

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyrtandra subumbellata* (ha‘iwale)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2017. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 138 species in Hawaii, Oregon, Washington, and California. Federal Register 82(75): 18665–18668, April 20, 2017.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

Name of Reviewer:

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Megan Laut, 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 (Service) beginning in October 2018. The review was based on a review of current, available information since the last 5-year review for *Cyrtandra subumbellata* (USFWS 2013). The evaluation completed by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, 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).

Review Analysis:

Please refer to the previous 5-year reviews for *Cyrtandra subumbellata* published in the Federal Register on January 18, 2008 and August 1, 2013 (available at https://ecos.fws.gov/docs/five_year_review/doc1775.pdf and https://ecos.fws.gov/docs/five_year_review/doc4208.pdf) for a complete review of the species’ status, threats, and management efforts. 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 *C. subumbellata*.

This short-lived perennial shrub in the Gesneriaceae (African violet) family is endangered and endemic to O‘ahu. The current status and trends for *Cyrtandra subumbellata* are provided in the tables below.

New Status Information:

- The current status of this species is unknown. As reported in the 2013 5-year review, there were 200 individuals observed in 2001 in the back of Punalu‘u Valley in the Ko‘olau mountains with three individuals seen in two other locations within Punalu‘u in 2010 and 2011. There were an additional eight plants seen in 2006 in two locations within Kahana Valley, and two plants seen in Uwao in 2007. During this time, a population of 75 individuals at South Kaukonahua Stream was extirpated by 2010 (U.S. Army 2018).
- In 2012, 14 critical habitat units in two ecosystems (lowland wet and wet cliff) were designated for *Cyrtandra subumbellata* in the Ko‘olau mountains of O‘ahu (30,058 ac, 12,162 ha) (77 FR 57648, September 18, USFWS 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 Hawai‘i 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 (at the species level) *Cyrtandra subumbellata* is highly vulnerable to the impacts of climate change, with a vulnerability score of 0.763 (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 into the future, such as locating key microsites that overlap with current and future climate change envelopes for outplanting efforts.

New Management Actions:

- Captive propagation for genetic storage and reintroduction—The ANRP reports 68 seeds already in storage representing on founder from Kahana (ANRP 2018).

Synthesis:

Currently, there are at most 213 individuals of *Cyrtandra subumbellata*, but likely substantially fewer individuals, in three populations in the Ko‘olau mountains with the largest population of 200 individuals last seen in 2001, and another population showing sharp decline over ten years between 2000 and 2010. A landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections was made by Fortini *et al.* (2013) and their analysis showed that *C. subumbellata* is highly vulnerable to the effects of climate change. No surveys, seed collections, or other management actions have occurred since the last 5-year review.

Stabilizing (interim), downlisting, and delisting objectives were 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.

Cyrtandra subumbellata is a short-lived perennial shrub. To prevent extinction, which is the first step 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. In addition, a minimum 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, saplings) and increasing in number, with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. At most, there is one population totaling more than 50 individuals (Table 1), not all threats are controlled, and genetic representation is incomplete (Table 2). Therefore, *Cyrtandra subumbellata* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

Other than the new data on this taxon's vulnerability to climate change, we are not aware of any new threats. There is no significant new information regarding the species' biological status since the last 5-year reviews in 2008 and 2013. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2019.

- Surveys and monitoring—Continue to conduct surveys in suitable and historical habitat for additional populations.
- Ungulate monitoring and control—Construct and monitor fenced exclosures to protect individuals from the negative impacts of habitat degradation and browsing by feral pigs.
- Ecosystem-altering invasive plant species control—Control nonnative invasive plant species at all populations.
- Climate change adaptation strategy—Assess the modeled effects of climate change on this species and use to determine future landscape needed for the recovery of the species.
- Herbivory by rats—Implement control methods for rats at all populations.
- Herbivory by slugs—Implement control methods for slugs at all populations.
- Captive propagation for genetic storage and reintroduction—
 - Continue collection and propagation efforts for maintenance of genetic stock and for reintroduction.
 - Continue to assess genetic variability within the extant populations and implement a plan for conserving the species' genetic diversity in *ex situ* and reintroduced populations.

- Reintroduction and translocation—Reintroduce *Cyrtandra subumbellata* into areas protected from known threats within historical range.
- Population biology research—Study *Cyrtandra subumbellata* populations with regard to hybridization to determine the extent of this threat.
- Alliance and partnership development—Work with the U.S. Army, the Hawai‘i Division of Forestry and Wildlife and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

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

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1996 (listing)	<50	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
1998 (recovery plan)	<50	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2003 (critical habitat)	12	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2008 (5-year review)	117	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially

			Three populations with 50 mature individuals each	Partially
2012 (critical habitat)	100+	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	Partially
2013 (5-year review)	216	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	Partially
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2019 (5-year review)	ca 213	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Reproduction (<i>i.e.</i> viable seeds, seedlings) at all three populations	No
			Three populations with 50 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 *Cyrtandra subumbellata* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate destruction and degradation of habitat	A	Ongoing	Partial, one management unit, currently unoccupied, not fenced
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Rodent predation or herbivory	C	Ongoing	None
Slug herbivory	C	Ongoing	None
Competition with established invasive plant species	E	Ongoing	None
Low numbers	E	Ongoing	Partial, some seed storage

References:

See previous 5-year reviews for a full list of references (USFWS 2008, 2013). Only references for new information are provided below.

[ANRP] Army Natural Resources Program–O‘ahu. 2018. 2018 Status report for the Makua and Oahu Implementation Plans. Prepared by Pacific International Center for High Technology Research. 217 pp. + 723 pp. appendices.

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] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

[U.S. Army] U.S. Army, Environmental Division. 2018. Report to the U.S. Fish and Wildlife Service for Oahu Army Natural Resource Program, Permit: TES-043638, Reporting period January 1, 2018-December 31, 2018. 16 pp.

[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. *Cyrtandra subumbellata* 5-year review summary and evaluation.
USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/five_year_review/doc4208.pdf.

[USFWS] 2017. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 138 species in Hawaii, Oregon, Washington, and California. Federal Register 82(75): 18665–18668, April 20, 2017.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Cyrtandra subumbellata* (ha'iwale)

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

For Field Supervisor, Pacific Islands Fish and Wildlife Office

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