5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Isodendrion hosakae* (aupaka)

Current Classification: Endangered

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 *Isodendrion hosakae* (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/203*).

Review Analysis:

Please refer to the previous 5-year reviews for *Isodendrion hosakae* published in the Federal Register on August 28, 2012 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1983.pdf*), and on September 30, 2020 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3167.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 *Isodendrion hosakae*.

This short-lived perennial terrestrial shrub in the Violaceae (violet) endangered and found on the island of Hawai‘i. The status and trends for *Isodendrion hosakae* are provided in the tables below.

New Status Information:

- Currently, there are 240 wild individuals (including at least 26 but up to 102 mature plants) of *Isodendrion hosakae* at Puu Pāpapa within Pōhakuloa Training Area [PTA] (U.S. Army Garrison-Hawai‘i [USAG-HI] 2024).
- Currently, there are 58 founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks and plants in a nursery or living collection (Lyon Arboretum 2024; USAG 2024; Volcano Rare Plant Facility [VRPF] 2024).

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 *Isodendrion hosakae* at PTA. During monitoring in 2024, CEMML staff reported 21 seedlings were observed (USAG 2024).
- CEMML conducted weed control around *Isodendrion hosakae* plants and maintains fuel breaks across PTA to protect plants from wildfires (USAG-HI 2024).
- Collection and propagation for genetic storage and reintroduction—
    - Lyon Arboretum Seed Conservation Laboratory reports 230 seeds in storage representing five founder plants, collected from Puu Pāpapa in 2023 (Lyon Arboretum 2024).
    - PTA Rare Plant Propagation Facility (PTA RPPF) reports 1,193 seeds in storage representing 53 wild founder plants, and an additional 15 potted plants, representing six founder plants (USAG-HI 2024).
    - VRPF reports nine potted plants in cultivation representing two founders from Puu Pāpapa (VRPF 2024).
    - Translocations—A total of seven plants were reintroduced at PTA between 2004 and 2014, and currently three total reintroduced individuals remain at one site (USAG-HI 2024). In addition, PTA reported 45 individuals were reintroduced in 2019 at Puu Pāpapa and Puu Huluhulu, however, no individuals were observed during monitoring in 2023 (USAG-HI 2024). In 2024, CEMML staff reintroduced 43 individuals at PTA (USAG-HI 2024).

Table 1. Status and trends of *Isodendrion hosakae* 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?
1991 (listing)	ca 275	0	All threats managed in all 6 populations	Partially
			Complete genetic storage	No
			Naturally reproducing populations at all 6 sites	No
			Maintained for 10 years	No
2012 (5-year review)	871	Unknown	All threats managed in all 6 populations	Partially
			Complete genetic storage	Partially
			Naturally reproducing populations at all 6 sites	No
			Maintained for 10 years	No

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Targets identified by HPPRCC	*Preventing Extinction Targets Completed?
2020 (5-year review)	134	19 remain	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2025 (5-year review)	240 (102 mature, 138 immature)	88 planted w/in 5 yrs; 46 total	All threats managed in all 6 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 6 populations	Partially
			Complete genetic storage	Partially
			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 *Isodendrion hosakae* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate destruction and degradation of habitat and herbivory	A, E	Ongoing	Partial, enclosures constructed at PTA
Established ecosystem altering invasive plant species degradation of habitat	A, E	Ongoing	Nonnative plant control at PTA
Fire destruction and degradation of habitat	A	Ongoing	Partial, non-native plant control and firebreaks at PTA and fire management plan
Agriculture and urban development	A	Ongoing	None
Climate change degradation and destruction of habitat	A	Ongoing	None
Invertebrate predation and herbivory	C	Ongoing	None
Lack of adequate hunting regulations	D	Ongoing	Partial, exclosures at PTA
Military activities	E	Ongoing	Partial, management plan
Reduced viability due to low numbers	E	Ongoing	Partial, collection, storage, and reintroduction
Military training activities	E	Ongoing	Partial, management following ESA consultation

Synthesis:
Currently there are 240 wild individuals, including at least 26 and up to 102 mature plants, of *Isodendrion hosakae* on the island of Hawai‘i. Individuals are provided protection from ungulates by fencing, and nonnative plant control. Plant cutting and seed collections, seed storage, propagation, and translocations are ongoing.

Stabilizing (interim), and Downlisting, and Delisting criteria are provided in the were provided in the Recovery Plan for *Lipochaeta venosa* and *Isodendrion hosakae* (USFWS 1994) and the Amendment to the Recovery Plan for *Lipochaeta venosa* and *Isodendrion hosakae* (USFWS 2019) 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 targets, and Downlisting, and Delisting criteria. 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.

Isodendrion hosakae is a short-lived perennial 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 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 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met (Table 1). There are not three populations with greater than 50 mature individuals, all threats are not being managed and genetic storage is not complete (Table 2). Therefore, *Isodendrion hosakae* meets the definition of Endangered as it 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 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 *Isodendrion hosakae* to assess resiliency and make collections.
  - Determine suitable locations for reintroductions.
- Ungulate monitoring and control—Monitor and 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 to control established ecosystem-altering nonnative invasive plant species, and those that compete with *Isodendrion hosakae*.
- Site and habitat protection—Develop and implement effective control measures to reduce the impacts of destruction by military activities, agriculture and urban development, fire, and invasive invertebrate predation.
- Fire prevention and control—Implement and update 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 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 reduced viability due to low numbers.
- 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:

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

Lyon Arboretum. 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.

[USAG-HI] United States Army Garrison – Hawai‘i. 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. 1994. Recovery plan for *Isodendrion hosakae* and *Isodendrion hosakae*. Portland, OR 45 pp. + appendices.

[USFWS] 2012. *Isodendrion hosakae* 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/1983.pdf*.

[USFWS] 2020. *Isodendrion hosakae* 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/3167.pdf*.

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[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 *Isodendrion hosakae* (aupaka)

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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