5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Pritchardia kaalae* (loulu)

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:

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 *Pritchardia kaalae* (USFWS 2019). 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/2904*).

Review Analysis:

Please refer to the previous 5-year reviews for *Pritchardia kaalae* published in the Federal Register on January 18, 2008, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1157.pdf*); August 12, 2013, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2094.pdf*), and on September 30, 2019, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2904.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. kaalae*.

This long-lived perennial tree in the Arecaceae (palm) family is endangered and endemic to O‘ahu. The current status and trends for *Pritchardia kaalae* are provided in the tables below.

New Status Information:

- Currently, *Pritchardia kaalae* occurs in four population units in the Waiʻanae mountains, with wild plants totaling 205 mature and 631 immature individuals (Army Natural Resources Program on Oʻahu [ANRPO] 2023a; ANRPO 2023b, Appendix 4-1). The largest wild population unit is ʻŌhikilolo, with 76 mature and 617 immature individuals, as well as recruitment (seedlings) (ANRPO 2023b, Appendix 4-1).
- Currently, there are approximately 10 founder lines represented in *ex situ* storage and propagation collections, including seeds in seed banks and plants in a nursery or living collection (ANRPO 2023b, Appendix 4-3; Lyon Arboretum 2023).

New Threats:

- None

New Management Actions:

- Monitoring and surveys—ANRPO monitor individuals of *Pritchardia kaalae* in the Waiʻanae mountains of Oʻahu (ANRPO 2023a).
- Ungulate monitoring and management — Fences and ungulates are monitored by the ANRPO at ʻŌhikilolo, Makaleha to Manuwai, and ʻŌhikilolo East to West Makaleha (ANRPO 2023b, Appendix 4-2).
- Nonnative plant control—Nonnative plants are controlled in two management units (ʻŌhikilolo and ʻŌhikilolo East to West Makaleha) (ANRPO 2023b, Appendix 4-2).
- Control of predation and herbivory by rats— The ANRPO controls rats using Goodnature™ A24 rat traps at ʻŌhikilolo, Makaleha to Manuwai, and ʻŌhikilolo East to West Makaleha (ANRPO 2023a, Appendix 4-2).
- Slug control— The ANRPO controls slugs at the reintroduction site at ʻŌhikilolo East to West Makaleha (ANRPO 2023a, Appendix 4-2).
- Invertebrate monitoring— The ANRPO monitors traps for the presence of coconut rhinoceros beetles, which have both damaged and killed *Pritchardia kaalae* trees at populations in the ʻŌhikilolo management unit in the past year (ANRPO 2023a).
- Collection and propagation for genetic storage and reintroduction—
    - ANRPO reports 10 founders represented in seed storage with at least 10 seeds, and of those, five founders are in storage with more than 50 viable seeds. ANRPO also maintains a living collection with approximately five founders with three or more plants in propagation (ANRPO 2023b, Appendix 4-3).
    - Lyon Arboretum Micropropagation Laboratory reports eight explants in micropropagation representing three founders (Lyon Arboretum 2023).
- Reintroduction/ Augmentation/ Introduction—
    - ANRPO reintroduction plantings at two population units, ʻŌhikilolo and ʻŌhikilolo East to West Makaleha, are estimated at 147 mature individuals, 530 immature individuals, and 19 seedlings that currently survive (ANRPO 2023b, Appendix 4-3).

