

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Pritchardia aylmer-robinsonii* (wahane)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2009. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 103 species in Hawaii. Federal Register 74(49):11130-11133.

Lead Region/Field Office:

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

Name of Reviewer(s):

Marie Bruegmann, Plant Recovery Coordinator, PIFWO

Jess Newton, Recovery Program Lead, PIFWO

Assistant Field Supervisor for Endangered Species, PIFWO

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on March 16, 2009. The review was based on final critical habitat designation for 95 plant species from the islands of Kauai and Niihau (USFWS 2003), as well as a review of current, available information. The National Tropical Botanical Garden provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Tamara Sherrill, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Lead and the Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

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).

Application of the 1996 Distinct Population Segment (DPS) Policy:

This Policy does not apply to plants.

Review Analysis:

Please refer to the final critical habitat nondesignations rule for *Pritchardia aylmer-robinsonii* published in the Federal Register on February 27, 2003 (USFWS 2003) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and 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. aylmer-robinsonii*.

A number of researchers have found fossil evidence including pollen, seeds, fruits, and trunks, indicating that *Pritchardia* palms represented a larger percentage of the flora in coastal to mid-elevation habitats in the Hawaiian Islands during pre-Polynesian times. Remaining populations of *Pritchardia* palms today are remnants of a once much more continuous and widespread distribution of the past (Burney *et al.* 2001; Athens 2002; Chapin *et al.* 2007).

Pritchardia aylmer-robinsonii was originally listed as endangered in 1996 (USFWS 1996). Harold St. John discovered three locations of *P. aylmer-robinsonii* in 1947 on the island of Niihau, at the Kaali Cliff and in Mokouia and Haao Valleys between 70 and 270 meters (230 and 886 feet) elevation. Only two wild plants are believed to survive on the Kaali cliffs in a rugged and steep area where they receive some protection from grazing animals. Originally a component of the coastal dry forest, this species is widely cultivated by residents of Niihau, producing abundant seeds (Wood 2010). Progeny of wild plants have been grown in homes and botanical gardens throughout Hawaii and seed has been widely circulated among horticulturists (National Tropical Botanical Garden 2009). However, there is some concern that cultivated plants may not be suitable sources for restoration material. Hawaiian *Pritchardia* species are long-lived often living for more than 100 years (Gemmill 1996).

Pritchardia species have been observed to be pollinated by introduced bees and wasps (Gemmill 1996), and the common honeybee can forage as far away as 6.1 kilometers (3.8 miles) (Beekman and Ratnieks 2000). *Pritchardia* are primarily outcrossers in nature, but at least in the case of an isolated *Pritchardia munroi* individual it has been observed to self-pollinate and was able to produce viable seeds. The remaining individuals of this genus are mostly found in isolated, small single-island endemic groups that are probably self-pollinating. In addition, cultivated plants of the more common *Pritchardia* species were shown to have less genetic variability than wild plants (Gemmill 1996). This suggests that in cultivation, unless only one species of *Pritchardia* is intensively collected and the planting is isolated enough to prevent bee pollination with another species (such as one growing in a nearby landscape planting), the seeds that results may be hybrids of the two species. Further research is needed to confirm or disprove the idea that different *Pritchardia* species in close proximity may be able to produce hybrid seedlings.

Genetic analysis is needed to determine where this species belongs within the genus of Hawaiian *Pritchardia*. In reviewing this species within the Pacific genus *Pritchardia*, Donald Hodel did not find any significant morphological differences between *P. remota* from the island of Nihoa and *P. aylmer-robinsonii* from the island of Niihau (Hodel 2007). In addition, Hodel choose to incorporate *P. aylmer-robinsonii* into the name *P. remota* as a single taxon (Hodel 2007). Fossil seeds from Makauwahi Cave on the southern coast of Kauai morphologically matched a group of palms previously noted to be closely related (*P. aylmer-robinsonii*, *P. glabrata*, *P. napaliensis*, and *P. remota*) (Burney *et al.* 2001; Read and Hodel 1999). It is thus likely that it was a widespread coastal species, formerly also occurring on leeward Kauai (Burney *et al.* 2001).

The original habitat of *Pritchardia aylmer-robinsonii* was coastal dry shrubland and forest. Presumably this might include native species such as *Eragrostis variabilis* (kawelu), *Heliotropium* sp., *Heteropogon contortus* (pili grass), *Jacquemontia ovalifolia* (pau o Hiiaka), *Lycium sandwicense* (ohelo kai), *Scaevola sericea* (naupaka), *Sida fallax* (ilima), and *Sporobolus virginicus* (aki aki) (Wagner *et al.* 1999).

Although no information has been reported regarding rat damage on this species, rats are seed predators of other *Pritchardia* species (Listing Factor C) (USFWS 2010) and presumably this could be true of the wild individuals on Niihau as well. On Nihoa, a serious infestation of gray bird grasshoppers (*Schistocerca nitens*) damaged *Pritchardia remota* in 2002 and 2004 (USFWS 2009), and grasshoppers have been observed on *Pritchardia* plants reintroduced on Lehua Islet, adjacent to Niihau (Listing Factor C) (D. Burney, National Tropical Botanical Garden, pers. comm. 2010). Therefore, grasshoppers may have affected plants on Niihau as well; however no damage has been reported on *Pritchardia* species planted nearby homes located in Puu Wai village of Niihau (M. DeMotta, National Tropical Botanical Garden, pers. comm. 2010).

