

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Labordia cyrtandrae* (kamakahala)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 58 species in Washington, Oregon, California, and Hawaii. Federal Register 75(226):71726-71729.

Lead Region/Field Office:

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

Name of Reviewer(s):

Vickie Caraway, Plant Biologist, PIFWO

Daniel Clark, Oahu, Kauai, Northwest Hawaiian and American Samoa Islands Team
Manager, PIFWO

Marie Brueggemann, Plant Recovery Coordinator, PIFWO
Recovery Program Lead, PIFWO

Kristi Young, Programmatic Deputy Field Supervisor, 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 January 31, 2012. The review was based on a review of current, available information since the last five-year review for *Labordia cyrtandrae* (USFWS 2008). The National Tropical Botanical Garden provided an initial draft of portions of the five-year review and recommendations for conservation actions needed prior to the next five-year review. The document was reviewed by the Plant Biologist, Islands Team Manager, and Plant Recovery Coordinator, followed by the Recovery Program Lead. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

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).

Review Analysis:

Please refer to the previous 5-year review for *Labordia cyrtandrae* published on January 18, 2008 (available at http://ecos.fws.gov/docs/five_year_review/doc1845.pdf) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of *L. cyrtandrae*.

This short-lived shrub is endangered and occurs on the island of Oahu. The current status and trends for *Labordia cyrtandrae* are provided in the tables below.

New status information:

- Two populations of *Labordia cyrtandrae* are known. The major population is located on military lands at Kaala (East Makaleha-North Mohiakea) in the Waianae Mountains. This population contains 71 wild and 13 reintroduced mature individuals and four wild and 110 reintroduced immature individuals (Oahu Army Natural Resources Program [OANRP] 2012a).
- The second population, in the Koolau Mountains, consists of one mature individual located at Manana (OANRP 2012a).

New Threats:

- Climate change – Climate change may pose a threat to this species. 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) funded climate modeling that will help resolve these spatial limitations. High spatial resolution climate outputs are expected in 2013.
- Established ecosystem altering invasive weeds - *Hedygium gardnerianum* is a major threat to the habitat for *L. cyrtandrae* and a control strategy is being developed (U. S. Army Garrison 2010).
- Ungulate predation or herbivory - The current Kaala fence is not adequate to exclude pigs - damage has been documented to *L. cyrtandrae* within this fence (U.S. Army Garrison 2010).

New management actions:

- Ecosystem-altering invasive plant species control - Control of *Hedygium gardnerianum* (Kahili ginger) has been ongoing around populations of *L. cyrtandrae*. In September 2009, aerial surveys to map the extent of the *H. gardnerianum* infestation were conducted in Haleauau (U. S. Army Garrison 2010).
- Captive propagation for genetic storage and reintroduction:
 - Hand pollination has improved seed set in the Haleauau population and pollen from the single (male) individual in Manana has been collected (U.S. Army Garrison 2010).
 - The OANRP nursery contains 259 individuals (OANRP 2012b).

Synthesis:

Stabilization, downlisting, and delisting objectives are provided in the recovery plan for Oahu plants (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Labordia cyrtandrae* is a short-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* (off-site) collection. In addition, a minimum of three populations should be documented on Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

Although the overall numbers of individuals of the species have increased slightly since the last five-year review, the stabilization goals for this species have not been met, as only one population of 50 or more mature individuals exists (Table 1) and all threats are not being sufficiently managed throughout the populations (Table 2). Therefore, *Labordia cyrtandrae* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Reintroduction / translocation– Create new populations by reintroducing individuals into suitable habitat within the historical range in concert with management of the known threats to this species.
- Captive propagation for genetic storage and reintroduction - Continue seed collection for genetic storage.
- Surveys/inventories - Search for additional populations of *Labordia cyrtandrae* in known historical sites and suitable habitat, especially in the Koolau Mountains.
- Ungulate exclosure - Fence individual plants for short-term protection from ungulates.
- Life history research - Study *L. cyrtandrae* 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.

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

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1996 (listing)	10	0	All threats managed in 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	13	0	All threats managed in 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	8	0	All threats managed in 3 populations	No
			Complete genetic storage	Partially
			3populations with 50 mature individuals each	No
2008 (5-yr review)	47	0	All threats managed in 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2013 (5-yr review)	76	123	All threats managed in 3 populations	Partially (Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

Table 2. Status of threats to *Labordia cyrtandrae* and ongoing conservation efforts

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A, C, D	Ongoing	Partially
Rats - herbivory	C	Ongoing	No
Military activity	E	Ongoing	No
Black twig borer and other insect predation	C	Ongoing	No
Fire	A, E	Ongoing	Partially
Invasive introduced plants	A, E	Ongoing	Partially
Climate change	A, E	Increasing	No

References:

See previous 5-year review for a full list of references (USFWS 2008). Only references for new information are provided below.

[OANRP] Oahu Army Natural Resource Program. 2012a. Makua Implementation Plan - Population Unit Status: *Labordia cyrtandrae*. Unpublished. 1 page.

[OANRP] Oahu Army Natural Resource Program. 2012b. Army Nursery Inventory Summary. Unpublished. 1 page.

U.S. Army Garrison. 2010. 2010 Status report for the Makua and Oahu implementation plans. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 588 pages. Available online at http://manoa.hawaii.edu/hpicesu/DPW/2010_YER/2010_YER_Edited.pdf.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery Plan for Oahu Plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages, plus appendices.

[USFWS] U.S. Fish and Wildlife Service. 2008. *Labordia cyrtandrae* (no common name) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 10 pages. Available online at http://ecos.fws.gov/docs/five_year_review/doc1845.pdf.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Labordia cyrtandrae* (kamakahala)

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

acting deputy
Field Supervisor, Pacific Islands Fish and Wildlife Office

Maria M. Buegman

Date 2013-08-15