

*Cyanea recta*  
(no common name)

**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 recta* (no common name)

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# **5-YEAR REVIEW**

## *Cyanea recta*

### **1.0 GENERAL INFORMATION**

#### **1.1 Reviewers**

**Lead Regional Office:**

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

**Lead Field Office:**

Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (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 of the U.S. Fish and Wildlife Service (USFWS), beginning on April 29, 2008. The review was based on the final critical habitat designation for *Cyanea recta* and other species from the island of Kauai (USFWS 2003), as well as a review of current, available information. The National Tropical Botanical Garden provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Samuel Aruch, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Assistant Field Supervisor for Endangered Species and Acting Deputy Field Supervisor before submission to the Field Supervisor for approval.

#### **1.3 Background:**

**1.3.1 Federal Register (FR) Notice citation announcing initiation of this review:**

USFWS. 2008. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 70 species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

### 1.3.2 Listing history

Original Listing

**FR notice:** USFWS. 1996. Endangered and threatened wildlife and plants; determination of endangered or threatened status for 24 plants from the island of Kauai, Hawaii; final rule. Federal Register 61(198):53070-53089.

**Date listed:** October 10, 1996

**Entity listed:** Species

**Classification:** Threatened

Revised Listing, if applicable

**FR notice:** N/A

**Date listed:** N/A

**Entity listed:** N/A

**Classification:** N/A

### 1.3.3 Associated rule makings :

USFWS. 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, Hawaii; final rule. Federal Register 68:9116-9479.

Critical habitat was designated for *Cyanea recta* in four units totaling 1,555 hectares (3,840 acres) on the island of Kauai (USFWS 2003). These designations includes habitat on State and private lands (USFWS 2003).

### 1.3.4 Review History:

Species status review [FY 2009 Recovery Data Call (August 2009)]:

Declining

#### **Recovery achieved:**

1 (0-25%) (FY 2007 Recovery Data Call – this was the last year this was reported)

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

2

### 1.3.6 Current Recovery Plan or Outline

**Name of plan or outline:** Kauai II: Addendum to the recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 140 pages.

**Date issued:** August 23, 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 criteria?**

*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 Kauai II: Addendum to the recovery plan for the Kauai 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 recta* 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, weeding, etc.) and be represented in an *ex situ* (at other than its original site, *e.g.*, a nursery) collection. In addition, a minimum of three populations should be documented on Kauai where they now occur 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. While there are greater than 3 wild populations with 50 mature individuals, all threats are not being managed and genetic storage is incomplete. Therefore, this recovery objective has not been met.

For downlisting, a total of five to seven populations of *Cyanea recta* should be documented on islands where they now occur or occurred historically. 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 recta* should be documented on islands where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 mature individuals per population for short-lived perennials. 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 1.3.3 ("Associated Rulemakings") and in section 2.4 ("Synthesis") below, which also includes any new information about the status and threats of the species.

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

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Downlisting Criteria identified in Recovery Plan</b>	<b>Down listing Criteria Completed?</b>
1996 (listing)	500-1,500	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	No
			5-7 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
1998 (recovery plan)	1,000-1,500	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
2003 (critical habitat)	198-208	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals	No

			each	
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
2008 (5-year review)	1,000+	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	Unknown
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown

### **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 Inadequacy of existing regulatory mechanisms:**

**2.3.2.5 Other natural or manmade factors affecting its continued existence:**

## **2.4 Synthesis**

Historically, *Cyanea recta* was found in upper Hanalei Valley, Waioli Valley, Hanapepe Valley, Kalalau cliffs, Wainiha Valley, Makaleha Mountains, Limahuli Valley, Powerline Trail, and the Lehua Makanoë-Alakai area on the island of Kauai (USFWS 2003). Wood confirms collections in the 1990s from Iliiliula in the Lihue-Koloa Forest Reserve, Alakai Swamp Trail, Makaleha Mountains, Waioli, Wainiha, Limahuli, and the headwaters of the Hanalei River below Pohakupele (Wood 2008). At the time of listing in 1994 there were 6 populations with 150 to 1,500 individuals located in upper Waioli Valley, Wainiha Valley, Makaleha Mountains, Limahuli Valley, the Wahiawa Bog area, Iliiliula drainage, and the back of Hanalei Valley (USFWS 1996). In 1998, the recovery plan stated that there were 1,000 to 1,500 individuals in 7 populations of those same areas (USFWS 1998). In 2003, there was a total of 8 populations, with approximately 198 to 208 individuals, on State and private lands in the following areas: Waioli Valley, the left and right branches of Wainiha Valley, Makaleha Mountains, and Puu Eu, including areas in Halelea Forest Reserve, Kealia Forest Reserve, and the Lihue-Koloa Forest Reserve (USFWS 2003). This estimate of the number of individuals is in accord with observations recorded in 1993 (Hawaii Biodiversity and Mapping Program 2008), but whether it reflects current numbers is unclear. Observations within the last ten years were 10 individuals in 1998 and again in 2000 in the Lumahai Valley, on the eastern ridge just above the falls (Perlman 2008; Wood 2008); an individual seen in 2006 in Waioli, a hanging valley on the north face of Namolokama, on a prominent ridge to east of main falls within the Halelea Forest Reserve (Wood 2008); and most recently, in September 2008, Ken Wood observed several thousand individuals while exploring the upper side-gulches of the upper Wainiha Valley, where several hundred individuals were noted in 2004 (Wood 2008).

