

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyanea shipmanii* (haha)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2013. Endangered and threatened wildlife and plants; Initiation of 5-year status reviews of 44 species in Oregon, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 78(24):8185-8187.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawaii

Name of Reviewer(s):

Chelsie Javar-Salas, Plant Biologist, PIFWO

Michelle Bogardus, Maui Nui and Hawaii Island Team Manager, PIFWO

Marie Brueggemann, Plant Recovery Coordinator, PIFWO

Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on March 4, 2013. The review was based on a review of current, available information since the last 5-year review for *Cyanea shipmanii* (USFWS 2009). The evaluation by Chelsie Javar-Salas, Plant Biologist, was reviewed by the Island Team Manager and the Plant Recovery Coordinator. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

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 at: http://ecos.fws.gov/tess_public.

Review Analysis:

Please refer to the previous 5-year review for *Cyanea shipmanii* published on July 21, 2009 (available at: http://ecos.fws.gov/docs/five_year_review/doc2463.pdf) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of *C. shipmanii*.

This short-lived perennial is endangered and historically found on the eastern slopes of Mauna Kea on Hawaii Island (USFWS 1996). Currently, it is found on Hawaii Island (USFWS 2009). The status and trends for *Cyanea shipmanii* are provided in the tables below.

New status information:

- In 2010, there were two populations containing two wild individuals of *Cyanea shipmanii* (Plant Extinction Prevention Program [PEPP] 2010). A new wild individual was found in the Ka‘u Forest Reserve (PEPP 2010). At Pu‘u Kipu, only one wild individual was observed from the four individuals originally found (PEPP 2010).
- In 2013, the Upper Waiakea Forest Reserve population contained four wild immature individuals of *Cyanea shipmanii* (PEPP 2014). There are 25 reintroduced individuals of *C. shipmanii* at Kipimana (PEPP 2014). In addition, two new seedlings were discovered near the original wild plant at Kipimana (PEPP 2014). At Kahuku, there are approximately 447 reintroduced individuals of *C. shipmanii* (PEPP 2014). There are two wild individuals (one mature and one immature) at Hakalau Forest National Wildlife Refuge (J. VanDeMark, PEPP, pers. comm. 2014).
- Overall, the numbers of individuals have increased from the four individuals reported in the previous 5-year review, to approximately eight wild individuals in 2014. Only one of these individuals is mature.

New threats:

- Climate change destruction or degradation of habitat – Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawaii 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 shipmanii* is highly vulnerable to the impacts of climate change and identified as a wink-out species. Wink-out species are species projected to lose more than 99 percent of its current climate envelope (areas that contain the full range of climate conditions under which the species is known to occur) by 2100. Therefore, additional management actions are needed to conserve this taxon into the future.
- Slug herbivory – Herbivory by slugs has been reported as a new threat to this species (PEPP 2011, 2014).
- Invasive introduced plants – In Puu Kipu, the outplanted population is threatened by competition from the introduced invasive plant species *Ehrharta stipoides* (meadow ricegrass) (PEPP 2011). At Hakalau Forest National Wildlife Refuge, the reintroduced population is threatened by competition from the introduced invasive plant species *Rubus argutus* (prickly Florida blackberry) and *Ilex aquifolium* (English holly) (PEPP 2011).

New management actions:

- Surveys / inventories
 - A survey was conducted for wild individuals at Hakalau Forest National Wildlife Refuge; none were found (PEPP 2009).
 - At Puu Kipu, no new individuals were found during a survey of the area (PEPP 2011).
 - Surveys were conducted at Kipimana for new individuals. The original wild plant remained dead; however, two new seedlings were discovered nearby (PEPP 2014).

- A survey was conducted at Kahuku around the dead wild individual of *C. shipmanii*; none were found (PEPP 2014).
- Ungulate monitoring and control
 - PEPP (2014) inspected the fenced enclosure at the Upper Waiakea Forest Reserve and extended fencing from the existing enclosure to protect a newly discovered seedling of *C. shipmanii* that was located outside of the fence.
 - In 2013, a fenced enclosure was constructed around two newly discovered seedlings at Kipimana.
- Population viability monitoring and analysis – PEPP (2010, 2011, 2012, 2013, 2014) monitored the wild and outplanted populations.
- Captive propagation for genetic storage and reintroduction
 - The Volcano Rare Plant Facility (2013) has 12 individuals in their nursery from four locations. The Facility propagated 204 individuals for reintroduction next year. Meanwhile, 174 individuals were reintroduced at Kulani (28) and Hawaii Volcanoes National Park (146) in 2013.
 - The Lyon Arboretum’s Seed Conservation Lab (2013) has more than 12,700 seeds in storage.
 - There are 266 accessions from two sources of *C. shipmanii* at the Harold L. Lyon Arboretum Micropropagation Laboratory (2013).
 - PEPP (2014) collected approximately 50 fruits and 3 cuttings of *C. shipmanii* that were damaged by fallen tree branches.
- Reintroduction / translocation
 - In 2014, 299 individuals of *C. shipmanii* were reintroduced into a 1.5 acre fenced enclosure in Kau (PEPP 2014).
 - In 2014, eight individuals were reintroduced at Kahuku in Kau (PEPP 2014).

