongoing	Partial, exclosures at PTA and HVNP
Military training activities	E	Ongoing	Partial, management following ESA consultation

Synthesis:
Currently there are approximately 9,560 wild individuals of *Silene hawaiiensis* on the island of Hawai‘i. Individuals are provided protection from ungulates by fencing, and nonnative plant control. Plant cutting collections, seed storage, and propagation are ongoing.

Stabilizing (interim) and preventing extinction targets, and downlisting, and delisting criteria are provided in the Recovery Plan for the Big Island Plant Cluster (USFWS 1996), and 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.

Silene hawaiiensis is a short-lived perennial shrub. 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 the island of Hawai‘i, 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 300 mature, reproducing individuals per population.

The interim goals for this species have not been met (Table 1). Although there are three populations with greater than 300 individuals, it is uncertain how many individuals matured, all threats are not being managed and genetic storage is not complete (Table 2). Therefore, *Silene hawaiiensis* meets the definition of Threatened as it is likely to become an endangered species within the foreseeable future throughout all or a significant portion of 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 2020. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2025.

- Surveys and monitoring—
  - Continue to monitor known populations of *Silene hawaiiensis* to assess resiliency and make collections.
  - Continue surveys for populations of *Silene hawaiiensis* in areas of potentially suitable habitat.
- Ungulate monitoring and control—Construct fenced exclosures and construct new fences to protect individuals from the negative impacts of browsing by ungulates.
- Invasive nonnative plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species, and those that compete with *Silene hawaiiensis.*
- Site and habitat protection—Develop and implement effective control measures to reduce the impacts of destruction by military activities, drought, lava flows, and fire.
- Site and habitat protection—Develop and implement effective control measures to reduce the impacts of invasive invertebrate predation and hunting.
- Fire prevention and control—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.
- Captive propagation for genetic storage and reintroduction—Continue to maintain collection and propagation efforts for maintenance of genetic stock and reduce the impacts of seed collection on plant regeneration.
- Build resiliency, redundancy, and representation — Increase species' viability through habitat restoration and threat control.
- Research—
  - Determine which species may act as pollinators and which may assist with fruit dispersal.
  - Conduct genetic studies to determine genetic variation within the population (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:

[HAVO] Hawai‘i Volcanoes National Park. 2024. Annual report to the U.S. Fish and Wildlife Service threatened and endangered plants Hawaii Volcanoes National Park ES019078. 39 pp.

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

[NTBG]. 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.

[USAG] United States Army Garrison. 2024. U.S. Army Garrison Pōhakuloa Training Area Natural Resources Program FY 2022 to FY 2023 Biennial Report. Prepared by Center for Environmental Management of Military Lands, Colorado State University. June 2024. 558pp.

[USFWS] U.S. Fish and Wildlife Service. 1996. Recovery plan for the Big Island plant cluster. Portland. 201 pp. + appendices.

[USFWS] 2010. *Silene hawaiiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1656.pdf*.

[USFWS] 2015. *Silene hawaiiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2306.pdf*.

[USFWS] 2020. *Silene hawaiiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3179.pdf*.

[USFWS] 2023. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 133 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 88(56): 17611–17614, March 23, 2023.

[VRPPF] Volcano Rare Plant Propagation Facility. 2024. 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.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Silene hawaiiensis* (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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