

## **5-YEAR REVIEW**

Short Form Summary

**Species Reviewed:** *Platanthera holochila* (No common name)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2007. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 71 species in Oregon, Hawaii, Commonwealth of the Northern Mariana Islands, and territory of Guam. Federal Register 72(45):10547-10550.

### **Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii

### **Name of Reviewer(s):**

Christian Torres-Santana, Pacific Islands Fish and Wildlife Office, Student Trainee Biologist  
Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator  
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species

### **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 8, 2007. The review was based on the final critical habitat designation for *Platanthera holochila* and other species from the island of Kauai, as well as a review of current, available information (USFWS 2003 a, b, c, d). The Bernice P. Bishop Museum provided an initial draft of portions of the five-year review. The evaluation of the status of the species was prepared by our lead PIFWO biologist and reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

### **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](http://ecos.fws.gov/tess_public)).

### **Application of the 1996 Distinct Population Segment (DPS) Policy:**

This Policy does not apply to plants.

### **Review Analysis:**

Please refer to the final critical habitat designation for *Platanthera holochila* published in the Federal Register on February 27, March 18, May 14, and June 17, 2003 (USFWS 2003a, b, c, d) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of *P. holochila*.

Historically, *Platanthera holochila* was recorded from the Alakai Swamp and Kaholuamano area and the Wahiawa Mountains on Kauai, the Koolau Mountains on Oahu, and scattered locations on Molokai and Maui. At the time of listing as federally endangered, five populations were known on Kauai, Maui and Molokai, totaling fewer than 35 individuals (USFWS 1996).

*Platanthera holochila* continues to decline in number of wild individuals, and currently is known from only three populations totaling 26 individuals: one individual on Kauai, possibly one individual on Maui, and 24 individuals on Molokai (Plant Extinction Prevention Program 2007; USFWS 2008a). The taxon is believed extinct on Oahu, and has not been collected there since 1938 (Wagner *et al.* 1999; USFWS 2003d).

No individuals have been observed in the Hanaula enclosure, West Maui despite monitoring known locations during favorable times of the year (Plant Extinction Prevention Program 2008). The Nature Conservancy (TNC) was unsuccessful in locating any individuals in Kapunakea Preserve in 2006. The fenced population in TNC's Waikamoi Preserve, East Maui has not been observed for several years. A single plant found in 2000 in Waihee Valley, Maui, has not been revisited due to issues with Maui County land access. Only a single individual was observed on Kauai in 2005, and has not been seen since, even though the site is monitored regularly (Bruegmann *in litt.* 2006; M. Bruegmann; USFWS 2008b). The largest population, consisting of 24 individuals, is located in the TNC Kamakou Preserve, Molokai (Maui Nui Plant Extinction Prevention Program 2008; H. Oppenheimer, Maui Nui Coordinator, Plant Extinction Prevention Program, pers. comm. 2008). The majority of individuals (20) are numbered and tagged, and located within a pig-free enclosure. The remaining four individuals were enclosed by a fence in 2007.

*Platanthera holochila* requires an associated mycorrhizal fungus for successful germination and growth of seedlings in micropropagation (Zettler *et al.* 2005). A native fungal mycobiont continues to be isolated, and plants in cultivation have been reared using an isolated mycorrhizal fungus from Florida. A low-agar pH and a medium containing nutrients are required to cultivate *P. holochila* to the leaf-bearing stage. Seed viability was found to be greater than 85 percent for the Molokai population and 89 percent for the Kauai population. However, maximum germination was only about 16 percent. The species is assumed to be self-pollinating. Zettler *et al.* are continuing studies on the species' germination and mycorrhizal association needs.

Threats to *Platanthera holochila* include habitat destruction by cattle (*Bos taurus*) and feral pigs (*Sus scrofa*) (Factors A and D), and introduced invasive plant species such as *Tibouchina herbaceae* (glory bush), *Clidemia hirta* (Koster's curse), and *Ageratina adenophora* (Maui pamakani) (USFWS 1996, 1999, 2003a, b, c, 2008a; H. Oppenheimer, pers. comm. 2008).

Green fruits have been collected for germination research related to mycorrhizal symbiosis (Plant Extinction Prevention Program 2007). Overcollection of genetic material could threaten the survival of the taxon given the low number of individuals. Dissemination of locality information could result in the illegal collection of plant material, or trampling plants during visitation (Factor B) (H. Oppenheimer, pers. comm. 2008). All populations are probably negatively impacted by slugs such as *Limax* spp. and *Derocerus* spp. (USFWS 1999; H. Oppenheimer, pers. comm. 2008). After hurricane Iniki in 1992, the two populations in Alakai Swamp, Kauai were reduced to only a single population of ten immature plantlets representing a single clone

(USFWS 1996). Single catastrophic events are therefore a significant threat to this taxon (Factor E). The Waihee Valley population is also threatened by landslides (Factor E) (H. Oppenheimer, pers. comm., 2008).

