

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. 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 87(90): 28031–28034, May 10, 2022.

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, Recovery Program 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 2023. The review was based on a review of current, available information since the last 5-year review for *Cyrtandra subumbellata* (USFWS 2019). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Recovery Program 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/ecp/species/3463>).

Review Analysis:

Please refer to the previous 5-year reviews for *Cyrtandra subumbellata* published in the Federal Register on January 18, 2008, August 1, 2013, and September 20, 2019 (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1150.pdf, https://ecos.fws.gov/docs/tess/species_nonpublish/2068.pdf, and https://ecos.fws.gov/docs/tess/species_nonpublish/2847.pdf) for a complete review of the species' status, threats, management efforts, and references cited. 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 is known from the island of O'ahu. The status and trends for *Cyrtandra subumbellata* are provided in the tables below.

New Status Information:

- Currently, there are two populations (Punalu‘u and Kahana) of *Cyrtandra subumbellata* totaling 16 to 27 mature individuals (Plant Extinction Prevention Program [PEPP] 2019–2023). The population at Kaukonahua of 25 individuals was extirpated in 2010, and the two individuals at Uwao-Waianu are likely hybrids with *C. propinqua* (PEPP 2019–2023).
- Only one founder from Punalu‘u is represented in collections and propagation. Recruitment is not reported and no attempts to translocate or reintroduce individuals has occurred (Army Natural Resources Program of O‘ahu [ANRPO] 2023; Lyon Arboretum 2022; Native Ecosystems Protection & Management [NEPM] 2020).

New Threats:

- None reported.

New Management Actions:

- Monitoring and management—
 - The Plant Extinction Prevention Program (PEPP) monitors individuals of *Cyrtandra subumbellata* in the northern Ko‘olau mountains in two populations at Punalu‘u and Kahana (PEPP 2019–2023). In 2022, 10 to 15 individuals were monitored at Punalu‘u.
 - The Army Natural Resources Program of O‘ahu (ANRPO) monitored a population at Kaukonahua until its disappearance in 2010 (ANRPO 2022, p. 41; PEPP 2019–2023).
- Collection and propagation for genetic storage and reintroduction—
 - In the early 2000s, the ANRPO propagated nine individuals representing one founder at Punalu‘u (ANRPO 2023).
 - In 2022, the Lyon Arboretum Micropropagation Laboratory reported storage of 33 explants representing the same founder at Punalu‘u (Lyon Arboretum 2022).
 - In 2018, the State’s Native Ecosystems Protection & Management Program (NEPM) reported propagation of 61 seedlings representing the same founder at Punalu‘u (NEPM 2020).
 - In 1993, the National Tropical Botanical Garden reported 200 seeds in storage representing an unknown founder on O‘ahu. In addition, in 1995, there was one plant in a living collection at the Southshore Garden representing an unknown source (NTBG 2022). Viability of this collection is unknown.

Table 1. Status and trends of *Cyrtandra subumbellata* from listing through current 5-year review. Table 1a shows progress according to Interim Stabilization Goals; Table 1b shows progress according to Preventing Extinction Goals.

Table 1a.

Date	No. wild individuals	No. Outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
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1996 (listing)	<50	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2008 (5-year review)	117	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	Partial
2013 (5-year review)	216	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	Partial

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Targets identified by HPPRCC	*Preventing Extinction Targets Completed?
2019 (5-year review)	ca 213	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	No
			3 populations with 50 mature individuals each	Partial

2024 (5-year review)	16–27	0	All threats managed in all 3 populations	Partial, one subpopulation at Punalu‘u in enclosure
			Complete genetic storage	Partial, only 1 founder at Punalu‘u represented
			Natural reproduction at all 3 populations	None reported.
			3 populations with 50 mature individuals each	No

* 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 stage after Preventing Extinction).

