

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Cyanea dunbarii* (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):

Ann Marie Gawel, Plant Biologist, PIFWO

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 dunbariae* (USFWS 2008). The evaluation by Ann Marie Gawel and Chelsie Javar-Salas, both Plant Biologists, was reviewed by the Island Team Manager, and 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 dunbariae* published on January 18, 2008 (available at http://ecos.fws.gov/docs/five_year_review/doc1770.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. dunbarii*.

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

New taxonomic information:

No new taxonomic information has been received since the last 5-year review (USFWS 2008). In 2012, USFWS proposed to revise the taxonomic status for this species through a spelling correction, when it revises critical habitat on Molokai, Lanai, Maui, and Kahoolawe with no change in species' range or distribution (USFWS 2012). The proposed spelling correction for this species is *Cyanea dunbariae*, and is addressed as such for the remainder of this review.

New status information:

In addition to those populations cited in the previous 5-year review, new observations include the following:

- There are two known populations of *Cyanea dunbariae*, both on the island of Molokai. The population at Mokomoko or Kapuna springs has declined to four individuals (Plant Extinction Prevention Program [PEPP] 2013).

Overall, *Cyanea dunbariae* has decreased from 16 individuals in the wild reported in the last 5-year review to 4 individuals (PEPP 2013).

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 dunbariae* is highly vulnerable to the impacts of climate change. Therefore, additional management actions are needed to conserve this taxon into the future.

New management actions:

- Captive propagation for genetic storage and reintroduction
 - In 2011, 20 individuals of *C. dunbariae* propagated from seed at the Olinda Rare Plant Nursery on Maui were transported to Molokai for eventual reintroduction (PEPP 2011).
 - The Harold L. Lyon Arboretum Seed Conservation Laboratory (2013) contains more than 58,000 seeds of *C. dunbariae*.
 - The National Tropical Botanical Garden (2013) has an unspecified amount of seeds in storage for *C. dunbariae*.
 - There are more than 150 propagules of *C. dunbariae* at the Harold L. Lyon Arboretum Micropropagation Laboratory (2013).
 - The Olinda Rare Plant Facility (2012) has two individuals represented in their nursery for seed production and outplanting efforts.
- Reintroduction/translocation – In 2012, the Plant Extinction Prevention Program outplanted 32 individuals of *C. dunbariae* in the Kalamaula area of Molokai and scouted sites nearby for other potential reintroduction sites (PEPP 2012).

- Population viability monitoring and analysis – In 2011, the Plant Extinction Prevention Program monitored and collected seeds from the wild population at Mokomoko and the outplanted population at Kalamaula (PEPP 2012).
- Ungulate monitoring and control – In 2012, the Plant Extinction Prevention Program constructed a fence around the outplanted individuals of *C. dunbariae* at Kalamaula on Molokai (PEPP 2012).
- Invasive plant monitoring and control – The Plant Extinction Prevention Program performed manual weed control at Mokomoko and at Kalamaula (PEPP 2013).
- Listing and critical habitat designation – Five units of unoccupied and occupied areas of critical habitat for *C. dunbariae* was proposed in the lowland mesic, lowland wet, and montane mesic ecosystems on Molokai (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 addendum to the recovery plan for the Molokai plant cluster (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Cyanea dunbariae* 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 Molokai. 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 no population of 50 mature individuals exist (Table 1) and threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Cyanea dunbariae* 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 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' high vulnerability to climate change.
- Reintroduction/translocation – Continue augmenting current natural populations to increase numbers of individuals.
- Invasive plant monitoring and control – Eradicate invasive introduced plants within ungulate exclosures and maintain the exclosures free of invasive introduced plants.
- Ungulate monitoring and control – Maintain existing exclosures and monitor for potential incursions.
- Population viability monitoring and analysis – Continue monitoring all individuals at both Mokomoko and Kalamaula.
- Predator / herbivore monitoring and control – Control slugs and rodents within the vicinity of all known *C. dunbariae* populations.

- Stochastic events – Build resilience and redundancy – Increase numbers of populations and individuals scattered through historic range to reduce impacts from landslides and flooding.
- Climate change adaptation strategy – Research the suitability of habitat for reintroducing this species in the future due to the impacts of climate change.
- 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 dunbariae* from listing through current 5-year review.

Date	No. wild indivs	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1996 (listing)	15-20	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	35-40	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	30	Unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2007 (5-year review)	16	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2012 (critical habitat – proposed)	10	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2014 (5-yr review)	4	32	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

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

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – degradation of habitat and herbivory	A, C, D, E	Ongoing	Partially, only Kalamaula is fenced
Invasive introduced plants	A, E	Ongoing	Partially, periodic weed controlled at both populations
Rodent predation or herbivory – Rats	C	Ongoing	None
Slugs herbivory	C	Ongoing	None
Landslides and erosion	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 Micropropagation Laboratory. 2013. Micropropagation database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Harold L. Lyon Arboretum Seed Conservation Laboratory. 2013. Seed storage database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

National Tropical Botanical Garden. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 30 pages. Unpublished.

Olinda Rare Plant Facility. 2012. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 3 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. 1998. Molokai II: Addendum to the recovery plan for the Molokai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages + appendices.
- [USFWS] U.S. Fish and Wildlife Service. 2008. *Cyanea dunbariae* (haha) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 10 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(122):34464-34775.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Cyanea dunbarii* (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**

Mau M Bluegman

Date *2017-03-12*