

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Cyanea platyphylla* ('akū'akū)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2018. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 156 species in Oregon, Washington, Hawaii, Palau, Guam, and the Northern Mariana Islands. Federal Register 88(83): 20088–20092, May 7, 2018.

### **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 2019. The review was based on a review of current, available information since the last 5-year review for *Cyanea platyphylla* (USFWS 2012). 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 ([http://ecos.fws.gov/tess\\_public](http://ecos.fws.gov/tess_public)).

### **Review Analysis:**

Please refer to the previous 5-year review for *Cyanea platyphylla* published in the Federal Register on August 28, 2012 (available at [https://ecos.fws.gov/docs/five\\_year\\_review/doc4087.pdf](https://ecos.fws.gov/docs/five_year_review/doc4087.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. platyphylla*.

This short-lived perennial shrub in the Campanulaceae (bellflower) family is endangered and endemic to the island of Hawai'i. The current status and trends for *Cyanea platyphylla* are provided in the tables below.

#### New Status Information:

- Currently, there are six wild populations totaling 10 mature individuals and three immature individuals at ‘Ō‘ōkala to Humu‘ula, Laupāhoehoe, Waiākea Upper, and Wao Kele o Puna on the island of Hawai‘i (Plant Extinction Prevention Program (PEPP) 2015, 2016, 2017, 2019). However, the identity of the individual at Wao Kele o Puna is uncertain, and one mature and one immature individual at Laupāhoehoe were once described as *Cyanea fernaldii* (now synonymized with *C. platyphylla*).

#### 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 *Cyanea platyphylla* is vulnerable to the impacts of climate change, with a vulnerability score of 0.168 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions may be needed to conserve this taxon into the future, such as locating key microsites that overlap with current and future climate envelopes for outplanting efforts.
- Herbivory by slugs and nonnative snails—The Plant Extinction Prevention Program (PEPP) observed slug herbivory damage on plants at the Waiākea Upper population (PEPP 2018).
- Falling trees and tree branches—PEPP reported that falling trees and tree branches could damage or destroy the individuals at ‘Ō‘ōkala (PEPP 2019).

#### New Management Actions:

- Surveys and inventories—In 2017, PEPP raised the status of *Cyanea platyphylla* from “potential PEP” to “PEP” (fewer than 50 individuals in the wild). Two wild plants at Waiākea Upper were observed to have 12 to 15 seedlings (PEPP 2015). Between 2017 and 2018, PEPP conducted surveys for plants at several historic sites including Waiākea Lower, Waiākea Upper, and discovered a new plant at ‘Ō‘ōkala to Humu‘ula. PEPP plans to survey Wao Kele o Puna soon to assess the status of one wild individual (PEPP 2019).
- Ungulate monitoring and control—PEPP installed fencing at ‘Ō‘ōkala to Humu‘ula to provide protection from feral pigs for two mature plants (PEPP 2019).
- Captive propagation for genetic storage and reintroduction—
  - Lyon Arboretum Micropropagation Laboratory reports 87 explants in storage representing six founders from Laupāhoehoe (Lyon Arboretum 2019). The Lyon Arboretum Seedbank Laboratory reports storage of 1,032 seeds representing two founders from Waiākea Upper (Lyon Arboretum 2019).

- The Volcano Rare Plant Facility (VRPF) reports two refugia plants representing one founder from Laupāhoehoe, and four inventory plants representing the same founder from Laupāhoehoe, and six refugia plants representing three founders from Tom’s Trail (Waiākea Upper) (VRPF 2019).
- PEPP reports collection of two fruit from one founder at Pu‘u Maka‘ala-Ola‘a that is now dead, and collection of many fruit from one founder at Waiākea Upper (PEPP 2019).
- Reintroduction and translocation—
  - PEPP reintroduced 27 immature plants representing two founders at Pu‘u Maka‘ala-Ola‘a (PEPP 2019).
  - PEPP met with a landowner in regards to planning conservation efforts at ‘Opihikao (PEPP 2019).

