

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyrtandra cyaneoides* (māpele)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2020. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

Lead Region/Field Office:

Interior Region 12/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 or USFWS) beginning in October 2021. The review was based on a review of current, available information since the last 5-year review for *Cyrtandra cyaneoides* (USFWS 2017). The evaluation 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 (<https://ecos.fws.gov/ecp/species/4026>).

Review Analysis:

Please refer to the previous 5-year reviews for *Cyrtandra cyaneoides* published in the Federal Register on January 18, 2010, and September 13, 2017 (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1620.pdf and https://ecos.fws.gov/docs/tess/species_nonpublish/2425.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. cyaneoides*.

This short-lived perennial shrub in the Gesneriaceae (African violet) family is listed as endangered and is known from the island of Kaua‘i. The status and trends for *Cyrtandra cyaneoides* are provided in the tables below.

New Status Information:

- In 2017, there were estimated to be between 250 to 1,000 individuals ranging from eastern Kaua‘i at Keālia to central Kaua‘i from Hanakāpī‘ai to Wainiha and west to Wai‘alae (USFWS 2017). Numbers of individuals reported from Wainiha have been declining and the low estimate of 250 individuals total may be more accurate (Kishida 2017, in litt. in USFWS 2017).

New Threats:

- None reported.

New Management Actions:

- Surveys and inventories—In 2018, the occurrence of 20 individuals (in 2017) at Wai‘alae was observed to consist of only 10 mature and 3 immature individuals (Kishida and Tangalin 2018; Perlman et al. 2017).
- Invasive nonnative plant control—The Plant Extinction Prevention Program (PEPP) reported control of nonnative plants at the Wai‘alae population (PEPP 2017).
- Collection and captive propagation—In 2019, the National Tropical Botanical Garden (NTBG) reported collection and storage of 92,660 seeds representing one founder at Nāmolo-kama (Hanalei). One other founder from the Makaleha Mountains is represented by 559 seeds and was collected in 2011 (NTBG 2021).
- Reintroduction and augmentation—In 2019, NTBG reported reintroduction of 137 individuals to Limahuli (NTBG 2019).

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

Date	No. wild individuals	No. outplanted	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
1996 (listing)	350–400	0	All threats managed in all 5–7 populations	No
			Complete genetic storage	No
			5–7 populations with 300 mature individuals each	No
1998 (recovery plan)	350–400		All threats managed in all 5–7 populations	No
			Complete genetic storage	Partially

			5–7 populations with 300 mature individuals each	No
2003 (critical habitat)	354–454	0	All threats managed in all 5–7 populations	No
			Complete genetic storage	Partially
			5–7 populations with 300 mature individuals each	No
2010 (5-year review)	ca 800	0	All threats managed in all 5–7 populations	No
			Complete genetic storage	Partially
			5–7 populations with 300 mature individuals each	No
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2017 (5-year review)	250	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	No
			3 populations with 50 mature individuals each	No
2022 (5-year review)	ca 250	137	All threats managed in all 3 populations	Partially, 1 enclosure
			Complete genetic storage	No
			Natural reproduction at all 3 populations	Unknown
			3 populations with 50 mature individuals each	Unknown

* 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 cyaneoides* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat and herbivory by feral ungulates	A, C	Ongoing	Partial, enclosure at 1 population
Established ecosystem altering invasive plant species degradation of habitat and competition	A, E	Ongoing	Partial, nonnative plant control within enclosure
Climate change degradation and destruction of habitat, including hurricanes	A	Ongoing	None
Predation and herbivory by rodents	C	Ongoing	None
Predation and herbivory by invertebrates	C	Potential	None
Inadequacy of existing regulatory mechanisms—Lack of adequate hunting regulations	D	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, seed storage, propagation, and reintroduction

Synthesis:

Currently there are approximately 250 wild individuals of *Cyrtandra cyaneoides* on Kaua‘i. One population of wild individuals is protected from feral ungulates by fencing. Some nonnative plant control is conducted in the fenced area.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Kaua‘i Islandwide Recovery Plan (USFWS 2021) 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 cyaneoides 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 three populations should be documented on Kaua‘i where the species occurs or occurred historically and these populations must be naturally reproducing (i.e., viable seeds, seedlings) with a minimum of 50 mature, reproducing individuals.

The preventing extinction goals for this species have not been met. Currently, there are approximately 250 wild individuals. It is unknown if there are any populations with 50 mature, reproducing individuals (Table 1). There are only a couple founders in genetic storage/ controlled propagation, and all threats are not being managed (Table 1, Table 2). Therefore, *Cyrtandra cyaneoides* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

No new threats and no significant new information regarding the species’ biological status have been reported since the last 5-year review in 2017. Thus, the following recommendations for future actions are reiterated or updated for the 5-year review for 2022.

- Surveys and inventories—Continue to survey to determine the current status of *Cyrtandra cyaneoides* within historical range.
- Ungulate monitoring and control—Continue to construct and maintain exclosures around all populations to protect remaining wild individuals against habitat disturbance and herbivory by feral ungulates.
- Nonnative invasive plant monitoring and control—Continue to control established ecosystem-altering nonnative invasive plant species and those that compete with *C. cyaneoides* at all populations.
- Climate change adaptation strategy—Research suitability of habitat for viability of species, including where to conduct translocations in the future due to impacts of climate change.
- Predator and herbivore monitoring and control—
 - Implement effective control measures for rats.
 - Develop and implement effective control methods for slugs.
 - Determine the level of threat from invertebrate herbivory and the need for additional recovery actions.
- Captive propagation for genetic storage and reintroduction—Collect material for genetic storage and for propagation for reintroduction.
- Reintroduction and augmentation—Reintroduce individuals into protected suitable habitat.
- Build resiliency and redundancy—Increase numbers of individuals and populations through historic range to reduce impacts of hurricanes.
- Population biology research—

- Study distribution and genetic relationship between *C. cyaneoides* and *C. kealiae* relating to possible deleterious hybridization.
- Study *C. cyaneoides* populations to determine viable population size and structure, geographical distribution, flowering cycles, pollination vectors and seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.
- Alliance and partnership development—Continue to work with partners and other land managers in planning and implementation of ecosystem-level restoration and management to benefit this species.

References:

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

Kishida, W. and N. Tangalin 2018. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Cyrtandra cyaneoides*, Pacific Islands Fish and Wildlife Office.

[NTBG] National Tropical Botanical Garden. 2021. 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.

Perlman, S., L. Arnold, and K. Cassel. 2017. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Cyrtandra cyaneoides*, Pacific Islands Fish and Wildlife Office.

[PEPP] Plant Extinction Prevention Program. 2017. Plant Extinction Prevention Program FY 2017 Annual Report (Oct 1, 2016-Sep 30, 2017), Coop Agreement: F14A00174, U.S. Fish and Wildlife Service CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds. 235 pp.

[USFWS] U.S. Fish and Wildlife Service. 2010. *Cyrtandra cyaneoides* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. https://ecos.fws.gov/docs/tess/species_nonpublish/1620.pdf.

[USFWS] 2017. *Cyrtandra cyaneoides* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. https://ecos.fws.gov/docs/tess/species_nonpublish/2425.pdf.

[USFWS] 2020. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

[USFWS] 2021. Kaua'i Islandwide Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 65 pp. + appendices.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Cyrtandra cyaneoides* (māpele)

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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