

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Pritchardia remota* (Loulu)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2015. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 133 species in Hawaii, Oregon, Idaho, and Washington. Federal Register 80(30): 8100–8103.

### **Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawaii

### **Name of Reviewer(s):**

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Gregory Koob, Conservation & Restoration 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 (USFWS) beginning in January 2016. The review was based on a review of current, available information since the last 5-year review for *Pritchardia remota* (USFWS 2009). The evaluation by Cheryl Phillipson, Biologist, PIFWO, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Gregory Koob, Conservation and Restoration 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/tess\\_public](http://ecos.fws.gov/tess_public)).

### **Review Analysis:**

Please refer to the previous 5-year review for *Pritchardia remota* published in the Federal Register on July 21, 2009 (USFWS 2009, available at [https://ecos.fws.gov/docs/five\\_year\\_review/doc2439.pdf](https://ecos.fws.gov/docs/five_year_review/doc2439.pdf)) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status have come to light since listing to warrant a change in the Federal listing status of *P. remota*.

This long-lived perennial palm tree in the Areaceae family is endangered and found on the Northwestern Hawaiian Island of Nihoa. The current status and trends for *Pritchardia remota* are provided in the tables below.

### **New Status Information:**

In addition to those populations cited in the previous 5-year review, new observations include the following:

- In Hodel's review (2007), there are no significant morphological differences between *Pritchardia remota* and *P. aylmer-robinsonii* (found on Niihau). Hodel synonymizes *P. aylmer-robinsonii* with *P. remota* (2007, 2012). We will address this change in the next 5-year review for *P. aylmer-robinsonii*.
- At the time of the last 5-year review in 2009 there were two populations totaling 1,100 individuals on Nihoa. Currently, on Nihoa, the palms still occur in large colonies in two separate valleys (West Palm Valley and East Palm Valley). A population estimate will be conducted on Nihoa in September 2017. A visit to Nihoa in 2016 observed that both populations are healthy with mature fruits and flowers present (Plentovich *et al.* 2016). However, the population area is constricting, where individuals do not occur at the higher elevations of the previous range (Plentovich 2017, pers comm.). Only two older palms remain on Niihau (Hodel 2012).

#### New Threats:

- Climate change loss or degradation of habitat—Climate change may pose a threat to this species. Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawaii using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under climate change. The assessment by Fortini *et al.* (2013) concluded that *Pritchardia aylmer-robinsonii* is vulnerable to the impacts of climate change, with a vulnerability score of 0.584 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions are needed to conserve this taxon (on Niihau) into the future. No analysis was provided for *P. remota*.

#### New Management Actions:

- NTBG has dozens of plants planted on their grounds representing many collections from Nihoa and Niihau (NTBG 2017). Waimea Arboretum has eight seeds in propagation (2016). Pahole Rare Plant Facility on Oahu has two potted plants (PEPP 2016). The Seed Conservation Lab has two collections in storage for research (Lyon Arboretum 2017).
- In 2015, the Service funded a research project regarding optimization of seed banking methods for Hawaiian plants and the study included *Pritchardia remota*. Five hundred and thirty-two seeds (including seeds of *Pritchardia remota*) collected by the Seed Conservation Laboratory staff were sent to the National Center for Genetic Resources Preservation in Fort Collins for research on cryopreservation to extend storage life of species with short-lived seeds (PEPP 2016). Seeds of species of *Pritchardia* cannot be stored conventionally, and currently can only be stored for a few months unless they are stored via cryopreservation methods (Walters 2017, pers. comm.).

#### Synthesis:

Currently, there are approximately 1,100 individuals of *Pritchardia remota* in two populations on Nihoa, and two individuals on Niihau, though no populations estimates have been recently conducted. A landscape-based assessment of climate change vulnerability for native plants of Hawaii using high resolution climate change projections was made by Fortini *et al.* (2013) and

their analysis showed that *P. aylmer-robinsonii* is highly vulnerable to the effects of climate change; however, no analysis was provided for *P. remota*. Dozens of plants are maintained at NTBG, planted as living collections, as well as other botanical gardens throughout the state.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Recovery Plan for Three Plant Species from Nihoa Island (USFWS 1998), and have been updated according to the draft revised recovery objective guidelines developed by the Hawaii 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 determination 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 remota* is a long-lived perennial tree with no specific characteristics known. To reach preventing extinction objectives, 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 an *ex situ* (at other than the plant's natural location, such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on Nihoa and Niihau (and in suitable habitat on Laysan) 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 individuals per population.

The preventing extinction goals for this species have not been met (Table 1). Although there may be two populations of 25 individuals, a third population is needed, genetic representation is incomplete (Table 1), and threats are not being sufficiently managed throughout the range of the species (Table 2). Therefore, *Pritchardia remota* meets the definition of endangered as it remains in danger of extinction throughout its range.

### **Recommendations for Future Actions:**

No new threats and no other significant new information regarding the species' biological status have been reported since the last 5-year review in 2010. Therefore, the following recommendations for future actions are reiterated for the 5-year review for 2017.