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	57–107	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	ca 20	12	All threats managed in all 3 populations	Partially
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	<50	unknown	All threats managed in all 3 populations	Partially
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No

2012 (5-year review)	<13	ca 15	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>*Preventing Extinction Criteria identified by HPPRCC</b>	<b>*Preventing Extinction Criteria Completed?</b>
2020 (5-year review)	10 mature, 3 immature	27	All threats managed in all 3 populations	Partially
			Complete genetic storage	Complete for 3 populations
			Reproduction ( <i>i.e.</i> viable seeds, seedlings) at all 3 populations	Partially, reproduction at 1 population
			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 *Cyanea platyphylla* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Ungulate degradation of habitat	A	Ongoing	Partial, five small exclosures constructed
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Ungulate predation or herbivory	C	Ongoing	Partial, five small exclosures constructed

Rodent predation or herbivory	C	Ongoing	None
Invertebrate predation or herbivory	C	Ongoing	None
Lack of adequate hunting regulations	D	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, propagation, seed storage, and reintroduction efforts are ongoing

**Synthesis:**

Currently there are 10 mature wild individuals and three immature individuals of *Cyanea platyphylla* on the island of Hawai‘i. 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. platyphylla* is vulnerable to the effects of climate change. Four wild and two reintroduced populations are provided protection from feral ungulates by fencing. Seed collection, propagation, and reintroduction are ongoing.

Stabilizing (interim), downlisting, and delisting objectives were provided in Bid Island II: Addendum to the Recovery Plan for the Big Island Plant Cluster (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.

*Cyanea platyphylla* 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. In addition, a minimum of three populations should be documented on the island of Hawai‘i 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. Although genetic storage is complete for three populations (Table 1), there are no populations totaling at least 50 reproducing individuals, and all threats are not being managed (Table 1, Table 2).] Therefore, *Cyanea platyphylla* meets the definition of Endangered as it remains in danger of extinction throughout its range.

### **Recommendations for Future Actions:**

Herbivory by slugs and damage and destruction by falling trees and tree branches are noted as new threats to *Cyanea platyphylla*. We are not aware of any other significant new information regarding the species' biological status since the last 5-year review in 2012. Thus, the following recommendations for future actions are added or reiterated for the 5-year review for 2020.

- Ungulate monitoring and control—Continue to maintain fenced exclosures to protect individuals from the negative impacts of browsing by ungulates.
- Invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species, and those that compete with *Cyanea platyphylla*.
- Predator and herbivore monitoring and control—Implement effective methods to control slugs and nonnative snails.
- Establish or augment populations in areas where damage or destruction by falling trees and tree branches are not a threat.
- 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.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for reintroduction.
- Reintroduction and translocation—Continue to reintroduce individuals into suitable habitat within historic range that is being managed for known threats to this species to build resiliency and redundancy to reduce impacts of loss of viability.
- Alliance and partnership development—Continue to work with partners in planning and implementation of ecosystem-level restoration and management to benefit this species.

### **References:**

- 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.
- Lyon Arboretum. 2019. 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, Hawaii.

- [PEPP] Plant Extinction Prevention Program. 2015. Annual report fiscal year 2015 (July 1, 2014-June 30, 2015). 179 pp.
- [PEPP] 2016. Plant Extinction Prevention Program FY 2016 Annual Report (Oct 1, 2015-Sep 30, 2016), US FWS CFDA Program #15.657; Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F14AC00174, December 24, 2016, UH Manoa, PCSU, PEPP. 237 pp.
- [PEPP] 2017. Plant Extinction Prevention Program FY 2017 annual report (Oct 1, 2016-Sep 30, 2017), US FWS CFDA program #15.657; Endangered species conservation-recovery implementation funds, Cooperative Agreement F14AC00174, December 12, 2017, UH Manoa, PCSU, PEPP. 235 pp.
- [PEPP] 2018. Plant Extinction Prevention Program, fiscal year 2018 interim performance report, (October 1, 2017 - September 30, 2018), Cooperative Agreement: F18AC00502, 49 pp.
- [PEPP] 2019. Plant Extinction Prevention Program, annual recovery subpermit FWSPIFWO-26 report (January 1<sup>st</sup>, 2018–December 31<sup>st</sup> 2018), as designated under the U.S. Endangered Species Act. Unpublished report submitted to U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. 569 pp.
- [USFWS] 2012. *Cyanea platyphylla* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.  
[https://ecos.fws.gov/docs/five\\_year\\_review/doc4087.pdf](https://ecos.fws.gov/docs/five_year_review/doc4087.pdf).
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- [VRPF] Volcano Rare Plant Facility. 2019. 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, Hawaii.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Cyanea platyphylla* ('akū'akū)

**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
- X   No Change in listing status

**For Field Supervisor, Pacific Islands Fish and Wildlife Office**

\_\_\_\_\_ Date \_\_\_\_\_