

Cyanea dunbariae
(Haha)

**5-Year Review
Summary and Evaluation**

**U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii**

5-YEAR REVIEW
Species reviewed: *Cyanea dunbariae* (Haha)

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5-YEAR REVIEW

***Cyanea dunbariae* (Haha)**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

Region 1, Jesse D'Elia, Chief, Division of Recovery, (503) 231-2071

Lead Field Office:

Pacific Islands Fish and Wildlife Office, Gina Shultz, Assistant Field Supervisor for Endangered Species, (808) 792-9400

Cooperating Field Office(s):

N/A

Cooperating Regional Office(s):

N/A

1.2 Methodology used to complete the 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) between June 2006 and June 2007. The National Tropical Botanical Garden provided most of the updated information on the current status of *Cyanea dunbariae*. They also provided recommendations for conservation actions that may be needed prior to the next five-year review. The evaluation of the lead PIFWO biologist was reviewed by the Plant Recovery Coordinator. These comments were incorporated into the draft five-year review. The document was then reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before final approval.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

USFWS. 2006. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 70 species in Idaho, Oregon, Washington, Hawaii, and Guam. Federal Register 71(69):18345-18348.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1996. Determination of endangered status for three plant species (*Cyanea dunbarii*, *Lysimachia maxima*, and *Schiedea sarmentosa*) from the island of Molokai, Hawaii; final rule. Federal Register 61(198):53130-53137.

Date listed: November 12, 1996

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

1.3.3 Associated rulemakings:

USFWS. 2003. Endangered and threatened wildlife and plants: final designation or nondesignation of critical habitat for 42 plant species from the island of Molokai, HI: final rule. Federal Register 68(52):12982-13141.

Critical habitat was designated for *Cyanea dunbariae* in three units totaling 439 hectares (1,084 acres) on Molokai. This designation includes habitat on state and private lands (USFWS 2003).

1.3.4 Review History:

Species status review [FY 2006 Recovery Data Call (September 2006)]:

Declining

Recovery achieved:

1 (0-25%) (FY 2006 Recovery Data Call)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

5

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Molokai II: Addendum to the recovery plan for the Molokai plant cluster. 1998. U.S. Fish and Wildlife Service, Portland, Oregon. 52 pages.

Date issued: May 20, 1998

Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Yes
 No

2.1.2 Is the species under review listed as a DPS?

Yes
 No

2.1.3 Was the DPS listed prior to 1996?

Yes
 No

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes
 No

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes
 No

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

Yes
 No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes
 No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

Yes
 No

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery?

Yes
 No

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

A synthesis of the threats (Factors A, C, D, and E) affecting this species is presented in section 2.4. Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the Addendum to the recovery plan for the Molokai plant cluster (USFWS 1998). *Cyanea dunbariae* is a long-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* (off-site) 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.

This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Cyanea dunbariae* should be documented on Molokai. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 300 mature individuals per population. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery objective has not been met.

For delisting, a total of eight to ten populations of *Cyanea dunbariae* should be documented on Molokai. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 mature individuals per population. Each population should persist at this level for a minimum of five consecutive years before delisting is considered.

This recovery objective has not been met.

2.3 Updated Information and Current Species Status

In addition to the status summary table below, information on the species' status and threats was included in the final critical habitat rule referenced above in section I.C.5 ("Associated Rulemakings") and in section II.D ("Synthesis") below, which also includes any new information about the status and threats of the species.

Status of *Cyanea dunbariae* from listing through 5-year review.

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1996 – listing	15-20	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 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 25 mature individuals each	No
2003 – critical habitat	30	Unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2007 – 5-yr review	16	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No

2.3.1 Biology and Habitat

2.3.1.1 New information on the species’ biology and life history:

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species’ biology and life history:

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family

size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

2.3.1.4 Taxonomic classification or changes in nomenclature:

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species within its historic range, etc.):

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

2.3.1.7 Other:

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

2.3.2.3 Disease or predation:

2.3.2.4 Other natural or manmade factors affecting its continued existence:

2.4 Synthesis

Cyanea dunbariae is only known from one population, where its numbers have been in steady decline. *Cyanea dunbariae* was collected in 1918 at Waihanau and Waialae Valleys, and was not observed again until 1992 in Mokomoko Gulch within the Molokai Forest Reserve (USFWS 2003). Between 1993 and 2005, this location has been visited almost annually. The population at Mokomoko Gulch, off Kapuna Springs Road, Molokai, has seen a decline in the number of plants from approximately 30 in 1995 to 22 in 2001, and down to six plants in 2004. In 2005, botanists found three adults, eight juveniles and five seedlings (Perlman 2006; Tangalin 2006).

This species' name was misspelled as *Cyanea dunbarii* in both the listing rule (USFWS 1996) and the recovery plan (USFWS 1998), based on a misspelling in the

first edition of Wagner *et al.* (1990). The change to the correct spelling of *C. dunbariae* was made in the supplement to the revised edition of Wagner *et al.* (1999).

Cyanea dunbariae is found in lowland mesic to wet *Dicranopteris linearis* (uluhe)-*Metrosideros polymorpha* (ohia) forest on moderate to steep slopes along one stream and a side stream at Mokomoko Gulch, Molokai. There are two sites, referred to as the “main gulch” and “side gulch,” but they are considered one population. They are located at elevations ranging from 680 to 713 meters (2,230 to 2,340 feet) and 692 to 697 meters (2,270 to 2,290 feet) respectively (Perlman 2006) (USFWS 1998; National Tropical Botanical Garden 2005).

