5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Canavalia molokaiensis* (ʻāwikiwiki)

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, Hawaiʻi

Name of Reviewer:

Cheryl Phillipson, 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 *Canavalia molokaiensis* (USFWS 2018). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and 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/2269*).

Review Analysis:

Please refer to the previous 5-year reviews for *Canavalia molokaiensis* published in the Federal Register on August 2, 2011, and October 22, 2018 (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1750.pdf*, and *https://ecos.fws.gov/docs/tess/species_nonpublish/2614.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 *C. molokaiensis*.

This short-lived perennial vine in the Fabaceae (pea) family is endangered and is endemic to Molokaʻi. The status and trends for *Canavalia molokaiensis* are provided in the tables below.

New Status Information:

- In 2018, approximately 18 to 33 individuals were known on Molokaʻi. As of 2023, the Molokaʻi Plant Extinction Prevention Program reports 2 individuals in Kupaia gulch, 2 individuals in Mokomoko gulch, and 6 individuals in Kua gulch (Bakutis 2023, pers. comm.). The status of populations at Puaʻahala, Waialeʻia, and Wailau totaling at least 13 individuals may be the same.
- One founder (maternal line) is represented in *ex situ* storage and cultivation (Olinda Rare Plant Facility [ORPF] 2023; Bakutis 2023, pers. comm.).

New Threats:

- None reported.

New Management Actions:

- Monitoring and surveys—Currently, the Molokaʻi Plant Extinction Prevention Program (MoPEPP) monitors populations, collects seeds for storage, and conducts translocations (PEPP 2022, pp. 7, 16; Bakutis 2023, pers. comm.).
- Collection and propagation for genetic storage and translocation—
    - In 2022, the Lyon Arboretum Seed Conservation Laboratory reported storage of 19 seeds representing one founder at Wailau Valley (Lyon Arboretum 2022).
    - In 2018, the Waimea Valley Arboretum reported storage of one seed sourced from one founder of *Canavalia molokaiensis* at Kukaʻiwaʻa (Waimea Valley Arboretum 2018). In 2022, the Arboretum reported storage of two seeds from one translocated plant at Kalaupapa National Historical Park propagated from the founder plant at Kukaʻiwaʻa (Waimea Valley Arboretum 2022).
    - In 2022, the Olinda Rare Plant Facility propagated 63 plants representing one founder at Kukaʻiwaʻa (ORPF 2023).
- Translocation and augmentation—MoPEPP reported translocation of 2 individuals to ʻŌnini gulch (Bakutis 2023, pers. comm.).

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1992 (listing)	ca 50	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2011 (5-year review)	170	76	All threats managed in all 3 populations	No

			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)	18–33 (-51)	20	All threats managed in all 3 populations	No
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2023 (5-year review)	10–23	2	All threats managed in all 3 populations	Partially, 2 translocated populations in exclosures
			Complete genetic storage	Partial, 1 founder represented
			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 *Canavalia molokaiensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, 2 translocated populations in exclosures

Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control within exclosures
Climate change degradation or loss of habitat	A	Ongoing	None
Predation and herbivory by feral ungulates	C	Ongoing	Partial, 2 translocated populations in exclosures
Predation and herbivory by rats	C	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, propagation, seed storage, and translocation efforts are ongoing

Synthesis:
In 2018, there were 18 to 33 mature wild individuals of *Canavalia molokaiensis* on Molokaʻi. Currently, there are at least 10 to possibly 23 individuals. Only two founders are represented in collections. Three translocated populations, one at Kalaupapa, one in Kukaʻiwaʻa, and another in ʻŌnini, are within managed, fenced areas.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the Molokaʻi Plant Cluster (USFWS 1996) and have been 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.

Canavalia molokaiensis is a short-lived perennial vine with vegetative reproduction. 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 six populations should be documented on Molokaʻi where they now occur or occurred historically. 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 as there are no populations of at least 50 reproducing individuals.(Table 1). Only one founder is represented in collections or in propagation or translocations. In addition, not all threats

are being managed (Table 2). Therefore, *Canavalia molokaiensis* 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 2018. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2023.

- Surveys and monitoring—Survey to assess the current status of known populations of *Canavalia molokaiensis* and for additional populations of in areas of potentially suitable habitat.
- Ungulate monitoring and control—Continue to construct exclosures to protect individuals from the negative impacts of habitat destruction and degradation, and herbivory, by feral ungulates.
- Invasive nonnative plant monitoring and control—Continue control of established ecosystem-altering nonnative invasive plant species within and around all wild and translocated populations of *C. molokaiensis*.
- Rat control—Implement effective control measures for rats at all wild and translocated populations.
- Climate change adaptation strategy—Assess the modeled effects of climate change on this species to determine future landscape needed for its recovery.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for translocation.
- Translocation and augmentation—Continue to reintroduce individuals into suitable habitat within historic range that is being managed for known threats to this species.
- Build resiliency, redundancy, and representation—Increase numbers of populations and individuals throughout historic range to reduce impacts of predation by rats and low numbers.
- 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 taxon.

References:

Bakutis, A. 2023, pers. comm. Molokaʻi Plant Extinction Prevention Program updates for PEPP plant species endemic to Molokaʻi. 31 MAY 2023.

[HPPRCC] Hawaiʻi 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, Hawaiʻi.

[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.

[PEPP] 2022. Plant Extinction Prevention Program fiscal year 2022 interim performance report (October 1, 2021-September 30, 2022), Cooperative Agreement F19AC00532 (Interim report), U.S. Fish and Wildlife Service CFDA Program #15.657 Endangered Species Conservation—Recovery Implementation Funds, University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 50 pp.

[USFWS] U.S. Fish and Wildlife Service. 1996. Recovery plan for the Moloka‘i plant cluster (Hawai‘i). Portland. 143 pp.

[USFWS] 2011. *Canavalia molokaiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/1750.pdf.*

[USFWS] 2018. *Canavalia molokaiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/2614.pdf*.

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Waimea Valley Arboretum. 2018. 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.

Waimea Valley 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.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Canavalia molokaiensis*
(ʻāwikiwiki)

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**

LAUREN WEISENBERGER

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