*Cyanea recta* is restricted to Makaleha Mountains, Powerline Trail, and Waioli Valley (Wagner and Herbst 2003). Once included as synonymous with *Cyanea recta*, *Cyanea salicina* was recently resurrected for plants from northeast Kauai by Lammers based on minor differences in flower size and color, but never published (Wagner and Herbst 2003). Ken Wood, Research Biologist at the National Tropical Botanical Garden, states that *C. salicina* apparently falls within the geographical boundaries of *C. recta* and may not be worthy of species distinction (Wood 2008). Individuals he observed which were identified as *C. salicina* in Wainiha fit the description of *C. recta* at different periods of flowering. *Cyanea recta* differs from *C. salicina* in having larger bracts, pedicels, and hypanthium, a broader corolla tube and color differences. Further work is needed to better understand their taxonomic and geographical relationships (Wood 2008).

*Cyanea recta* grows in lowland wet *Metrosideros polymorpha* (ohia) forest, usually in gulches or on slopes, and typically at elevations between 234 and 1,406 meters (768 and 4,613 feet). Associated native plant species include *Antidesma platyphyllum* (hame), *Boehmeria grandis* (akolea), *Broussaisia arguta* (kanawao), *Cheirodendron platyphyllum* (lapalapa), *Cibotium* spp. (hapuu), *Dicranopteris linearis* (uluhe), *Diplazium* spp. (hoio), *Ilex anomala* (kawau), *Kadua affinis* (manono), *Machaerina angustifolia* (uki), *Myrsine lessertiana* (kolea lau nui), *Perrottetia sandwicensis* (olomea), *Pipturus albidus* (mamake), *Psychotria* spp. (kopiko), *Sadleria* sp. (amau), and *Syzygium sandwicensis* (ohia ha) (Perlman 2008; USFWS 2003).

Wainiha Valley, back below Hinalele Falls, is *Metrosideros polymorpha* mixed lowland wet forest, at 579 to 762 meters (1,900 to 2,500 feet) elevation, with associated native species including *Antidesma platyphyllum* var. *hillebrandii*, *Bidens forbesii* (kookoolau), *Boehmeria grandis*, *Cheirodendron* spp. (olapa), *Cibotium* sp. (hapuu), *Coprosma waimeae* (olena), *Cyrtandra cyaneoides* (mapele), *C. kealiae* (haiwale), *C. paludosa* (moa), *Dicranopteris linearis*, *Diplazium sandwichianum*, *Dubautia knudsenii* (naenae), *Elaphoglossum* sp. (hoe a Maui), *Kadua affinis*, *Peperomia* sp. (ala ala wai nui), *Perrottetia sandwicensis*, *Pipturus kauaiensis*, *P. ruber*, *Pittosporum* spp. (hoawa), *Psychotria hexandra*, *P. mariniana*, *Rubus hawaiiensis* (akala), *Syzygium sandwicensis*, *Tetraplasandra* sp. (ohe), and *Urera glabra* (opuhe) (Perlman 2008; Wood 2008).

Waioli, a hanging valley on north face of Namolokama, on a prominent ridge to east of the main falls is *Metrosideros polymorpha* – *Cheirodendron* spp. windswept forest and shrubland at 396 to 823 meters (1,300 to 2,700 feet) elevation with associated species including *Bidens campylothea* (kookoolau), *Boehmeria grandis*, *Broussaisia arguta*, *Cheirodendron platyphyllum*, *Cibotium glaucum*, *Cyanea sylvestris* (haha), *Dicranopteris linearis*, *Diplazium sandwichianum*, *Diplopterygium pinnatum* (uluhe lau nui), *Dubautia knudsenii*, *D. laxa* (naenae pua melemele), *Freycinetia arborea* (ieie), *Gardenia remyi* (nanu), *Hesperomannia lydgatei* (no common name [NCN]), *Ilex anomala*,

*Isodendron longifolium* (aupaka), *Kadua tryblium* (NCN), *Perrottetia sandwicensis*, *Pritchardia perlmanii* (loulou), *Psychotria mariniana*, *P. hexandra*, *Sadleria* sp., *Sticherus owhyhensis* (uluhe), and *Wikstroemia* sp. (akia) (Perlman 2008; Wood 2008).

