

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyanea macrostegia* ssp. *gibsonii* (haha)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; 5-year status reviews of 46 species in Idaho, Oregon, Washington, Nevada, Montana, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 77(44):13248-13251.

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
Maui nui and Hawaii Island Team Manager, PIFWO
Marie Bruegmann, Plant Recovery Coordinator, PIFWO
Recovery Program Lead, 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 6, 2012. The review was based on a review of current, available information since the last 5-year review for *Cyanea macrostegia* ssp. *gibsonii* (USFWS 2011). The evaluation by Chelsie Javar-Salas, Plant Biologist, was reviewed by the Island Team Manager, Plant Recovery Coordinator, followed by the Recovery Program Lead. 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 (http://ecos.fws.gov/tess_public).

Review Analysis:

Please refer to the previous 5-year review for *Cyanea macrostegia* subsp. *gibsonii* published on January 18, 2008 (available at http://ecos.fws.gov/docs/five_year_review/doc1771.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. macrostegia* subsp. *gibsonii*.

This long-lived perennial tree is endangered and is endemic to the island of Lanai (USFWS 2008). The current status and trends for *C. macrostegia* subsp. *gibsonii* are provided in the tables below.

New status information:

In 2013, there were three populations of *Cyanea macrostegia* subsp. *gibsonii* containing approximately ten mature wild individuals (Plant Extinction Prevention Program [PEPP] 2013). The number of individuals has decreased from the estimated range of 14 to 24 wild individuals reported in the previous 5-year review (USFWS 2008).

New taxonomic information:

The Smithsonian Institution's *Flora of the Hawaiian Islands Database* (Wagner *et al.* 2005) recognizes and accepts the treatment of this species as *Cyanea gibsonii*. In 2012, USFWS proposed to revise the taxonomic status for this species when it proposed to revise critical habitat designations on Maui, Lanai, Kahoolawe, and Molokai (USFWS 2012). The proposed change will recognize *C. macrostegia* ssp. *gibsonii*'s elevation from a subspecies to a full species with the new name of *C. gibsonii*. The range of the species has not changed with this taxonomic revision. The recognition and official taxonomic change by USFWS of *C. gibsonii* will be finalized in the final rule for critical habitat designations on Maui, Lanai, Kahoolawe, and Molokai. The species will be recognized as *C. gibsonii* for the remainder of this review.

New threats:

- Climate change destruction 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 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 gibsonii* is highly vulnerable to the impacts of climate change. Furthermore, *C. gibsonii* was identified as a “wink-out” species, defined as a species that is 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 urgently needed to conserve this taxon into the future.
- Stochastic events – Drought mortality and reduced viability – In 2010, drought was reported as a threat to *C. gibsonii* (PEPP 2011, 2012).

New management actions:

- Captive propagation for genetic storage and reintroduction
 - In 2010, six basal sprouts from several individuals were collected on Lanai for propagation at the Olinda Rare Plant Facility (PEPP 2010). The basal sprouts were collected after being damaged by rats (*Rattus* spp.) (PEPP 2010).
 - In 2011, fruit was collected from a single individual at Hauola Gulch and given to Lyon Arboretum (PEPP 2012). Two basal cuttings were given to Olinda Rare Plant Facility for propagation (PEPP 2012).
 - Seeds were collected from individuals growing at Olinda Rare Plant Facility and given to Harold L. Lyon Arboretum for storage (PEPP 2012).

- There are more than 8,400 seeds of *C. gibsonii* in storage at the Harold L. Lyon Arboretum Seed Conservation Laboratory (2013).
- Olinda Rare Plant Facility (2013) has 15 individuals of *C. gibsonii* in propagation at its nursery.
- Invasive plant monitoring and control – Weeds controlled by the Plant Extinction Prevention Program (PEPP 2009, 2010, 2011, 2012, 2013).
- Predator / herbivore monitoring and control – Rats were controlled with snap traps (PEPP 2013).
- Surveys / inventories
 - In 2011, the Plant Extinction Prevention Program (2011) conducted a survey of the Hauola Gulch on Lanai and discovered a new population of *C. gibsonii*. Three mature individuals and an unknown number of seedlings were discovered.
 - In 2012, a survey of the Waialala Gulch discovered a new individual of *C. gibsonii* (PEPP 2013).
- Population viability monitoring and analysis – Monitoring was conducted by the Plant Extinction Prevention Program (2009, 2010, 2011, 2012, 2013) on Lanai.
- Listing and critical habitat designation – Three units of unoccupied and occupied areas of critical habitat for *C. gibsonii* was proposed in the montane wet and wet cliff ecosystems on Lanai (USFWS 2012). The final rule for critical habitat designations has not been published at the time of this review.

Synthesis:

Stabilizing, downlisting, and delisting objectives are provided in the Lanai plant cluster recovery plan (USFWS 1994), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Cyanea gibsonii* is a long-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* (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 Lanai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

The stabilization goals for this species have not been met, as no population has more than 25 mature individuals (Table 1) and all threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Cyanea gibsonii* 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 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 – Fence remaining populations to protect them from the impacts of feral ungulates.
- Invasive plant monitoring and control – Eradicate invasive introduced plant species within ungulate exclosures and maintain the exclosures free of invasive introduced plants.
- Predator / herbivore monitoring and control – Control slugs (unidentified species) and rodents within the vicinity of all known *C. gibsonii* populations.
- Population viability monitoring and analysis – Continue monitoring wild 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 gibsonii* from listing through current 5-year review.

Date	No. wild indivs	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1991 (listing)	1	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
1995 (recovery plan)	75-80	Unknown	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
2003 (critical habitat)	74	Unknown	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2007 (5-yr review)	14-24	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2012 (critical habitat – proposed)	10-20	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2014 (5-yr review)	~10	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No

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

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – degradation of habitat and herbivory	A, C, D, E	Ongoing	None
Invasive introduced plants	A, E	Ongoing	Partially, weeds controlled
Rodent predation or herbivory – rats	C	Ongoing	Partially, snap traps set
Slugs herbivory	C	Ongoing	None
Landslides and erosion	E	Ongoing	None
Drought	E	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 2008). 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 Seed Conservation Laboratory. 2013. Seed storage database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Olinda Rare Plant Facility. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 5 pages. Unpublished.

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

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

[PEPP] Plant Extinction Prevention Program. 2011. Plant Extinction Prevention Program annual report, fiscal year 2011 (July 1, 2010-June 30, 2011). 200 pages. Unpublished.

- [PEPP] Plant Extinction Prevention Program. 2012. Plant Extinction Prevention Program annual report, fiscal year 2012 (July 1, 2011-June 30, 2012). 169 pages. Unpublished.
- [PEPP] Plant Extinction Prevention Program. 2013. Plant Extinction Prevention Program annual report, fiscal year 2013 (July 1, 2012-June 30, 2013). 207 pages. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 1995. Lanai plant cluster recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. 138 pages.
- [USFWS] U.S. Fish and Wildlife Service. 2008. *Cyanea macrostegia* ssp. *gibsonii* 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 11 pages.
- [USFWS] U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; listing 38 species on Molokai, Lanai, and Maui as endangered and designating critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species; proposed rule. Federal Register 77(112):34464-34775.
- Wagner, W.L., D.R. Herbst, and D.H. Lorence. 2005. Flora of the Hawaiian Islands website. Available online at <http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm>. Accessed February 5, 2014.

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

Pre-1992 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

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

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Date 2014-03-12