

5-YEAR REVIEW
Short Form Summary
Species Reviewed: *Cyanea humboldtiana* (hāhā)

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 *Cyanea humboldtiana* (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/2005>).

Review Analysis:

Please refer to the previous 5-year reviews for *Cyanea humboldtiana* published in the Federal Register on August 2, 2011, and September 20, 2019 (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1766.pdf, and https://ecos.fws.gov/docs/tess/species_nonpublish/2837.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. humboldtiana*.

This short-lived perennial shrub in the Campanulaceae (bellflower) family is endangered and is known from the island of O‘ahu. The status and trends for *Cyanea humboldtiana* are provided in the tables below.

New Status Information:

- Currently, 12 wild populations in the Ko‘olau mountains of O‘ahu (Wai‘ele, Koloa, Kaluanui, ‘Ōpae‘ula, Helemano, Poamoho, Waiawa, Waimano, Moanalua, Kōnāhuanui, Waimanalo, and Pia Valley) total approximately 46 mature and 6 immature individuals; however, six of these populations have not been observed in more than 10 years (Army Natural Resources Program on O‘ahu [ANRPO] 2023; Plant Extinction Prevention Program [PEPP] 2019–2023).
- Ten founders from eight populations (Koloa, Waimano, Kōnāhuanui, Mānoa, Helemano, Pia Valley, Poamoho, and Moanalua) are represented in *ex situ* storage and propagation collections, including seeds in seed banks and explants in tissue culture (ANRPO 2023; Lyon Arboretum 2022; O‘ahu Native Ecosystems Protection & Management [NEPM] Rare Plant Nursery 2020; PEPP 2019–2023).

New Threats:

- None reported.

New Management Actions:

- Monitoring and surveys—The ANRPO and PEPP monitor populations of *Cyanea humboldtiana* (ANRPO 2021 p.40; PEPP 2019–2023). In 2021, PEPP discovered seven new individuals (PEPP 2021, p. 17).
- Feral ungulate control—Four areas in which *C. humboldtiana* occurs are fenced: Koloa, Kaluanui, Poamoho, and Waimano.
- Rodent control—The ANRPO conducts rodent control in an area where *C. humboldtiana* occurs (Koloa) and may incidentally protect this species (ANRPO 2021, p. 270).
- Collection and propagation for genetic storage and reintroduction—
 - The ANRPO reported storage of 39 propagules representing one founder at Koloa (ANRPO 2023).
 - In 2020–2021, the Lyon Arboretum Micropropagation Laboratory reported storage of 293 explants representing five founders from four populations (Waimano, Koloa, Mānoa, and Pia Valley) (Lyon Arboretum 2022). In 2014, the Lyon Arboretum Seed Conservation Laboratory initiated storage of 4,563 seeds representing the same two founders at Mānoa and three other founders from Kōnāhuanui, Pia Valley, and Poamoho (Lyon Arboretum 2022).
 - The State’s NEPM Program reported propagation and storage of 122 seedlings representing one founder each from Waimano and Koloa, and the two founders from Mānoa (O‘ahu NEPM Nursery 2020). In addition, 644 seeds were sent to the seed conservation laboratory representing one founder at Helemano and two founders at Moanalua (O‘ahu NEPM Nursery 2020).

Table 1. Status and trends of *Cyanea humboldtiana* 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?
1996 (listing)	100–220	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Unknown
2011 (5-year review)	22+	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	No

Table 1b.

Date	No. wild individuals	No. outplanted	*Preventing Extinction Targets identified by HPPRCC	*Preventing Extinction Targets Completed?
2019 (5-year review)	ca 40	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	No
			3 populations with 50 mature individuals each	No

2024 (5-year review)	46 mature 6 immature	0	All threats managed in all 3 populations	Partial, rodent, control at 1 population
			Complete genetic storage	Partial, representation for 10 founders at 8 populations
			Natural reproduction at all 3 populations	No, no recruitment reported
			3 populations with 50 mature individuals each	No, no populations > 50 reproducing individuals

* 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 *Cyanea humboldtiana* 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, 4 fenced areas
Established ecosystem altering invasive plant species degradation of habitat and competition	A, E	Ongoing	Partial, nonnative plant control at 4 fenced areas
Climate change degradation or loss of habitat	A	Ongoing	None
Reduced viability due to small populations	E	Ongoing	None
Trampling and human activity	E	Ongoing	None

Synthesis:

Currently there are approximately 46 mature and 6 immature wild individuals of *Cyanea humboldtiana* in 12 populations in the Ko‘olau mountains of O‘ahu. Four of these populations are completely or partially within fenced areas managed by ANRPO. One fenced area has some rodent control efforts for other rare plant species. Seed collection

and propagation of 10 founders from eight populations are ongoing. No translocations or recruitment are reported.

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.

Cyanea humboldtiana 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. Four populations are completely or partially within a fenced area managed for ungulate and nonnative plant control (Table 1, Table 2). There is partial genetic representation for eight founders from 10 populations (Table 1). There are no populations totaling at least 50 reproducing individuals and recruitment is not reported (Table 1). Rodent control is incidentally conducted at one population for other rare species (Table 2). There are no translocations or augmentations at this time. Therefore, *Cyanea humboldtiana* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

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—Survey known populations and those that have not been observed for more than 10 years to determine the current status of the species.
- Ungulate monitoring and control—Continue to construct and maintain exclosures to protect individuals from the negative impacts of habitat degradation and browsing by feral ungulates.

- Nonnative invasive plant monitoring and control—Continue control of established ecosystem-altering nonnative invasive plant species, and those that compete with *Cyanea humboldtiana*.
- Climate change adaptation strategy—Assess the modeled effects of climate change on the viability of this species and use to determine future landscape needed for its recovery.
- 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 when augmenting or reintroducing populations.
- Reintroduction and translocation—Establish new populations and augment existing populations in suitable habitat 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 human activity.
- Alliance and partnership development—Continue to work with the State and ANRPO and other partners and land managers to implement ecosystem-level restoration and management to benefit this species.

References:

[ANRPO] Army Natural Resources Program on O‘ahu. 2021. 2021 Status report for the Mākua and O‘ahu Implementation Plans. Office of the Vice President for Innovation and Research, University of Hawai‘i. 207 pp., appendices 623 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. 255 pp., appendices 534 pp.

[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.

[O‘ahu NEPM Nursery] O‘ahu Native Ecosystems Protection and Management Nursery. 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] Plant Extinction Prevention Program 2021. Plant Extinction Prevention Program fiscal year 2021 interim performance report (October 1, 2020-September 30, 2021), Cooperative Agreement F19AC00532 (Interim report), U.S. Fish and Wildlife Service CFDA Program #15.657 Endangered Species Conservation—Recovery Implementation Funds, University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 46 pp.
- [PEPP] 2019–2023. Hawai‘i Department of Land & Natural Resources, Division of Forestry & Wildlife, Grant number: F21AP00243, Statewide Endangered Plant Program, INTERIM Performance Report. Submitted March 2023. 132 pp. + database.
- [USFWS] U.S. Fish and Wildlife Service. 1998. Recovery Plan for the O‘ahu Plants. Portland. 207 pp. + appendices.
- [USFWS] 2011. *Cyanea humboldtiana* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/five_year_review/doc/1766.pdf.
- [USFWS] 2019. *Cyanea humboldtiana* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/five_year_review/doc/2837.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 *Cyanea humboldtiana* (hāhā)

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

_____ Date _____