Synthesis:

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for Big Island plant cluster (USFWS 1996), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Cyanea shipmanii* is a short-lived perennial, and to be considered stable, the taxon must be managed to control threats (e.g., fenced) and be represented in an *ex situ* (at other than the plant’s natural location, such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on the island of Hawaii. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The interim stabilization goals for this species have not been met, as only 8 wild individuals are known (Table 1). However, only one of these individuals has reached reproductive maturity and the maturity of the reintroduced individuals is unknown at the time of this review. Likewise, all of the threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Cyanea shipmanii* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Surveys / inventories – Survey geographical and historical range for a current assessment of the species’ status.
- Captive propagation for genetic storage and reintroduction
 - Continue collection of genetic resources for storage, propagation, and reintroduction into protected suitable habitat within historical range.
 - Evaluate genetic resources currently in storage to determine the need to place additional genetic resources in long-term storage due to this species’ vulnerability to climate change.
- Ungulate monitoring and control – Maintain existing fences and fence remaining populations to protect them from the impacts of feral ungulates.
- Invasive plant monitoring and control – Eradicate invasive introduced plants within ungulate exclosures and maintain exclosures free of invasive plants.
- Predator / herbivore monitoring and control – Control slugs (unidentified species) and rodents within the vicinity of all known *C. shipmanii* populations.
- Population viability monitoring and analysis – Continue monitoring wild and outplanted individuals.
- Climate change adaptation strategy – Research the suitability of habitat for reintroducing this species in the future due to the impacts of climate change. As a species likely to wink out by 2100, ensure that adequate genetic storage is maintained as viable material.
- Alliance and partnership development – Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this taxon.

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

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1994 (listing)	< 50	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1996 (recovery plan)	< 10	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	< 10	117	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2009 (5-yr review)	4	434	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2015 (5-yr review)	8 (only 1 mature)	763	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

Table 2. Threats to *Cyanea shipmanii* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – degradation of habitat and herbivory	A, C, D, E	Ongoing	Partially, the Upper Waiakea Forest Reserve and Kipimana are fenced
Invasive introduced plants	A, E	Ongoing	None
Rodent predation or herbivory – rats	C	Ongoing	None
Slug herbivory	C	Ongoing	None
Low numbers	E	Ongoing	Partially, captive propagation for genetic storage and reintroduction
Climate change	A, E	Increasing	None

References:

See previous 5-year review for a full list of references (USFWS 2009). Only references for new information are provided below.

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. 141 pages.

Harold L. Lyon Arboretum Micropropagation Laboratory. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Micropropagation database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Harold L. Lyon Arboretum Seed Conservation Laboratory. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Seed storage database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Plant Extinction Prevention Program. 2010. Plant Extinction Prevention Program annual report, fiscal year 2010 (July 1, 2009-June 30, 2010). Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

Plant Extinction Prevention Program. 2011. Plant Extinction Prevention Program annual report, fiscal year 2011 (July 1, 2010-June 30, 2011). Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

Plant Extinction Prevention Program. 2012. Plant Extinction Prevention Program annual report, fiscal year 2012 (July 1, 2011-June 30, 2012). Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

Plant Extinction Prevention Program. 2013. Plant Extinction Prevention Program annual report, fiscal year 2013 (July 1, 2012-June 30, 2013). Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

[USFWS] U.S. Fish and Wildlife Service. 1996. Recovery plan for the Big Island plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 202+ pages.

[USFWS] U.S. Fish and Wildlife Service. 2009. *Cyanea shipmanii* (haha) 5-year review summary and evaluation. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. 10 pages.

Volcano Rare Plant Facility. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished.

Personal communication:

VanDeMark, Joshua R. 2014. Hawaii Island Coordinator, Plant Extinction Prevention Program. E-mail to Donna Ball, Pacific Islands Fish and Wildlife Office, dated September 26, 2014. Subject: status updates.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Cyanea shipmanii* (haha)

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

Appropriate Listing/Reclassification Priority Number, if applicable:

for Programmatic Deputy Field Supervisor, Pacific Islands Fish and Wildlife Office

Maureen Blugman

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