5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Kanaloa kahoolawensis* (Kohe Malama Malama o Kanaloa, Ka Palu Palu o Kanaloa)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 87(90):28031–28034, May 10, 2022.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

Name of Reviewer:

Cheryl Phillipson, 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 *Kanaloa kahoolawensis* (USFWS 2020). The evaluation by Cheryl Phillipson, 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/8191*).

Review Analysis:

Please refer to the previous 5-year reviews for *Kanaloa kahoolawensis* published in the Federal Register on January 18, 2008, March 27, 2014, and September 29, 2020 (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1180.pdf, https://ecos.fws.gov/docs/tess/species_nonpublish/2191.pdf, and https://ecos.fws.gov/docs/tess/species_nonpublish/3155.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 *K. kahoolawensis*.

This short-lived perennial shrub in the Fabaceae (pea) family is endangered and known from the island of Kahoʻolawe. The current status and trends for *K. kahoolawensis* are provided in the tables below.

New Status Information:

- Currently, there are no known wild individuals; the last wild individual died in 2014. Seeds and propagules are stored at five facilities.
- The last wild founder is represented by seeds and in propagation.

New Threats:

- None reported.

New Management Actions:

- Nonnative plant monitoring and management—The Kahoʻolawe Island Reserve Commission (KIRC) outplants common native plants to restore hardpan areas of Kahoʻolawe and maintains them with irrigation (KIRC 2020, pp. 5–6).
- Captive propagation for genetic storage and reintroduction—
    - In 2021, the Lyon Arboretum Micropropagation Laboratory reported propagation of 30 explants representing one founder at Kahoʻolawe and two explants representing one plant in refugia on Maui (Lyon Arboretum 2022). Propagation from apical leaf material was attempted in 2022 but was not successful (Lyon Arboretum 2022).
    - In 2019, the Maui Nui Botanical Garden (MNBG) reported one plant in refugia propagated from the last wild individual; however, this individual succumbed to disease in 2020. Pollen was saved from this plant and 22 seedlings were propagated (MNBG 2019; KIRC 2020, p. 2).
    - In 2008, the National Tropical Botanical Garden (NTBG) reported storage of one seed representing one of the last wild individuals (NTBG 2022). This seed was transferred to Olinda Rare Plant Facility and germinated in 2023.
    - In 2022, the State's rare plant nursery at Waimano reported propagation and storage of four plants representing four different nursery propagules and another propagated plant kept under different nursery conditions from a fifth nursery propagule (Oʻahu Rare Plant Facilities 2023).
    - In 2008, the Olinda Rare Plant Facility (ORPF) reported propagation of one individual representing the last wild founder on ʻAleʻale, Kahoʻolawe. From 2013 through 2022, five plants were propagated from four different plants in refugia (ORPF 2019, 2020, 2023).
    - In 2023, the Plant Extinction Prevention Program (PEPP) documented seven potted plants grown at ORPF from four *ex situ*-source plants (see Lyon Arboretum 2022, above) (PEPP 2023).

Table 1. Status and trends of *Kanaloa kahoolawensis* 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	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1999 (listing)	2	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2008 (5-year review)	1	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No
2014 (5-year review)	1	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Targets identified by HPPRCC	*Preventing Extinction Targets Completed?
2020 (5-year review)	0	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Yes
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	No
			3 populations with 250 mature individuals each	No
2024 (5-year review)	0	0	All threats managed in all 3 populations	Partial, propagation at 5 facilities
			Complete genetic storage	Yes
			Natural reproduction at all 3 populations	No
			3 populations with 300 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 *Kanaloa kahoolawensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation of habitat by feral cats	A, C	Potential	Partial, KIRC plans to manage cats in potential habitat
Degradation of habitat by seabirds	A	Potential	None
Established ecosystem altering invasive plant species degradation of habitat and competition	A, E	Ongoing	Partial, nonnative plant control in potential habitat by KIRC
Drought destruction and degradation of habitat	A	Ongoing	Partial, KIRC irrigates outplanted native plant species in potential habitat
Climate change degradation or loss of habitat	A	Ongoing	None
Predation and herbivory by rodents	C	Potential	None
Predation and disease caused by nonnative insects	C	Ongoing	Partial, insects managed at plant facilities
Reduced viability due to low numbers	E	Ongoing	Partial, propagation efforts at 5 plant facilities

Synthesis:
Currently, there are no known wild individuals on Kahoʻolawe. Three seeds and more than 20 propagules representing the last known wild individual are in refugia at five separate facilities. Propagation of vegetative materials, pollination, and storage of pollen are ongoing. Coordinated restoration efforts are under development.