Lumahai Valley is *Metrosideros polymorpha* lowland wet forest with *Antidesma platyphyllum* var. *hillebrandii*, *Cheirodendron* spp., *Ilex anomala*, *Dubautia knudsenii*, *Kadua affinis*, *Melicope* spp. (alani), *Psychotria mariniana*, *P. hexandra*, *P. wawrae*, *Syzygium sandwicensis*, and *Tetraplasandra* spp. (Wood 2008). Makaleha is *Metrosideros polymorpha* - *Cheirodendron* spp. wet forest 762 to 853 meters (2,500 to 2,800 feet) elevation with *Athyrium sandwichianum*, *Broussaisia arguta*, *Gunnera* sp. (ape ape), *Kadua affinis*, *Kadua tryblium*, *Myrsine* sp., *Peperomia* sp., *Phyllostegia wawrana* (NCN), *Psychotria* spp., and *Vaccinium calycinum* (ohelo) (Perlman 2008).

The major threats to this species are habitat degradation by feral pigs (*Sus scrofa*) (Factors A and D); and competition with invasive introduced plant species including *Blechnum appendiculatum* (NCN), *Clidemia hirta* (Koster's curse), *Crassocephalum crepidioides* (NCN), *Deparia petersenii* (NCN), *Erechtites valerianifolia* (fireweed), *Lantana camara*, *Melastoma candidum* (NCN), *Paspalum conjugatum* (Hilo grass), *Rubus rosifolius* (thimbleberry), *Sacciolepis indica* (Glenwood grass), and *Youngia japonica* (Oriental hawkbeard) (Factor E) (USFWS 2003). In Wainiha, threats include feral pigs (Factors A and D), landslides (Factor E), and introduced invasive plant species including *Andropogon glomeratus* (beardgrass), *Angiopteris evecta* (mule's foot fern), *Buddleia asiatica* (dog tail), *Clidemia hirta*, *Sphaeropteris cooperi* (Australian tree fern), *Erigeron karvinskianus* (daisy fleabane), *Juncus planifolius* (rush), *Mariscus meyenianus* (NCN), *Paspalum conjugatum* (Hilo grass), *Pluchea carolinensis* (sourbush), *Rubus rosifolius*, and *Setaria parviflora* (yellow foxtail) (Factor E) (Wood 2008). In Waioli, *Clidemia hirta* and *Rubus rosifolius* compete with *Cyanea recta* (Factor E) (Wood 2008). Bark removal and chewing by rats (*Rattus rattus*) damages these plants, as does browsing by goats (*Capra hirtus*) (Factor C). Unidentified species of slugs feed on the stems (Factor C) (USFWS 2003; Wood 2008). Climate change may also pose a threat to *Cyanea recta* (Factors A and E). However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

There are 845 seeds in storage at the National Tropical Botanical Garden (National Tropical Botanical Garden 2009).

The downlisting goals for this species have not been met (see Table 1). While there is one population with over 1,000 individuals, there are several populations that have not been surveyed recently and all threats are not being managed. Therefore, *Cyanea recta* meets the definition of threatened as it remains in danger of extinction throughout its range.

### 3.0 RESULTS

#### 3.3 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 to collect seeds for adequate genetic storage.
- Exclude feral ungulates from wild populations.
- Determine and implement efficient and effective control for rats and slugs.
- Develop propagation methods.
- Survey to determine the current status of the species.
- Research distribution and genetic relationships with *Cyanea salicina*.
- Work with Hawaii Division of Forestry and Wildlife and other landowners to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

## 5.0 REFERENCES

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**Signature Page**  
**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Cyanea recta* (no common name)**

**Current Classification:** \_\_\_\_\_ T \_\_\_\_\_

**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:**

Marie Bruegmann, Plant Recovery Coordinator  
Marilet A. Zablan, Assistant Field Supervisor for Endangered Species  
Jeff Newman, Acting Deputy Field Supervisor

Approved \_\_\_\_\_ Date **AUG 27 2010**

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