

*Cyanea pinnatifida*  
(Haha)

**5-Year Review  
Summary and Evaluation**

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

**5-YEAR REVIEW**  
***Cyanea pinnatifida* (Haha)**

**I. GENERAL INFORMATION**

**A. Methodology used to complete the:**

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the Fish and Wildlife Service between July 2005 and June 2006. The Hawaii Biodiversity and Mapping Program was contracted to provide updated information on the current status of *Cyanea pinnatifida*. They also provided recommendations for future actions that may be needed prior to the next 5-year review. The evaluation of the lead PIFWO biologist was reviewed by the Plant Recovery Coordinator, whose comments were incorporated into the draft 5-year Review. The draft 5-year Review was then reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before PIFWO submission to the Regional Office.

**B. Reviewers**

**Lead Region:** Region 1

**Lead Field Office:** Pacific Islands Fish and Wildlife Office

**C. Background**

**1. FR Notice citation announcing initiation of this review:**

July 6, 2005. Endangered and Threatened Wildlife and Plants; Initiation of 5-year Reviews (of 33 species in Region 1). 70 FR 38972-38975.

**2. Species status:**

Stable (FY 2006 Recovery Data Call)

**3. Recovery achieved:**

1, meaning 0 - 25 percent of the identified recovery objectives for *Cyanea pinnatifida* have been achieved (FY 2006 Recovery Data Call)

**4. Listing history**

Original Listing

FR notice: U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; determination of endangered status for 26 plants from the Waianae Mountains, island of Oahu, Hawaii. *Federal Register* 56(209): 55770-55786.

Date listed: October 29, 1991

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

N/A

**5. Associated actions:**

Critical habitat was designated for *Cyanea pinnatifida* in three units totaling 802 acres (325 hectares) on Oahu (U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; final designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, Hawaii. *Federal Register* 68(116): 35949-36406).

**6. Review History:** Just the original listing, designation of critical habitat, and recovery plan development actions.

**7. Species' Recovery Priority Number at start of review):** 5, meaning a species with a high degree of threat and a low recovery potential.

**8. Recovery Plan or Outline**

Name of plan: Recovery Plan for the Oahu Plants. 1998. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pp. plus appendices.

Date issued: August 10, 1998

Dates of previous revisions: N/A

Some of the actions outlined in the Recovery Plan have been initiated but not completed (*e.g.* outplanting; rat and weed control; construction of exclosures for protection from feral pigs). Some recovery actions will require long-term commitments (*e.g.*, maintenance of exclosure fences; weed control) or may only be necessary intermittently (*e.g.*, surveys for more populations).

**II. REVIEW ANALYSIS**

**A. Application of the 1996 Distinct Population Segment (DPS) Policy**

This Policy does not apply to plant species.

**B. Recovery Criteria**

**1. Does the species have a final, approved recovery plan?**

*Yes*  
 *No*

**2. Does the recovery plan contain recovery (i.e., downlisting or delisting) criteria?**

*Yes*  
 *No*

3. **Adequacy of recovery criteria.**
- a. **Do the recovery criteria reflect the best available (i.e., most up-to-date) information on the biology of the species and its habitat?**  
 *Yes*  
 *No*
- b. **Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding existing or new threats)?**  
 *Yes*  
 *No*
4. **List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. For threats-related recovery criteria, please note which of the 5 listing factors\* are addressed by that criterion. If any of the 5-listing factors are not relevant to this species, please note that here.**

The threats (Factors A, C, and E) affecting this species are discussed in detail in section II.D. Factors B and D are not considered a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the Recovery Plan for Oahu Plants (Service 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) (Factors A, C, and E) 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.

This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Cyanea pinnatifida* should be documented on the island of Oahu where it now occurs or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats (Factors A, C, and E), with a minimum of 300 mature individuals per population. Each population should persist at this level for a minimum of 5 consecutive years before downlisting is considered.

This recovery objective has not been met.

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- A) Present or threatened destruction, modification or curtailment of its habitat or range;
  - B) Overutilization for commercial, recreational, scientific, or educational purposes;
  - C) Disease or predation;
  - D) Inadequacy of existing regulatory mechanisms;
  - E) Other natural or manmade factors affecting its continued existence.

For delisting, a total of 8 to 10 populations of *Cyanea pinnatifida* should be documented on the island of Oahu where it now occurs or occurred historically. Each of these populations must be naturally reproducing, stable, or increasing in number, and secure from threats (Factors A, C, and E), with a minimum of 300 mature individuals per population. Each population should persist at this level for a minimum of 5 consecutive years before delisting is considered.

This recovery objective has not been met.

### C. Synthesis

Historically, *Cyanea pinnatifida* was known from the central Waianae mountains. In 1991, at the time *Cyanea pinnatifida* was listed, there was only one known individual remaining in the wild, in Kaluaa Gulch in the southern Waianae mountains. When the Recovery Plan was published in 1998, this individual was still extant, but it died in August 2001 (Trae Menard, The Nature Conservancy of Hawaii, pers. comm. 2001). Currently, this species is known only from individuals under propagation at the University of Hawaii's Lyon Arboretum, and 70 individuals outplanted at Honouliuli Preserve within historical range (Service 2005; TNCH 2006a, 2006b). No recruitment has been observed to date from these outplanted individuals (Michael Walker, The Nature Conservancy of Hawaii Oahu Program, pers. comm. 2006).