Stabilizing (interim), and downlisting and delisting criteria are provided in the Addendum to the Recovery Plan for the Multi-Island Plants (USFWS 2002) and preventing extinction targets have been added and criteria updated according to the draft revised recovery objective guidelines developed by the Hawaiʻi 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.

Kanaloa kahoolawensis is a short-lived perennial shrub and an obligate outcrosser with a tendency for decline. 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 Kahoʻolawe 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 preventing extinction goals for *Kanaloa kahoolawensis* have not been met. There are no known wild individuals. There are no populations totaling at least 300 mature individuals. However, genetic storage goals have been met (Table 1). The propagules are maintained at five separate facilities for security and redundancy, but there are no translocation efforts at this time. Some habitat is being managed by nonnative plant control and reintroduction of native plant species, with irrigation. Therefore, *Kanaloa kahoolawensis* 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 2020. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2024.

- Surveys and monitoring—Continue to conduct surveys in suitable and historical habitat on Kahoʻolawe for occurrences.
- Nonnative invasive plant monitoring and control—If wild individuals are discovered, or if propagules are translocated, control established ecosystem-altering nonnative invasive plant species, and those that compete with *Kanaloa kahoolawensis* at all populations.
- Climate change adaptation strategy—Assess the modeled effects of climate change on this species and use to determine future landscape needed for its recovery.
- Rodent and feral cat monitoring and control—Determine the need for rodent and cat control at any new and translocated populations and implement effective controls if necessary.
- Captive propagation for genetic storage and reintroduction—
    - Continue collection and propagation efforts for maintenance of genetic stock and for reintroduction.
    - Develop a managed breeding program to generate more fruit/viable seeds and increase genetic diversity in captivity.
    - Continue hand pollination efforts to produce viable seeds.
    - Consider other methods of propagation including air-layering and grafting to increase numbers for seed production and genetic representation.

- Reintroduction and augmentation—Establish new populations in suitable native habitat within historical range that is being managed for known threats to this species.
- Build resiliency, redundancy, and representation—Increase species' viability through habitat restoration, threat control, and reintroduction and translocation to reduce impacts of habitat degradation by feral cats and seabirds, habitat degradation and competition from nonnative plants, predation and herbivory by rodents, climate change, and small populations.
- Alliance and partnership development—Continue to work with NEPM, PEPP, KIRC, and other partners to initiate planning and contribute to 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.

[KIRC] Kaho‘olawe Island Reserve Commission. 2020. Ko Hema Lamalama newsletter. Summer 2020, 12 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.

[MNBG] Maui Nui Botanical Garden. 2019. 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.

[NEPM] Native Ecosystems Protection & Management. 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.

O‘ahu 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.

[ORPF] Olinda Rare Plant Facility. 2019. 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] 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.

[ORPF] 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.

[PEPP] Plant Extinction Prevention Program. 2023. Hawai‘i Department of Land & Natural Resources, Division of Forestry & Wildlife, Grant number: F21AP00243, Statewide Endangered Plant Program, INTERIM Performance Report. Submitted March 2023. 132 pp.

[USFWS] U.S. Fish and Wildlife Service. 2002. Addendum to the Recovery Plan for the Multi-Island Plants. Portland, OR. 93 pp. + appendices.

[USFWS] 2008. *Kanaloa kahoolawensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc/1180.pdf.*

[USFWS] 2014. *Kanaloa kahoolawensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc/2191.pdf.*

[USFWS] 2020. *Kanaloa kahoolawensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc/3155.pdf.*

[USFWS] 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 87(90): 28031–28034, May 10, 2022.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Kanaloa kahoolawensis*
(Kohe Malama Malama o Kanaloa, Ka Palu Palu o Kanaloa)

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**

MEGAN LAUT

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