Feral pigs and axis deer activity are altering the habitat where this population is located, especially in the side gulch (Factors A and D) (USFWS 1998; Perlman 2006; Tangalin 2006). Like other *Cyanea* species, *C. dunbariae* is susceptible to predation from slugs and rats (Factor C). Birds have also been observed to damage the flowers (Factor C) (Perlman 2006). Invasive introduced plant species that degrade the habitat of and compete with this species include *Buddleia asiatica* (butterfly bush), *Commelina diffusa* (dayflower), *Erigeron karvinskianus* (daisy fleabane), *Hedychium* sp. (ginger), *Kalanchoe pinnata* (airplant), *Musa* sp. (banana), *Ricinus communis* (castor bean), *Psidium cattleianum* (strawberry guava), *Psidium guajava* (common guava), and *Rubus rosifolius* (thimbleberry) (Factor E) (USFWS 1998).

Species like *Cyanea dunbariae* that are endemic to a small portion of one island, and limited to a few populations and individuals, are inherently more vulnerable to extinction than widespread species because of the higher risks posed by genetic bottlenecks, random demographic fluctuations and localized catastrophes such as hurricanes, landslides or drought (Factor E).

The National Tropical Botanical Garden and the Harold L. Lyon Arboretum have seeds in storage (National Tropical Botanical Garden 2006; Harold L. Lyon Arboretum Micropropagation Laboratory 2006). There has been relatively little success growing *Cyanea dunbariae* from seed. Two plants from wild seed are being grown by National Tropical Botanical Garden in hopes of hand pollinating flowers to produce seed. This has been achieved before, but the first generation plants have not survived (D. Boucher, National Tropical Botanical Garden, pers. comm. 2006). Lyon Arboretum has plants of *C. dunbariae* in its laboratory (N. Sugii, Lyon Arboretum Micropropagation Laboratory, pers. comm. 2006). Seed is stored at Lyon Arboretum and National Tropical Botanical Garden from collections made in 1993 and 2001. Seeds of this species are not viable after more than a few years in storage (A. Yoshinaga, Center for Conservation Research and Training, pers. comm. 2006).

The stabilization and recovery goals for this species have not been met, as only 16 individuals are known. Therefore, *Cyanea dunbariae* meets the definition of endangered as it remains in danger of extinction throughout its range.

3.0 RESULTS

3.1 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number:

Brief Rationale:

3.3 Listing and Reclassification Priority Number:

Reclassification (from Threatened to Endangered) Priority Number: _____

Reclassification (from Endangered to Threatened) Priority Number: _____

Delisting (regardless of current classification) Priority Number: _____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS:

- Continue seed collection for genetic storage.
- Determine method to germinate and propagate plants from seed.
- Fence individual plants for short-term protection from ungulates.
- Control introduced invasive plant species around remaining plants.
- Control introduced rodents, birds and slugs around remaining plants, as needed.

5.0 REFERENCES:

Harold L. Lyon Arboretum Micropropagation Laboratory. 2006. Report on controlled propagation of species, as designated under the U.S. Endangered Species Act. Unpublished.

National Tropical Botanical Garden. 2006. Report on controlled propagation of species, as designated under the U.S. Endangered Species Act. Unpublished.

National Tropical Botanical Garden. 2005. Provenance report for accession 050677. Unpublished.

Perlman, S. 2006. National Tropical Botanical Garden, summary of field logs for *Cyanea dunbariae*, 1993 through 2005. Unpublished.

Tangalin, N. 2006. National Tropical Botanical Garden, field log summaries. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; final designations and nondesignations of critical habitat for 42 plant species from the island of Molokai, HI; final rule. Federal Register 68 (52):12982-13141.

[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. 52 pages.

[USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered status for three plant species (*Cyanea dunbarii*, *Lysimachia maxima* and *Schiedea sarmentosa*) from the island of Molokai, Hawaii; final rule. Federal Register 61(198):53130-53137.

Wagner, W.L., D. Herbst, and S.H. Sohmer. 1999. Manual of the flowering plants of Hawai'i, Revised Edition. University of Hawai'i Press, Bishop Museum Press, Special Publication. 97:1-1918.

Personal and Written Communications:

David Boucher. Research Associate, National Tropical Botanical Garden, July 13, 2006.

Nellie Sugii. Lyon Arboretum Micropropagation Laboratory, July 14, 2006.

Alvin Yoshinaga. Center for Conservation Research and Training, Seed Conservation Laboratory, Harold L. Lyon Arboretum. July 13, 2006.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Cyanea dunbariae* (Haha)

Current Classification: _____ E _____

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

Marilet A. Zablan, Recovery Program Leader and Acting Assistant Field Supervisor for Endangered Species, June 27, 2007

Marie Bruegmann, Plant Recovery Coordinator, May 24, June 11 and 28, 2007

Christian Torres-Santana, Fish and Wildlife Biologist, May 10, and June 27, 2007

Jeff Burgett, Fish and Wildlife Biologist, May 3, 2007

Approve  Date 1/18/08
Lead Field Supervisor, Fish and Wildlife Service