

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyanea pinnatifida* (Haha)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 69 species in Idaho, Washington, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 75(67):17947-17950.

Lead Region/Field Office:

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

Name of Reviewer(s):

Chelsie Javar, Fish and Wildlife Biologist, (PIFWO)

Marie Brueggemann, Plant Recovery Coordinator, (PIFWO)

Jess Newton, Recovery Program Leader, (PIFWO)

Assistant Field Supervisor for Endangered Species, (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 April 8, 2010. The review was based on a review of current, available information since the last 5-year review for *Cyanea pinnatifida* (USFWS 2007). Bernice Pauahi Bishop Museum provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Chelsie Javar, Fish and Wildlife Biologist, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

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).

Review Analysis:

Please refer to the previous 5-year review for *Cyanea pinnatifida* published on August 2, 2007 (available at http://ecos.fws.gov/docs/five_year_review/doc1129.pdf) and the recovery plan for the Oahu plants (USFWS 1998), for a complete review of the species' status, threats, and management efforts. No new threats or no new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of *C. pinnatifida*.

This short-lived shrub is endangered and occurs only on the island of Oahu (USFWS 1998). The current status and trends for *Cyanea pinnatifida* are provided in the tables below.

New taxonomic information:

None reported.

New threats:

Climate change may also pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

New management actions:

- Captive propagation for genetic storage and reintroduction:
 - In 2008, there were four individuals in the U.S. Army Nursery Wahiawa Facility (U.S. Army Garrison 2008).
 - In 2008, the Lyon Arboretum Micropropagation Lab had 41 individuals in propagation (Harold L. Lyon Arboretum Micropropagation Laboratory 2008).
 - In 2009, fruits were collected from three individuals of *Cyanea pinnatifida* from the reintroduction site at Kaluaa (Plant Extinction Prevention Program 2010).
 - In 2010, the Pahole Rare Plant Facility (2010) had five individuals of this species in storage for controlled propagation.
 - In 2010, the Center for Conservation Research and Training seed storage laboratory (2010) had 16,893 seeds of this species in storage.
- Population viability monitoring:
 - In fiscal year 2008, the Oahu Plant Extinction Prevention Program began to monitor *Cyanea pinnatifida* populations previously located on lands managed by The Nature Conservancy of Hawaii at the Honouliuli Preserve.
 - In 2009, the Plant Extinction Prevention Program monitored the reintroduction site of *Cyanea pinnatifida* at Kaluaa (Plant Extinction Prevention Program 2009).
- Population biology research – Gardener and Daehler (2008) studied *Cyanea pinnatifida* at Honouliuli Reserve to document, for the first time, floral visitors to several rare plant species in the field. Gardener and Daehler recorded *Zosterops japonicas* (Japanese White-eye) robbing nectar and foraging for insects on *C. pinnatifida*. They also noted that native masked bees *Hylaeus connectans* (presumably) were visiting the flowers of this species.

Synthesis:

In 2008, there were two populations of *Cyanea pinnatifida* at Ekahanui at Honouliuli and at the reintroduction site at Kaluaa containing approximately 10 individuals at each population totaling 20 individuals (Plant Extinction Prevention Program 2008). In 2010, 10 individuals remained at the reintroduction site at Kaluaa (Plant Extinction Prevention Program 2010); the number of individuals at Ekahanui was not reported.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for Oahu plants (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Cyanea pinnatifida* is a short-lived perennial, and to be considered stable, this species must be managed to control threats (e.g. fenced) and be represented in an *ex situ* collection. In addition, a minimum of three populations should be documented on the island of Oahu where the species now occurs or occurred historically. 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 currently no population of 50 mature individuals exists (Table 1) and all threats are not being managed (Table 2). Therefore, *Cyanea pinnatifida* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Captive propagation for genetic storage and reintroduction:
 - Continue to collect seeds from tagged individuals, keeping close track of the maternal source for use in *ex situ* propagation.
 - Continue to collect seeds from all existing populations and send to at least two or three different venues for propagation.
- Reintroduction / translocation implementation – Reintroduce the species back into its known historical range.
- Ecosystem-altering invasive plant species control – Control invasive introduced plant species around reintroduced populations.
- Genetic research – Conduct research to develop a plan to maintain or increase genetic variability of *Cyanea pinnatifida*.
- Surveys / inventories – Conduct thorough surveys of all suitable habitats where *Cyanea pinnatifida* was historically seen.
- Threats research:
 - Conduct studies to develop and implement control methods for slugs around all known populations.
 - Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

- Site / area / habitat protection – Develop and implement effective measures to reduce the impact of drought and landslides and flooding.
- Alliance and partnership development – Work with the Hawaii Division of Forestry and Wildlife and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

Table 1. Status of *Cyanea pinnatifida* from listing through current 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1991 (listing)	1	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	1	2	All threats managed in all 3 populations	Partially
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	0	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No
2007 (5-year review)	0	70	All threats managed in all 3 populations	Partially
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No
2012 (5-yr review)	0	20	All threats managed in all 3 populations	Partially (see Table 2)
			Complete genetic storage	Yes
			3 populations with 50 mature individuals each	No

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

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – Degradation of habitat and herbivory	A, C, D	Ongoing	Partially: Only the reintroduced population is fenced
Established ecosystem-altering invasive plant species	A	Ongoing	Partially: Periodic weed controlled at the Kaluaa reintroduction site
Landslides and flooding	A	Ongoing	No
Rodent predation or herbivory – Rats	C	Ongoing	Partially: Bait stations in immediate vicinity of individuals at
Slugs herbivory	C	Ongoing	No
Drought	E	Ongoing	No
Climate change	A, E	Increasing	No

References:

See previous 5-year review for a full list of references (USFWS 2007). Only references for new information are provided below.

Center for Conservation Research and Training Seed Storage Laboratory. 2010. Microsoft Access database. Honolulu, Hawaii. Unpublished.

Gardener, M.C. and C.C. Daehler. 2008. Documenting floral visitors to rare Hawaiian plants using automated video recordings. *Pacific conservation biology* 12:189-194.

Harold L. Lyon Arboretum. 2008. Micropropagation database. Honolulu, Hawaii. Microsoft Access database. Unpublished.

Pahole Rare Plant Facility. 2010. Controlled propagation report to U.S. Fish and Wildlife Service. Unpublished.

Plant Extinction Prevention Program. 2008. Section 6 annual performance report for endangered plant restoration and enhancement – Plant Extinction Prevention (formerly Genetic Safety Net), July 1, 2007 to June 30, 2008. 113 pages. Unpublished.

Plant Extinction Prevention Program. 2009. Annual report for Plant Extinction Prevention Program, fiscal year 2009 (July 1, 2008 to June 30, 2009). 115 pages. Unpublished.

Plant Extinction Prevention Program. 2010. Plant Extinction Prevention Program annual report, fiscal year 2010 (July 1, 2009-June 30, 2010). 122 pages. Unpublished.

U.S. Army Garrison. 2008. 2008 status report for the Makua implementation plan. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 210 pages. Available online at <<http://manoa.hawaii.edu/hpicesu/dpw.htm>>.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages + appendices. Available online at <<http://www.fws.gov/pacificislands/recoveryplans.html>>.

[USFWS] U.S. Fish and Wildlife Service. 2007. *Cyanea pinnatifida* (haha) 5-year review, summary and evaluation. U.S. Fish and Wildlife Service, Honolulu. 9 pages. Available at <http://ecos.fws.gov/docs/five_year_review/doc1129.pdf>.

