

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Stenogyne bifida* (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 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 2022. The review was based on a review of current, available information since the last 5-year review for *Stenogyne bifida* (USFWS 2018). The evaluation by Daniel Adamski, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator/Acting Recovery 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 (<http://ecos.fws.gov/ecp/species/2769>).

Review Analysis:

Please refer to the previous 5-year reviews for *Stenogyne bifida* published in the Federal Register on August 27, 2010. (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1659.pdf) June 5, 2014, (available at https://ecos.fws.gov/docs/tess/species_nonpublish/2208.pdf) and October 23, 2018 (available at https://ecos.fws.gov/docs/tess/species_nonpublish/2664.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. bifida*.

This short-lived perennial climbing herb in the Lamiaceae (mint) family is endangered and endemic to Moloka‘i. The status and trends for *Stenogyne bifida* are provided in the tables below.

New Status Information:

- *Stenogyne bifida* may be extinct in the wild. The last known individual died in 2013, and there currently are no known wild individuals (Bakutis, pers. comm. 2023).
- Currently, there are approximately two known founder lines represented in *ex situ* storage and propagation collections, as well as additional founders of unknown origins from Moloka'i. These collections including seeds in seed banks, explants in tissue culture, plants in a nursery or living collection (Lyon Arboretum 2022; National Tropical Botanical Garden (NTBG) 2022; Olinda Rare Plant Facility (ORPF) 2023).

New Threats:

- None

New Management Actions:

- Monitoring and surveys—The Plant Extinction Prevention Program on Moloka'i surveys for wild individuals of *Stenogyne bifida*, and monitors reintroduced populations (Bakutis, pers. comm. 2023).
- Collection and propagation for genetic storage and reintroduction—
 - The Lyon Arboretum Micropropagation Laboratory reports 144 explants in micropropagation and 90 meristematic tissues stored via cryopreservation (in liquid nitrogen) representing one founder from Kamakou (Lyon Arboretum 2022).
 - NTBG reports 44 seeds in storage from five founders of unknown origin, and an unknown number of seeds in storage from three additional founders from Kua Gulch (NTBG 2022).
 - ORPF reports 128 individuals in cultivation from one founder and 18 seeds in storage from one founder (ORPF 2023).
- Reintroduction/ Augmentation/ Introduction—Starting in 2020, over 370 individuals were outplanted across six reintroduction populations, however, population monitoring conducted in 2023 revealed all individuals had flowered, fruited and died, and no reintroduced individuals remain (Bakutis, pers. comm. 2023).

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1992 (listing)	<10	0	All threats managed in all 3 populations	No

			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2010 (5-year review)	1	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2014 (5-year review)	0	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2018 (5-year review)	0	0	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all X populations	No
			Complete genetic storage	Complete (currently no extant plants)
			3 populations with 50 mature individuals each	No
2023 (5-year review)	0	0	All threats managed in all 3 populations	Partially

			Complete genetic storage	Complete (currently no extant plants)
			Natural reproduction at all 3 populations	No
			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 *Stenogyne bifida* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, ungulate removal from fenced area
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control within fenced area
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Degradation and destruction by landslides	A	Ongoing	None
Predation and herbivory by feral ungulates	C	Ongoing	Partial, ungulate removal from fenced area
Predation and herbivory by rats	C	Ongoing	None
Predation and herbivory by invertebrates—Slugs, snails, black twig borer	C	Ongoing	None
Disease-Powdery Mildew	C	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, captive propagation for genetic storage and reintroduction

Synthesis:

Currently there are no known wild individuals of *Stenogyne bifida* on Moloka‘i. *Ex situ* storage, propagation, and outplanting are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the Moloka‘i Plant Cluster (USFWS 1996) 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.

Stenogyne bifida is a short-lived perennial climbing 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 Moloka‘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. Although genetic storage is complete (Table 1), there are no known wild individuals and *Stenogyne bifida* may be extinct in the wild (Table 1, Table 2). Therefore, *S. bifida* meets the definition of Endangered as it may be extinct 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 updated and reiterated for the 5-year review for 2023.

- Surveys and monitoring—Survey at historical populations of *Stenogyne bifida* and areas of potentially suitable habitat.
- Ungulate monitoring and control—Continue to maintain fenced exclosures 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 at historical populations within and around all historical wild and reintroduced populations.
- 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 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—Determine and implement effective methods for rodents and slugs around historical wild and reintroduced populations.
- 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. Continue attempts at reintroduction into suitable habitat that is being managed for known threats to this species to reduce impacts of erosion, treefall, flooding, 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:

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

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.

[ORPF] Olinda Rare Plant Facility. 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. 1996. Recovery plan for the Molokai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 153 pages.

[USFWS] 2008. *Stenogyne bifida* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/tess/species_nonpublish/1659.pdf.

[USFWS] 2014. *Stenogyne bifida* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
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[USFWS] 2018. *Stenogyne bifida* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/tess/species_nonpublish/2664.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.

Personal Communication:

Bakutis, A. 2023. Moloka‘i Coordinator, Plant Extinction Prevention Program, Moloka‘i, Hawai‘i. E-mail to Lauren Weisenberger, U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, dated May 30, 2023. Subject: 5-year review questions for *Stenogyne bifida*.

U.S. FISH AND WILDLIFE SERVICE

SIGNATURE PAGE for 5-YEAR REVIEW of *Stenogyne bifida* (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 _____