- Surveys and inventories—Conduct inventories of the current populations on Niihau and Nihoa to determine status.
- Invasive plant monitoring and control—
  - Control established ecosystem-altering nonnative invasive plant species around all populations.
  - Control invasive nonnative species that compete with the species around all populations.
  - Continue efforts to prevent introduction of new species to Nihoa.
- Predator and herbivore control research—

- Study *Pritchardia remota* populations to determine level of threat from invertebrate herbivory by the nonnative grasshopper *Schistocerca nitans* and any additional needed recovery actions.
- Determine identity of unknown fungus, the degree of impact to seeds, and if control methods are needed.
- Control rats in the vicinity of the population on Niihau.
- Captive propagation for genetic storage and reintroduction—Continue to collect material for genetic storage.
- Reintroduction and translocation—Assess potential sites for establishing reintroductions on Laysan or on other NWHI such as Necker and Lehua in areas with other than limestone substrate.
- Population biology research—
  - Assess genetic variability within extant populations and between *Pritchardia remota* and *P. aylmer-robinsonii*.
  - Study *P. remota* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.
- Human disturbance—Collecting impacts—Continue to restrict human access to Nihoa.
- Habitat and natural process management and restoration—Work with the State of Hawaii to implement remote monitoring methods and ecosystem-level management of wild and reintroduction sites.
- Update the listed entity on 50 CFR 17.12 to include the individuals on Niihau as *Pritchardia remota* and delist and remove *P. aylmer-robinsonii* if genetic studies verify this taxonomic change.

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

Date	No. wild individuals	No. outplanted	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
1996 (listing)	680	0	Five colonies with a minimum of 100 mature individuals for a minimum of five consecutive years	Partially
			Successful propagation and outplanting <i>ex situ</i>	Partially

			Remote monitoring system	No
1998 (recovery plan)	680	0	Five colonies with minimum of 100 mature individuals for a minimum of five consecutive years	Partially
			Successful propagation and outplanting <i>ex situ</i>	Partially
			Remote monitoring system	No
2003 (critical habitat)	> 1,072	0	Five colonies with minimum of 100 mature individuals for a minimum of five consecutive years	Partially
			Successful propagation and outplanting <i>ex situ</i>	Partially
			Remote monitoring system	No
2009 (5-year review)	~1,100	0	Five colonies with minimum of 100 mature individuals for a minimum of five consecutive years	Partially
			Successful propagation and outplanting <i>ex situ</i>	Partially
			Remote monitoring system	No
<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>*Preventing Extinction Criteria identified by HPPRCC</b>	<b>*Preventing Extinction Criteria Completed?</b>

2016 (5-year review)	~1,100	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Reproduction ( <i>i.e.</i> viable seeds, seedlings) at all three populations	Partially
			Three populations with 25 mature individuals each	Partially

\*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 after Preventing Extinction).

**Table 2. Threats to *Pritchardia remota* and conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A	Ongoing	None
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	None
Hurricane destruction and degradation of habitat	A	Ongoing	None
Climate change loss or degradation of habitat	A	Ongoing	None
Collecting impacts	B	Ongoing	None
Ungulate predation or herbivory	C	Ongoing	None
Rodent predation or herbivory	C	Ongoing	None
Invertebrate predation or herbivory	C	Ongoing	None
Stochastic events—Reduced viability due to low numbers	E	Ongoing	Partial, seed collection and storage

**References:**

See previous 5-year review in 2009 for a full list of references. Only references for new information are provided below.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change

- vulnerability for all native Hawaiian plants. Technical report HCSU-044, Hawaii Cooperative Studies Unit, University of Hawaii at Hilo, Hawaii. 134 pp.
- [HPPRCC] Hawaii and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 12 pp.
- Hodel, D.R. 2012. Loulu, the Hawaiian Palm. University of Hawaii Press, Honolulu. Pp. 135–138.
- Lyon Arboretum. 2017. Micropropagation and Seed Conservation Laboratories controlled propagation database reports.
- [NTBG] National Tropical Botanical Garden. 2017. NTBG controlled propagation database report.
- [PEPP] Plant Extinction Prevention Program. 2016. Hawaii Department of Land & Natural Resources, DOFAW rare plant program, section 6 interim performance report, F15AF00595, Plant Extinction Prevention Program annual report Fiscal Year 2016 (July 1, 2015-June 30, 2016). 53 pp.
- Plentovich, S., C. Farmer, R. Rounds. 2016. Nihoa Island biological monitoring and management. 18-26 August 2016. Unpublished report to the U.S. Fish and Wildlife Service.
- Plentovich, S. 2017, pers. comm. Personal communication regarding the current status of *Pritchardia remota* on Nihoa.
- [USFWS] U.S. Fish and Wildlife Service. 2010. *Pritchardia remota* 5-year review summary and evaluation. [https://ecos.fws.gov/docs/five\\_year\\_review/doc2439.pdf](https://ecos.fws.gov/docs/five_year_review/doc2439.pdf).
- [USFWS] 2015. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 133 species in Hawaii, Oregon, Idaho, and Washington. 80 FR 8100, February 13, 2015.
- Waimea Arboretum. 2016. Waimea Valley Arboretum controlled propagation report.
- Walters, C. 2017, pers. comm. Personal communication regarding the current status of gene banking for the genus *Pritchardia*.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Pritchardia remota* (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**

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