

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyrtandra viridiflora* (haiwale)

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 5-year review for *Cyrtandra viridiflora* (USFWS 2009). 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 *Cyrtandra viridiflora* published on April 8, 2009 (available at http://ecos.fws.gov/docs/five_year_review/doc2465.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 *C. viridiflora*.

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

New status information:

- Helemano/Opaueula population has 58 individuals, 40 of which are mature (U.S. Army Garrison 2011).
- The Kawainui and Koloa populations have 16 mature individuals and four juveniles total (OANRP 2012a).
- The South Kaukonahua to Kipapa summit population has two mature individuals (OANRP 2012a).
- Two former locations, Kaalaea and Kaluanui to Maakua Ridge, are not known to have any remaining individuals, but have not been monitored recently (OANRP 2012a).
- Research staff from the Hawaii Biological Survey of Bernice P. Bishop Museum conducted a rare plant survey of approximately 220 hectares (540 acres) in the southeastern section of the Oahu Forest National Wildlife Refuge in 2011. Despite historical records of *Cyrtandra viridiflora* in this area, it was not observed during this survey (Imada *et al* 2011).

These surveys resulted in little overall change in the status of the species from the 69 individuals reported in the last five-year review to 70 individuals currently.

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 to be available sometime in 2013.

New management actions:

- Ungulate exclosures - One population unit, Helemano/Opaueula on Oahu, is partially protected from ungulates (U.S. Army Garrison 2010).
- Predator/herbivore control - Sluggo, an organic slug bait, is now labeled for use in the State of Hawaii for slug control in natural areas (OANRP 2012b).
- Captive propagation for genetic storage and reintroduction - Seeds from approximately ten percent of the plants have been collected for genetic storage (OANRP 2012b).

Synthesis:

To be considered stabilized, which is the first step in recovering the species, and as a short-lived perennial, threats to *Cyrtandra viridiflora* must be managed (*e.g.*, fenced) and the species must 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 Oahu. For the species to be considered stable, each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The stabilization goals for this species have not been met, as only one of the populations contains 50 mature individuals (Table 1) and all threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Cyrtandra viridiflora* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Ungulate exclosures - Control and eradicate pigs within the vicinity of all known *C. viridiflora* populations.
- Ecosystem-altering invasive plant species control - Control invasive introduced plant species within the vicinity of all known *C. viridiflora* populations.
- Predator / herbivore control - Control slugs and rodents within the vicinity of all known *C. viridiflora* populations.
- Reintroduction / translocation - Establish new populations and augment existing populations.
- Surveys / inventories - Survey the geographical and historical range for additional populations.
- Population biology research
 - Conduct genetic mapping of the extant populations.
 - Conduct studies pertaining to the life history of the taxon.
- Alliance and partnership development - Initiate planning and contribute to implementation of ecosystem-level management and restoration to benefit this species.

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

Date	No. wild indivs	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1996 (listing)	10	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998(recovery plan)	21	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	52	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2009 (5-yr review)	69	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2012 (5-yr review)	70	0	All threats managed in all 3 populations	Partially (Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No, trend is decline

Table 2. Status of threats to *Cyrtandra viridiflora* and ongoing conservation efforts

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification	A, D	Ongoing	Partially
Military training activity and hiking trails	E	Ongoing	Partially
Rats- herbivory	C	Unknown	None
Slugs- herbivory	C	Unknown	None
Stochastic events	E	Unknown	None
Fire – habitat modification and plant destruction	A, E	Ongoing	Partially
Invasive introduced plants	E	Ongoing	Partially
Climate change	A, E	Increasing	No

References:

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

Imada, Clyde, P. Clifford, and J.Lau. 2011. 2010 rare plant survey, Oahu Forest National Wildlife Refuge, Waipio, Oahu. Bishop Museum Technical Report 55. Prepared for U.S. Fish and Wildlife Service, Oahu Forest National Wildlife Refuge Complex. Honolulu, Hawaii. 92 pages. Unpublished.

[OANRP] Oahu Army Natural Resources Program. 2012a. CyrVir IP population unit plant count summary. 1 page. Unpublished.

[OANRP] Oahu Army Natural Resources Program. 2012b. Genetic storage summary, 2012-03-20 for *Cyrtandra viridiflora*. 1 page. Unpublished.

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/default.htm.

U.S. Army Garrison. 2011. 2011 status report for the Makua and Oahu implementation plans. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 269 pages. Available online at http://manoa.hawaii.edu/hpicesu/DPW/2011_YER/default.htm.

[USFWS] 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] U.S. Fish and Wildlife Service. 2009. *Cyrtandra viridiflora* (haiwale) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu,

Hawaii. 6 pages. Available online at
<http://ecos.fws.gov/docs/five_year_review/doc2465.pdf>.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Cyrtandra viridiflora* (haiwale)

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

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