

## **5-YEAR REVIEW**

Short Form Summary

**Species Reviewed:** *Cyanea asarifolia* (Haha)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 2007. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 71 species in Oregon, Hawaii, Commonwealth of the Northern Mariana Islands, and territory of Guam. Federal Register 72(45):10547-10550.

### **Lead Region/Field Office:**

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

### **Name of Reviewer(s):**

Christian Torres-Santana, Pacific Islands Fish and Wildlife Office, Student Trainee Biologist

Marie Brueggemann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator

Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species

### **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 (USFWS) beginning on March 8, 2007. The review was based on the final critical habitat designation for *Cyanea asarifolia* and other species from the island of Kauai, as well as a review of current, available information (USFWS 2003). The Bernice P. Bishop Museum provided an initial draft of portions of the 5-year review. The evaluation of the status of the species was prepared by the lead PIFWO biologist and reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and acting 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](http://ecos.fws.gov/tess_public)).

### **Application of the 1996 Distinct Population Segment (DPS) Policy:**

This Policy does not apply to plants.

**Review Analysis:**

Please refer to the final critical habitat designation for *Cyanea asarifolia* published in the Federal Register on February 27, 2003 (USFWS 2003) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of *C. asarifolia*.

First collected on Kauai in 1970, for over 20 years afterward *Cyanea asarifolia* was known only from five or six individuals growing along the bank of Anahola Stream, Kauai. Subsequent efforts at relocation were unsuccessful, and this population is thought to be extirpated from the wild (USFWS 1994, 1995, 2003). In 1991, a population of 14 adults and 5 seedlings of this short-lived perennial shrub were discovered at the headwaters of Wailua River in central Kauai. A year later and just prior to its Federal listing as an endangered species, Hurricane Iniki decimated this population, leaving only four or five immature individuals alive (USFWS 1994).

In 2003, two locations with a total of approximately four or five individuals were reported from the headwaters of the Wailua River in central Kauai on State-owned land in the Lihue-Koloa Forest Reserve (USFWS 2003). Perlman (2006) reported a single wild population of 20 to 30 individuals at Blue Hole as of February 2005. This population appears to be reproducing and there are seedlings (S. Perlman, National Tropical Botanical Garden, pers. comm. 2008). Little is known about the life history, biology, or genetic variability within the species (USFWS 1995, 2003). Herbarium vouchers at Bernice P. Bishop Museum and National Tropical Botanical Garden uncovered two specimens in flower and fruit. The holotype specimen from Anahola Valley, Kauai, was flowering and fruiting in April 1970; and a second voucher, from the headwaters of the north fork of Wailua River, was in flower and early fruit in November 1991 (National Tropical Botanical Garden 2008a; C. Imada, Research Botanist, Bernice P. Bishop Museum, pers. comm. 2008).

The major threats to this species remain the risk of extinction from naturally occurring events, such as hurricanes and rock slides (Factor E); reduced reproductive vigor due to the small number of existing individuals (Factor E); predation by introduced slugs and rodents [black rats (*Rattus rattus*) and mice (*Mus musculus*)] (Factor C); competition from invasive introduced plant species (Factor E); and habitat degradation by feral pigs (*Sus scrofa*) (Factors A and D) (USFWS 1994, 1995, 2003, 2008; Hawaii Department of Land and Natural Resources 2005).

To safeguard existing genetic material, propagation for genetic storage and reintroduction is occurring at the National Tropical Botanical Garden, the Kauai Department of Forestry and Wildlife and the University of Hawaii's Lyon Arboretum Micropropagation Laboratory. The National Tropical Botanical Garden (2008b) reports 70 seeds in storage. Harold L. Lyon Arboretum Micropropagation Facility (2008) reports three accessions from the Blue Hole area. The Kauai Division of Forestry and Wildlife (2006) reported two plants growing at their greenhouse. Nine individuals were outplanted in 1995 at the

Blue Hole area by the Kauai Division of Forestry and Wildlife (USFWS 1995; Hawaii Department of Land and Natural Resources 2005); however, a subsequent landslide destroyed all of the outplantings (USFWS 2008).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Kauai (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Cyanea asarifolia* is a short-lived perennial, and to be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on the island of Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The stabilization goals for this species have not been met, as currently only one wild population containing 20 to 30 individuals is known and the threats are not being managed (see Table 1). Therefore, *Cyanea asarifolia* meets the definition of endangered as it remains in danger of extinction throughout its range.

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

- Collect fruit from all wild individuals and any reintroduced individuals that set seed to add to the genetic diversity of the *ex situ* material.
- Construct enclosure fences to protect individuals from the negative impacts of feral pigs.
- Enhance current natural populations to increase numbers of individuals.
- Establish new populations within historical range or suitable habitat where threats have been controlled.
- Determine and implement adequate rat and slug control methods.
- Survey the geographical and historical range of *Cyanea asarifolia* for additional populations.
- Assess genetic variability within extant populations.
- Study *Cyanea asarifolia* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.

## References:

- Harold L. Lyon Arboretum Micropropagation Laboratory. 2008. Micropropagation database. University of Hawaii at Manoa. Unpublished.
- Hawaii Department of Land and Natural Resources. 2005. Hawaii's comprehensive wildlife conservation strategy; Hawaii's species of greatest conservation need; fact sheets: *Cyanea asarifolia*. Available online at <[http://www.state.hi.us/dlnr/dofaw/cwcs/files/Flora%20fact%20sheets/Cya\\_asa%20plant%20NTBG\\_OK.pdf](http://www.state.hi.us/dlnr/dofaw/cwcs/files/Flora%20fact%20sheets/Cya_asa%20plant%20NTBG_OK.pdf)>. Accessed 17 January 2008.
- Kauai Division of Forestry and Wildlife. 2006. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished.
- National Tropical Botanical Garden. 2008a. Herbarium database. National Tropical Botanical Garden, Kalaheo, Hawaii. Available online at <<http://ntbg.org/herbarium>>. Accessed 10 March 2008.
- National Tropical Botanical Garden. 2008b. 2008 Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished.
- Perlman, S. 2006. Plant Extinction Prevention status of Kauai species. August 28, 2006. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; determination of endangered or threatened status for 24 plants from the island of Kauai, HI; final rule. Federal Register 59(38):9304-9329.
- [USFWS] U.S. Fish and Wildlife Service. 1995. Recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, OR, xiv, 270 pages.
- [USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, HI; final rule. Federal Register 68(39):9116-9479.
- [USFWS] U.S. Fish and Wildlife Service. 2008. Rare plant tracking database. Pacific Islands Fish and Wildlife Office, Honolulu, HI. Accessed on April 28, 2008. Unpublished.

## Personal communication:

- Imada, Clyde. Research Botanist, Bernice P. Bishop Museum. Email communication to C. Torres-Santana (USFWS) on June 30, 2008.

Perlman, Steve. Botanist, National Tropical Botanical Garden. Email communication to Bernice P. Bishop Museum on June 2008.

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

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Stability Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1994 (listing)	4-5	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1995 (recovery plan)	4-5	9	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	4-5	unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2008 (5-year review)	20-30	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

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SIGNATURE PAGE for 5-YEAR REVIEW of *Cyanea asarifolia*

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

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



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Patrick Leonard

Date   4/8/09