All known extant populations are fenced, and thus are largely protected from the activities of feral pigs (USFWS 1999, 2008b; Plant Extinction Prevention Program 2007).

To safeguard existing genetic material, propagation for genetic storage and reintroduction is occurring at the University of Hawaii's Lyon Arboretum Micropropagation Laboratory. The Laboratory (2007, 2008) had 62 individuals in micropropagation in 2007, but they were all dead by 2008. The Zettler's laboratory in Illinois also houses micropropagation material for research on germination using mycorrhizal fungus (H. Oppenheimer, pers. comm. 2008; Zetter *et al.* 2005).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the multi-island plants (USFWS 1999), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Platanthera holochila* 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) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on islands 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.

The stabilization goals for this species have not been met as there are approximately 26 individuals and not all threats have been managed (see Table 1). Therefore, *Platanthera holochila* meets the definition of endangered as it remains in danger of extinction throughout its range.

### **Recommendations for Future Actions:**

- Continue collection of genetic resources for storage, future propagation and reintroduction into protected suitable habitat within historical range.
- Construct large-scale exclosure fences to allow for the expansion of existing populations in the Alakai Swamp on Kauai, within the West Maui Watershed Partnership, and in the Kamakou region of Molokai.
- Enhance current natural populations to increase number of individuals.
- Survey geographical and historical range for a thorough current assessment of the species.
- Assess genetic variability within extant and *ex situ* populations.

- Continue studies on germination and mycorrhizal needs of the *Platanthera holochila* to determine how to propagate for reintroduction.
- Study *Platanthera holochila* 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.

## References:

Harold L. Lyon Arboretum Micropropagation Laboratory. 2007. Micropropagation database. University of Hawaii at Manoa. Unpublished.

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[USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered or threatened status for fourteen plant taxa from the Hawaiian Islands; final rule. Federal Register 61(198):53108-53124.

[USFWS] U.S. Fish and Wildlife Service. 1999. Recovery plan for the multi-island plants. U.S. Fish and Wildlife Service, Portland. 206 pages + appendices.

[USFWS] U.S. Fish and Wildlife Service. 2003a. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, HI; final rule. Federal Register 68(39):9116-9479.

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

[USFWS] U.S. Fish and Wildlife Service. 2003c. Endangered and threatened wildlife and plants; designation of critical habitat for 60 plant species from the Islands of Maui and Kahoolawe, HI; final rule. Federal Register 68(93):25934-26165.

[USFWS] U.S. Fish and Wildlife Service. 2003d. 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):35949-35998.

[USFWS] U.S. Fish and Wildlife Service. 2008a. Rare plant tracking database. Pacific Islands Fish and Wildlife Office, Honolulu, HI. Accessed on April 28, 2008. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 2008b. Monitoring database for the Kauai bogs plant recovery project. Pacific Islands Fish and Wildlife Office, Honolulu, HI. Accessed on October 14, 2008. Unpublished.

Wagner, W.L., Brueggmann, M.M., Herbst, D.M., and Lau, C.Q.C. 1999. Hawaiian Vascular Plants at Risk. Bishop Museum Occasional Papers 60:1-58.

Zettler, L.W., S. Perlman, D.J. Dennis, S.F. Hopkins, and S.B. Poulter. 2005. Symbiotic germination of a federally endangered Hawaiian endemic, *Plantanthera holochila* (Orchidaceae), using a mycobiont from Florida: a conservation dilemma. *Selbyana* 26(1-2):269-276.

**Personal communication:**

Brueggmann, Marie. 2008. Kauai Bog Trip Report, November 28 through December 2, 2006. Unpublished progress report for the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii.

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**Table 1. Status of *Platanthera holochila* from listing through 5-year review.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Stability Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1996 – Listing	< 35	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1999 – recovery plan	< 41	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 – critical habitat	56-66	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Unknown
			3 populations with 50 mature individuals each	No
2008 – 5-yr review	26	0	All threats managed	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

**U.S. FISH AND WILDLIFE SERVICE**  
SIGNATURE PAGE for 5-YEAR REVIEW of *Platanthera holochila*

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
- No Change in listing status

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

Patrick Souza

Date 6/20/09