5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Plantago hawaiensis* (laukahi kuahiwi)

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 *Plantago hawaiensis* (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/3749*).

Review Analysis:

Please refer to the previous 5-year reviews for *Plantago hawaiensis* published in the Federal Register on August 28, 2012 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1967.pdf*), and on September 30, 2020 (available at *https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3173.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 *P. hawaiensis*.

This short-lived perennial herb in the Plantaginaceae (plantain) family is endangered and found on the island of Hawai‘i. The status and trends for *Plantago hawaiensis* are provided in the tables below.

New Status Information:

- At the time of the previous five-year review in 2020, there were an estimated 33 wild individuals at two locations in Hawai‘i Volcanoes National Park (HVNP). Since 2020, only a new population on the east side of Mauna Kea has been monitored, with seven mature individuals observed (PEPP 2024). The current estimate for *Plantago hawaiensis* is fewer than 40 wild individuals (PEPP 2024).
- Currently, there are twelve founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks and plants in a living collection (Lyon Arboretum 2024; Volcano Rare Plant Facility [VRPF] 2024).

New Threats:

- None

New Management Actions:

- Monitoring and surveys—PEPP and HVNP staff monitor wild and reintroduced populations of *Plantago hawaiensis* (PEPP 2024; HVNP 2024).
- Ungulate monitoring and control—PEPP and staff at HVNP monitor and repair fences and excludes ungulates from fences protecting wild and reintroduced populations. A 90-acre (36.4 hectares) fence was constructed in 2022 to protect individual wild plants at the Mauna Kea East population (HVNP 2024; PEPP 2024).
- Nonnative plant control—PEPP and staff at HVNP control nonnative plants around populations of *Plantago hawaiensis* as well as establish fire breaks to limit the effects of wildfires (HVNP 2024; PEPP 2024).
- Collection and propagation for genetic storage and reintroduction—
    - Lyon Arboretum reports 980 seeds in storage from five wild founders at Mauna Kea (Lyon Arboretum 2024).
    - PEPP collected 937 seeds from three founders in 2023 (PEPP 2024).
    - Volcano Rare Plant Facility (VRPF) reports four plants in cultivation representing two founder plants from Mauna Kea (VRPF 2024).
    - HVNP reported 8,281 seeds in storage representing four founders from Kapapala Upper, Kapapala Lower, and Kahuku East. An additional 198 potted plants remain in a living collection representing founders from Kahuku East (HVNP 2024).
- Translocations—HVNP reintroduced 15 individuals at Kilohana and Kahuku in 2022, and 12 were observed during monitoring in 2024 (HVNP 2024). PEPP reintroduced 19 individuals in 2023 into the Waipāhoehoe Exclosure (PEPP 2024).

Table 1. Status and trends of *Plantago hawaiensis* 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 1.

Date	No. wild individuals	No. Outplanted	Stabilization criteria identified in Recovery plan	Preventing Extinction Targets Completed?
1994 (Listing)	10	0	All threats managed in the 3 populations	No
			Complete genetic storage	No
			3 populations with 50 individuals each	no
2012 (5-year review)	several 100	>1,000, 301 survived	All threats managed in the 3 populations	No
			Complete genetic storage	No
			3 populations with 50 individuals each	Yes

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Targets identified by HPPRCC	*Preventing Extinction Targets Completed?
2020 (5-year review)	34	<74 survive, 383 planted	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	Partially
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	No
2025 (5-year review)	<40	34 planted, at most 31 persist	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	No

Table 2. Threats to *Plantago hawaiensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate destruction and degradation of habitat	A	Ongoing	Partial, ungulate control and exclosures
Established ecosystem altering invasive plant species degradation of habitat	A, E	Ongoing	Partial, nonnative plant control within exclosure
Climate change	A	Ongoing	None
Predation by nonnative birds	C	Ongoing	None

Synthesis:
Currently there are 40 or fewer wild individuals of *Plantago hawaiensis* on the island of Hawai‘i. Individuals are provided protection from ungulates by fencing, and nonnative plant control. Seed collections, propagation, and reintroductions are ongoing.

Stabilizing (interim) 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, Downlisting, and Delisting 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.

Plantago hawaiensis 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 is no single population totaling 50 reproducing individuals, all threats are not being managed, and genetic storage is limited (Table 2). Therefore, *Plantago hawaiensis* meets the definition of Endangered as it remain 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 *Plantago hawaiensis* to assess resiliency and make collections.
  - Continue surveys for populations of *Plantago hawaiensis* in areas of potentially suitable habitat.
  - Determine suitable locations for reintroductions.
- Ungulate monitoring and control—Monitor and maintain fenced exclosures and construct new fences as needed 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 *Plantago hawaiensis*.
- Predator and herbivore monitoring and control—Develop and implement effective control measures to reduce the impacts of predation by nonnative birds.
- 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 and limited regeneration of wild plants.
- 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.
- Research—Investigate control strategies for nonnative birds.
- 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:

[HVNP] 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.

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.

[PEPP] 2024. Plant Extinction Prevention Program FY 2023 annual report Oct 1, 2023-Sep 30, 2024), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F14AC00174, December 24, 2016, UH Mānoa, PCSU, PEPP. 56 pp.

[USFWS] U.S. Fish and Wildlife Service. 1996. Recovery plan for the Big Island plant cluster, 1996. Portland. 176 pp. + appendices.

[USFWS] 2012. *Plantago hawaiensis* 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/1967.pdf*.

[USFWS] 2020. *Plantago hawaiensis* 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/3173.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.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Plantago hawaiensis* (laukahi kuahiwi)

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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