When *Cyanea pinnatifida* was listed in 1991, habitat degradation by feral pigs was included as a threat to this species (Factor A) (56 FR 55770). As early as 1778, European explorers introduced livestock, which became feral, increased in number and range, and caused significant changes to the natural environment of Hawaii. The pig is originally native to Europe, northern Africa, Asia Minor, and Asia. European pigs became feral and invaded forested areas, especially wet and mesic forests and dry areas at high elevations. Feral pigs are currently present on Oahu and inhabit rain forests and grasslands. While rooting in the ground in search of the invertebrates and plant material they eat, feral pigs disturb and destroy vegetative cover, trample plants and seedlings, and threaten forest regeneration by damaging seeds and seedlings. They disturb soil and cause erosion, especially on slopes. Alien plant seeds are dispersed on their hooves and coats as well as through their digestive tracts, and the disturbed soil is fertilized by their feces, helping these plants to establish. Feral pigs are a primary vector in the spread of many introduced plant species (Smith 1985; Stone 1985; Medeiros *et al.* 1986; Scott *et al.* 1986; Tomich 1986; Cuddihy and Stone 1990; Wagner *et al.* 1999). At the time the Recovery Plan was published in 1998, the one remaining individual of *C. pinnatifida* was not directly threatened by pigs because of its location on the side of a gulch wall, and pigs are still found in its historical range (Service 1998). In 2001, it was reported that this last individual of *C. pinnatifida* had died (Trae Menard, pers. comm. 2001). Currently, the individuals of *C. pinnatifida* outplanted in Honouliuli Preserve are threatened by feral pigs that degrade the habitat (Factor A), so constant monitoring is needed to prevent ingress into the four exclosures have been constructed to prevent habitat destruction by feral pigs (TNCH 2006b).

At the time of listing, *Cyanea pinnatifida* was threatened by competition with and habitat degradation by alien plants such as *Clidemia hirta* (Koster's curse) (Factors A and E) (56 FR 55770). Currently, the nonnative plant species that impact the historical range and the outplanting area in Honouliuli are *Clidemia hirta*, *Passiflora suberosa* (huehue haole), *Melinis minutiflora* (molasses grass), *Psidium cattleianum* (strawberry guava), *Psidium guajava* (common guava), and *Schinus terebinthifolius* (Christmas berry) (TNCH 2006b). The outplanting site mentioned above is maintained by periodic weed control (TNCH 2006b).

In 1998 when the Recovery Plan was published, *Cyanea pinnatifida* was potentially threatened by predation by rats and slugs (Factor C) (Service 1998). Rats occur on all the main Hawaiian Islands around human habitations, in cultivated fields, and in dry to wet forests. Rats are known to eat the fruit and strip the bark of some native plants, particularly fruits of plants in the bellflower (Campanulaceae) family with fleshy stems and fruits (Tomich 1986; Cuddihy and Stone 1990). Rats are being controlled at the outplanting area by the use of bait stations and snap traps as part of the habitat protection program at Honouliuli Preserve (TNCH 2006b). New information in the U.S. Army's 2005 Status Report for the Makua Implementation Plan indicates that slugs can be a threat to all species of *Cyanea* (Factor C) (Makua Implementation Team 2003). Field experiments conducted by Alvin Yoshinaga and Curt Daehler demonstrated that slugs could reduce the survival of *Cyanea* spp. seedlings by as much as 80 percent (Makua Implementation Team 2003). Graduate student Stephanie Joe has been recently hired by the Army as a Natural Resources Research Specialist, and included among her duties is the investigation of control of slug herbivory. Her research on slug impacts on *Cyanea* seedlings has revealed similar levels of mortality, approximately 53 percent (Joe 2006).

Species like *Cyanea pinnatifida* that are endemic to a small portion of a single island are inherently more vulnerable to extinction than widespread species because of higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes and disease outbreaks (Factor E). All of the existing plants descend from a cutting that was collected from one known wild plant (Service 2005; Nellie Sugii, Lyon Arboretum, pers. comm. 2006). *Cyanea pinnatifida* was also threatened by collection and trampling by humans on or near trails (Factor E), but the current outplanting site is fenced (TNCH 2006b). When the Recovery Plan was published in 1998, the last individual of *C. pinnatifida* was located on the side of a gulch wall and was threatened by mortality due to environmental disturbances such as washouts and falling rocks and trees (Factor E), but this type of disturbance does not affect the current outplanting site (Service 1998; TNCH 2006b).

The stabilization, downlisting, and recovery goals for this species have also not been met and, therefore, *Cyanea pinnatifida* meets the definition of endangered as it remains in danger of extinction throughout all of its range.

### III. RESULTS

#### A. Recommended Classification

- Yes, downlist to Threatened
- Yes, uplist to Endangered
- Yes, delist
- No, no change is needed

#### B. New Recovery Priority Number N/A

### IV. RECOMMENDATIONS FOR FUTURE ACTIONS

- Formulate a plan to maintain or increase genetic variability of *Cyanea pinnatifida*.
- Conduct surveys of appropriate habitat in historical locations to determine if any other extant populations of *Cyanea pinnatifida* exist.
- Reintroduce additional populations of *Cyanea pinnatifida* within its historical range.

### V. REFERENCES

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#### **EXPERTS CONSULTED**

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

Current Classification Endangered

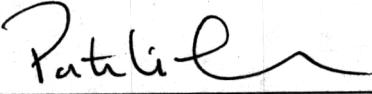
Recommendation resulting from the 5-Year Review

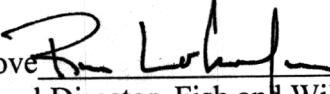
- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change is needed

Appropriate Listing/Reclassification Priority Number N/A

Review Conducted By

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 Date JUL - 3 2007  
Field Supervisor, Fish and Wildlife Service

Approve  Date Aug 2 2007  
Regional Director, Fish and Wildlife Service