Table 2. Threats to *Cyrtandra subumbellata* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, 1 subpopulation in enclosure, 1 unoccupied managed area, not fenced
Established ecosystem altering invasive plant species degradation of habitat and competition	A, E	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Predation and herbivory by rodents	C	Ongoing	None
Predation and herbivory by invertebrates—Slugs and snails	C	Ongoing	None
Hybridization	E	Potential	None
Low numbers	E	Ongoing	Partial, seed storage and propagation

Synthesis:

Cyrtandra subumbellata has substantially declined since the last five-year status review. Currently, two populations (Punalu‘u and Kahana) in the Ko‘olau mountains of O‘ahu total approximately 16 to 27 mature wild individuals. A third population at Uwao-Waianu is suspected to have hybridized with *C. propinqua*. A fourth population at

Kaukonahua was extirpated 2010. One subpopulation at Punalu‘u is fenced providing protection from feral ungulates. Seed collections are in storage and propagation is ongoing, but no translocation or augmentation is reported. Only one founder from Punalu‘u is represented, mostly in micropropagation and by seedlings and plants in facilities.

Stabilizing (interim), and downlisting and delisting criteria are provided in the Recovery Plan for the O‘ahu Plants (USFWS 1998) and preventing extinction targets have been added and criteria 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 milestone 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 that are well managed. In addition, a minimum of a total 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) with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. The number of wild individuals continues to decline. No populations total at least 50 reproducing individuals, and no recruitment is observed (Table 1, Table 2). Only one wild individual is represented in *ex situ* storage (Table 1). Only one subpopulation is in a fenced area and there are no reports of management of nonnative invasive plants, or rodent and slug/snail (Table 2). Hybridization is a potential threat to this species (Table 2). Therefore, *Cyrtandra subumbellata* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

Hybridization is reported as a potential threat to *Cyrtandra subumbellata*, but no significant new information regarding the species’ biological status has been reported since the last 5-year review in 2019. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2024.

- Surveys and monitoring—Continue to monitor known populations and survey for new populations in suitable habitat.

- Ungulate monitoring and control—Continue to construct and maintain exclosures to provide protection from the negative impacts of habitat degradation and browsing by feral ungulates.
- Nonnative invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species, and those that compete with *C. subumbellata*, 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 its recovery.
- Predator and herbivore monitoring and control—
 - Implement control methods for rats at all populations.
 - Implement effective methods for control of slugs/snails at all populations.
- Captive propagation for genetic storage and reintroduction—
 - Continue collection and propagation efforts for maintenance of genetic stock and for reintroduction.
 - Assess genetic variability within the extant populations and develop a plan for conserving the species’ genetic diversity in *ex situ* and reintroduced populations.
- Reintroduction and augmentation—Establish new populations and augment existing populations of *C. subumbellata* in suitable habitat within historical range that is being managed for known threats to this species.
- Build resiliency, redundancy, and representation—Increase species’ viability through habitat restoration, threat control, and reintroduction and translocation to reduce impacts of climate change and potential hybridization.
- Population biology research—Study *C. subumbellata* populations with regard to hybridization to determine the extent of this threat.
- Alliance and partnership development—Continue to work with ANRPO, NEPM, and other land managers and partners to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

References:

- [ANRPO] Army Natural Resources Program of O‘ahu. 2022. 2022 Status report for the Mākua and O‘ahu Implementation Plans. Office of the Vice President for Innovation and Research, University of Hawai‘i. 228 pp. + appendices, 690 pp.
- [ANRPO] 2023. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.
- [HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.
- Lyon Arboretum. 2022. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S.

Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

[NTBG] National Tropical Botanical Garden. 2022. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

[NEPM] Native Ecosystems Protection & Management. 2020. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

[PEPP] 2019–2023. Plant Extinction Prevention Program fiscal years 2019 to 2023 interim performance report (October 1, 2018-September 30, 2023). U.S. Fish and Wildlife Service CFDA Program \$15.657 Endangered Species Conservation—Recovery Implementation Funds, Cooperative Agreement: F18AC00502 (Final performance report), University of Hawaii at Manoa, Pacific Cooperative Studies Unit. 105 pp. + database.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery Plan for the O‘ahu Plants. Portland. 207 pp. + appendices.

[USFWS] 2008. *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/doc/1150.pdf.

[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/doc/2068.pdf.

[USFWS] 2019. *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/doc/2847.pdf.

[USFWS] 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 87(90): 28031–28034, May 10, 2022.

U.S. FISH AND WILDLIFE SERVICE
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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