Feral and domesticated cattle (*Bos taurus*), pigs (*Sus scrofa*), goats (*Capra hircus*), and sheep (*Ovis aries*) have degraded the habitat of *Pritchardia aylmer-robinsonii* (Listing Factors A and D) as well as directly damaged trees, seedlings, and/or seeds (Listing Factor C) (USFWS 1996).

The unauthorized collection of seeds from *Pritchardia* species is a huge threat to endangered palm species in Hawaii; however there are no direct reports for this particular species. Thus, critical habitat was not designated for *Pritchardia aylmer-robinsonii* because it would increase the threat of vandalism (Listing Factor B) (USFWS 2003).

Climate change may also pose a threat to this species (Listing Factors A and E). However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

No direct observations of the remaining wild *Pritchardia aylmer-robinsonii* on Niihau have been reported for many years, as the landowner has not allowed access. The current status of the wild plants is therefore unknown, although one individual is visible through binoculars from the adjacent islet of Lehua (D. Burney, pers. comm., 2010.).

In addition to all of the other threats, species like *Pritchardia aylmer-robinsonii* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes, landslides, flooding and disease outbreaks (Listing Factor E). The extent of these natural processes on this single island endemic are exacerbated by anthropogenic

threats, such as habitat loss for human development or predation by introduced species (USFWS 2010).

The Kauai Division of Forestry and Wildlife Nursery has 100 seeds in storage from an unknown number of individuals (Kauai Division of Forestry and Wildlife 2009). Four trees propagated from one individual are currently growing on Oahu at the Waimea Valley Arboretum (Waimea Valley Arboretum 2009). Two mature trees are growing on Maui at the Maui Nui Botanical Gardens (Maui Nui Botanical Gardens 2010).

Stabilizing, downlisting, and delisting objectives are not provided for *Pritchardia aylmer-robinsonii*, as it is exempt from needing a recovery plan, due to the lack of access to the privately-owned island on which it occurs. Referring to Recovery Plans written for similar species found on Niihau and other endangered *Pritchardia* species in Hawaii (USFWS 1998), recovery goals are based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Pritchardia aylmer-robinsonii* is a long-lived perennial, and to be considered stable, the taxon must be managed to control threats (*e.g.*, fenced) and be 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 the island of Niihau. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

The interim stabilization goals as they would have been defined for this species have not been met, as there are only one to two individuals left in the wild, hence no population contains more than 25 mature individuals (Table 1). In addition, all threats are not being managed (Table 2). Therefore, *Pritchardia aylmer-robinsonii* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Collaborate with land owners to gain access to Niihau to determine the current status of all populations.
- Collect material for genetic storage and propagation for reintroduction.
- Propagate for reintroduction and augmentation.
- Control rats in the vicinity of these populations.
- Develop and implement methods to control grey bird grasshoppers.
- Assess the genetic variability within extant populations and between species to determine the taxonomic status of *Pritchardia remota* and *P. aylmer-robinsonii*.
- Work with Hawaii Division of Forestry and Wildlife, Hawaii State Parks, and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

- Update the listed entity on 50 CFR 17 to include the two individuals from Niihau as *Pritchardia remota*.
- Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

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Table 1. Status of *Pritchardia aylmer-robinsonii* from listing through 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria	Stability Criteria Completed?
1996 (listing)	2	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
2003 (critical habitat)	2	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
2010 (5-year review)	1-2	0	All threats managed in all 3 populations	No (Table 2)
			Complete genetic storage	Yes
			3 populations with 25 mature individuals each	No: only 1 to 2 individuals remaining

Table 2. Threats to *Pritchardia aylmer-robinsonii*.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification and herbivory	A, C, D	Ongoing	No
Rats – predation	C	Ongoing	No
Grey bird grasshoppers – predation	C	Ongoing	No
Unauthorized collection and vandalism	B	Ongoing	No
Small population size	E	Ongoing	Yes: seeds collected and propagules growing in nurseries
Climate change	A, E	Increasing	No

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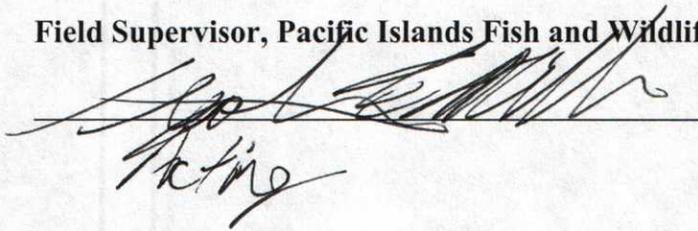
SIGNATURE PAGE for 5-YEAR REVIEW of *Pritchardia aylmer-robinsonii* (wahane)

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
- No Change in listing status

Field Supervisor, Pacific Islands Fish and Wildlife Office


Acting

Date 8/29/11