

Cyrtandra subumbellata
(Ha`iwale)

**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: *Cyrtandra subumbellata* (Ha'iwale)

TABLE OF CONTENTS

1.0	GENERAL INFORMATION	1
1.1	Reviewers	1
1.2	Methodology used to complete the review:.....	1
1.3	Background	1
2.0	REVIEW ANALYSIS	3
2.1	Application of the 1996 Distinct Population Segment (DPS) policy.....	3
2.2	Recovery Criteria.....	3
2.3	Updated Information and Current Species Status	4
2.4	Synthesis.....	6
3.0	RESULTS	7
3.1	Recommended Classification	7
3.2	New Recovery Priority Number	7
3.3	Listing and Reclassification Priority Number.....	7
4.0	RECOMMENDATIONS FOR FUTURE ACTIONS	8
5.0	REFERENCES	8
	Signature Page.....	10

5-YEAR REVIEW
***Cyrtandra subumbellata* (Ha`iwale)**

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 Hawaii Biodiversity and Mapping Program provided most of the updated information on the current status of *Cyrtandra subumbellata*. 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. Endangered and threatened wildlife and plants; determination of endangered status for twenty-five plant species from the island of Oahu, Hawaii. Federal Register 61(198):53089-53108.

Date listed: October 10, 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 101 plant species from the island of Oahu, HI: final rule. Federal Register 68(116):35949-36406.

Critical habitat was designated for *Cyrtandra subumbellata* in two units totaling 896 hectares (2,215 acres) on Oahu. 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)]:
Stable

Recovery achieved:

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

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

8

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Recovery plan for the Oahu plants.1998. U.S. Fish and Wildlife Service, Portland, Oregon. 270+ pages.

Date issued: August 10, 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?

 X *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 recovery plan for Oahu plants (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Cyrtandra subumbellata* is a short-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 Oahu. 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 *Cyrtandra subumbellata* should be documented on Oahu. 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 *Cyrtandra subumbellata* should be documented on Oahu. 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 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 *Cyrtandra subumbellata* from listing through 5-year review.

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1996 – listing	Fewer than 50	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 – recovery plan	Fewer than 50	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 – critical habitat	12	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2007 – 5-yr review	117	0	All threats managed all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

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:

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

Cyrtandra subumbellata was known historically from six scattered populations in the central Koolau Mountains on the island of Oahu (USFWS 1998). Only two current windward populations remain in Punaluu Valley, with more than 100 mature plants; and in Kahana Valley, with eight mature and seven immature plants. The sole recorded leeward population is located in Kuakonajua Gulch on the East Range of the U.S. Army's Schofield Barracks Military Reservation. When this plant was first discovered at this location in 1994, 25 plants were reported. Currently this population contains only two mature plants and one seedling (U.S. Army 2006). In total, the three populations are composed of at least 110 mature and seven immature individuals. There remains a good chance for additional populations of the species to be discovered since much of this species' potential habitat has been poorly surveyed, particularly along the windward side of the Koolau mountain range, where the slopes are very steep and relatively inaccessible (J. Lau, Hawaii Biodiversity and Mapping Program, pers. comm. 2006).

Cyrtandra subumbellata occurs in *Metrosideros* spp.(ohia lehua) wet forest or mixed ohia lehua-uluhe-koa (*Metrosideros* spp.-*Dicranopteris linearis*-*Acacia koa*) wet forest, in gulch bottoms or on gulch slopes (U.S. Army 2005).

The primary threats to *Cyrtandra subumbellata* are competition with the invasive introduced plants *Clidemia hirta* (Koster's curse) and *Psidium cattleianum* (strawberry guava) (Factor E), habitat degradation by feral pigs (Factors A and D), a variety of potential impacts from military activities (Factor E), predation of seeds and plant parts by rats and slugs (Factor C), and the risk of extinction from naturally-occurring events and/or reduced reproductive vigor due to the small number of extant populations and individuals (Factor E) (USFWS 1998; U.S. Army 2005). Hybridization (Factor E) has been documented between various pairs of Hawaiian species of *Cyrtandra* (Wagner *et al.* 1999; Smith *et al.* 1996). *Cyrtandra subumbellata* potentially occurs with ten other *Cyrtandra* species (U.S. Army 2005). Obvious hybrids involving *C. subumbellata* are relatively abundant, and in Kahana Valley at least, they appear to possibly outnumber individuals of pure *C. subumbellata* (J. Lau, pers. comm. 2006).

The U.S. Army staff plan to manage populations of *Cyrtandra subumbellata* in Punaluu Valley and Kaukonahua Gulch for interim stability, as defined in the recovery criteria. The currently known plants of *C. subumbellata* in Kaukonahua Gulch are not within any proposed management boundaries, but plants propagated from these individuals will be reintroduced into the proposed fenced areas for the other two populations (U.S. Army 2005 and 2006).

The stabilization and recovery goals for this species have not been met, as only three populations are known, only one of which has stable numbers, and the threats are not all being managed. Therefore, *Cyrtandra subumbellata* 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.
- Control rodents around remaining plants.
- Search for additional populations of *Cyrtandra subumbellata*.
- Study *Cyrtandra subumbellata* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors and threats.
- Study hybridization amongst Hawaiian species of *Cyrtandra* to determine whether hybridization poses a significant threat to *Cyrtandra subumbellata*.
- Continue U.S. Army studies on slug control.

5.0 REFERENCES:

- [U.S. Army] U.S. Army Garrison, Hawaii. 2005. Draft Implementation Plan for Oahu Training Areas: Schofield Barracks Military Reservation, Schofield Barracks East Range, Kawaiiloa Training Area, and Kahuku Training Area. Unpublished.
- [U.S. Army] U.S. Army Garrison, Hawaii. 2006. Status reports for the Makua implementation plan and the draft O`ahu implementation plan. Unpublished.
- [USFWS] 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, HI; final rule. Federal Register 68(116):35949-35998.
- [USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages, plus appendices.
- [USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered status for twenty-five plant species from the island of Oahu, Hawaii; final rule. Federal Register 61(198):53089-53108.
- 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 Communications:

Lau, Joel Q.C., 2006. Botanist, Hawaii Biodiversity and Mapping Program.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Cyrtandra subumbellata* (Ha'iwale)

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 24, 2007

Marie Bruegmann, Plant Recovery Coordinator, January 17, April 10, May 24, and June 29, 2007

Joy Hiromasa, Fish and Wildlife Biologist, March 26, 2007

Approve Patrick L. d Date 11/15/08
Lead Field Supervisor, Fish and Wildlife Service