Table 1. Status and trends of *Pritchardia kaalae* 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?
1996(Listing)	130	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	Partial
2008 (5-year review)	207	356	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 25 mature individuals each	Partial
2013 (5-year review)	188 mature, 1,088 immature, 14 seedlings	3 mature, 738 immature	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 25 mature individuals each	Partial

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2019 (5-year review)	200 mature; >1,000 immature	732	All threats managed in all 3 populations	Partial
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	Yes
			Complete genetic storage	Partial
			3 populations with 25 mature individuals each	Yes, wild and reintroduction
2024 (5-year review)	205 mature; 631 immature	147 mature; 530 immature	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			Natural reproduction at all 3 populations	Partial, 1 population
			3 populations with 25 mature individuals each	Partial, 2 populations

* 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 kaalae* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, ungulate control at three management units
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control at two management units
Fire destruction and degradation of habitat	A	Ongoing	Partial, fire management plan available
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Overcollection and vandalism	B	Ongoing	Partial, fencing a possible deterrent
Ungulate predation and herbivory	C	Ongoing	Partial, ungulate control at three management units
Rodent predation and herbivory	C	Ongoing	Partial, rodent control at three management units
Predation and herbivory by invertebrates—Slugs	C	Ongoing	Partial, control at one management unit
Predation and herbivory by invertebrates— coconut rhinoceros beetle	C	Ongoing	Partial, monitoring of populations
Competition with established invasive plant species	E	Ongoing	Partial, nonnative plant control at two management units

Synthesis:
Currently there are at 205 mature and 631 immature wild individuals of *Pritchardia kaalae* on O‘ahu. Individuals are provided protection by fencing, nonnative plant control, rodent control, slug control, and ungulate control. Coconut rhinoceros beetles are increasing and spreading throughout O‘ahu and killing trees of *Pritchardia kaalae* at one population and damaging trees at another, and techniques to control threat in the forests have yet to be developed. Seed collections, seed storage and propagation are ongoing, however seed storage techniques have yet to be determined and currently being researched at Lyon Arboretum.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the O‘ahu Plants (USFWS 1998) 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 kaalae 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 O‘ahu 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 25 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. There are only two populations with more than 25 reproducing individuals, only ten founders have been secured in *ex situ* storage (Table 1), and all threats are not being managed (Table 1, Table 2). Therefore, *Pritchardia kaalae* 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 2019. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2024.

- Surveys and monitoring—
  - Continue monitoring extant populations of *Pritchardia kaalae*
  - Determine suitable locations for reintroductions.
- Ungulate monitoring and control—Continue to maintain fenced exclosures 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 *P. kaalae*.
- Site and habitat protection—Continue to develop and implement effective threat control measures to reduce the impacts of invasive plants and invasive invertebrates.
- Fire prevention and control—Continue to develop and implement 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, including increasing temperatures, periods between rain events, and increasing frequency and intensity of hurricanes. Additional management actions may be needed, such as locating key microsites that overlap with current and future climate envelopes for translocation efforts.

- Predator, pest, and herbivore monitoring and control—Determine and implement effective methods to control rodents, and slugs.
- Invertebrate predation—Continue monitoring the spread of the coconut rhinoceros beetle and develop and implement control methods.
- 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 into suitable habitat that is being managed for known threats to this species to reduce impacts of climate change degradation and nonnative plant competition.
- 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:

[ANRPO] Army Natural Resource Program on Oʻahu. 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, Hawaiʻi.

[ANRPO] Army Natural Resource Program on Oʻahu. 2023b. Appendices to the Status report for the Mākua and Oʻahu Implementation Plans, Army Natural Resources Program, Oʻahu, Office of the Vice President for Research and Innovation, University of Hawaiʻi.

[HBMP] Hawaii Biodiversity and Mapping Program. 2010. Plant species GIS data and Access database.

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

[U.S. Fish and Wildlife Service] U.S. Fish and Wildlife Service. 1998. Recovery plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages, plus appendices.

[USFWS] 2008. *Pritchardia kaalae* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc1157.pdf*.

[USFWS] 2012. Endangered and threatened wildlife and plants; Endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Department of the Interior, Federal Register 77 (181): 57648–57862, September 18, 2012.

[USFWS] 2013. *Pritchardia kaalae* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc2094.pdf*.

[USFWS] 2019. *Pritchardia kaalae*. 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc2904.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 *Pritchardia kaalae* (loulu)

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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