

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Pritchardia munroi* (loulou)

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 *Pritchardia munroi* (USFWS 2018). The evaluation by Daniel Adamski, 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/8525>).

Review Analysis:

Please refer to the previous 5-year reviews for *Pritchardia munroi* published in the Federal Register on August 29, 2011, (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1787.pdf) June 5, 2014, (available at https://ecos.fws.gov/docs/tess/species_nonpublish/2202.pdf) October 23, 2018, (available at https://ecos.fws.gov/docs/tess/species_nonpublish/2655.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. munroi*.

This long-lived perennial tree in the Arecaceae (palm) family is endangered and known from the islands of Moloka'i and Maui. The current status and trends for *Pritchardia munroi* are provided in the tables below.

New Status Information:

- Currently, there are approximately three wild populations of *Pritchardia munroi* on Maui at Pōhākea and Ukumehame, totaling 3 mature individuals (Plant Extinction Prevention Program (PEPP) 2022). Two additional historic populations on Maui have not been monitored for 25 years (Wood 1998a; Wood 1998b) There is one wild population on Moloka‘i at Kapuaoko‘olau, containing one individual (Coehlo 2019). In addition, there is one reintroduced population on Maui totaling eight individuals, and three reintroduced populations on Moloka‘i totaling approximately 18 individuals (Bakutis et. al. 2019; Coehlo et. al. 2019; Coehlo 2020; Oppenheimer et. al. 2020; PEPP 2023).
- Currently, there are approximately three founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks, seeds in micropropagation, and plants in a nursery or living collection.

New Threats:

- None

New Management Actions:

- Monitoring and surveys— PEPP monitors and surveys for individuals of *Pritchardia munroi* on Moloka‘i and Maui (Bakutis et. al. 2019; Coehlo et. al. 2019; Coehlo 2020; PEPP 2022).
- Ungulate monitoring and management—PEPP monitors and maintains fencing at several populations on Moloka‘i and Maui (Coehlo et. al. 2019; Coehlo 2020; PEPP 2022).
- Invasive nonnative plant management— PEPP conducts nonnative plant control at Kainalu Gulch on Moloka‘i and at Ukumehame on Maui (Bakutis et. al. 2019; Oppenheimer et. al. 2020).
- Control of predation and herbivory by rats—PEPP controls rats at Pōhākea and Ukumehame on Maui, and at Kapuaoko‘olau on Moloka‘i (Coehlo 2020; PEPP 2022).
- Collection and propagation for genetic storage and reintroduction—
 - PEPP collected seeds from one founder at Pōhākea on Maui in 2022 (PEPP 2022).
 - Lyon Arboretum Micropropagation Laboratory reports 18 seeds in micropropagation representing one founder and the Lyon Seed Conservation Laboratory reports 15 seeds in storage from one cultivated plant (Lyon Arboretum 2022).
 - National Tropical Botanical Garden (NTBG) reports one individual in cultivation (NTBG 2022).
 - Olinda Rare Plant Facility (ORPF) reports 66 plants in cultivation representing three founders (ORPF 2022).
- Reintroduction/ Augmentation/ Introduction—
 - PEPP reintroduced one individual to an established outplanting site at Ukumehame on Maui in 2020, and two additional individuals in 2023 (Oppenheimer et. al. 2020; PEPP 2023).

- PEPP reintroduced 15 individuals to a new outplanting site at a fenced enclosure at Kainalu Gulch on Moloka‘i in 2019 (Coehlo et. al. 2019).

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1991 (listing)	1	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	No
2011 (5-year review)	2 (Moloka‘i) ca 22 (Maui)	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2014 (5-year review)	0 (Moloka‘i) uncertain (Maui)	14	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2018 (5-year review)	1 (Moloka‘i) ca 30 (Maui)	36	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all X populations	No

			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2023 (5-year review)	1 (Moloka'i) 3 (Maui)	24	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			Natural reproduction at all 3 populations	No
			3 populations with 25 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 *Pritchardia munroi* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, some populations fenced
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control at some populations
Drought destruction and degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Degradation and destruction by fire	A	Ongoing	None
Predation and herbivory by feral ungulates	C	Ongoing	Partial, some populations fenced
Predation and herbivory by rats	C	Ongoing	Partial, control at some populations
Predation and herbivory by invertebrates—Slugs, snails, black twig borer	C	Ongoing	None

Reduced viability due to low numbers	E	Ongoing	Partial; propagation, storage, and reintroduction
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Synthesis:

Currently there are approximately four wild individuals of *Pritchardia munroi* on Moloka‘i and Maui. Individuals are provided protection by fencing, rat control, and nonnative plant control. Seed collections, 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.

Pritchardia munroi is a long-lived perennial tree. 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 and Maui where they now occur or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, saplings) with a minimum of 25 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. There are few individuals in genetic storage (Table 1), and there are no single populations totaling at least 25 reproducing individuals, and all threats are not being managed (Table 1, Table 2). Therefore, *Pritchardia munroi* 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 1998. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2023.

- Surveys and monitoring—Survey for additional populations of *Pritchardia munroi* in areas of potentially suitable habitat.
- Ungulate monitoring and control—Continue to 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 control of established ecosystem-altering nonnative invasive plant species, and those that compete with *Pritchardia munroi* within and around all wild and translocated populations.
- Fire prevention and control—Continue to develop and implement fire prevention management plans and monitor populations after fire occurrence.
- 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—Continue to implement effective methods for rodents and slugs around wild and translocated 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 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.

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- Oppenheimer, H., K. Bustamente, and K. Kaaikala. 2020. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form in PEPP 2022: Plant Extinction Prevention Program, FY 2022 Annual Report (Oct 1, 2021-Sep 30, 2022), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F19AC00532 (Interim Report), December 29, 2022, UH Mānoa, PCSU, PEPP. 74 pp. BioPacifica database record for *Pritchardia munroi*, Pacific Islands Fish and Wildlife Office.
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SIGNATURE PAGE for 5-YEAR REVIEW of *Pritchardia munroi* (loulou)

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

_____ Date _____