

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. 2012. Endangered and threatened wildlife and plants; 5-year status reviews of 46 species in Idaho, Oregon, Washington, Nevada, Montana, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 77(44):13248-13251.

Lead Region/Field Office:

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

Name of Reviewer(s):

Ann Marie Gawel, Plant Biologist, PIFWO

Chelsie Javar-Salas, Plant Biologist, PIFWO

Maui nui and Hawaii Island Team Manager, PIFWO

Marie Bruegmann, Plant Recovery Coordinator, PIFWO

Recovery Program Lead, PIFWO

Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

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 6, 2012. The review was based on a review of current, available information since the last 5-year review for *Platanthera holochila* (USFWS 2009). The evaluation of Ann Marie Gawel and Chelsie Javar-Salas, both Plant Biologists, were reviewed by the Island Team Manager, and Plant Recovery Coordinator, followed by the Recovery Program Lead. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

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).

Review Analysis:

Please refer to the previous 5-year review for *Platanthera holochila* published on June 2, 2009 (available at http://ecos.fws.gov/docs/five_year_review/doc2447.pdf) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of *P. holochila*.

This short-lived perennial herb is endangered and occurs on the islands of Kauai, Maui, and Molokai (USFWS 1999). This species is extirpated on Oahu. The current status and trends for *Platanthera holochila* are provided in the tables below.

New status information:

In addition to those populations cited in the previous 5-year review, new observations include the following:

- Three new individuals of *Platanthera holochila* were discovered on Maui by the Plant Extinction Prevention Program (2009).
- Twenty-six individuals were outplanted on Molokai and Kauai (Plant Extinction Prevention Program [PEPP] 2009, 2011).

Overall, *Platanthera holochila* has increased from 26 individuals reported in the last 5-year review to 35 individuals (PEPP 2009, 2010, 2011, 2012, 2013).

New threats:

- Climate change destruction or degradation of habitat – Climate change may pose a threat to this species. Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawaii using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under climate change. The assessment by Fortini *et al.* (2013) concluded that *P. holochila* is moderately vulnerable to the impacts of climate change. Therefore, additional management actions are needed to conserve this taxon into the future.
- Rodent predation or herbivory
 - The Plant Extinction Prevention Program (2009, 2010, 2011) reported rats (*Rattus* spp.) as a threat to the Molokai population.
 - Mice (*Mus musculus*) or rats damaged a seed packet used during a seed sowing trial on Kauai (PEPP 2013).
- Lack of mutualists – The Plant Extinction Prevention Program (2012) reported the lack of mycorrhizal fungi as a threat to outplanted individuals on Kauai. As mentioned in the previous 5-year review, *P. holochila* requires an associated mycorrhizal fungus for successful germination and growth of seedlings in micropropagation (Zettler *et al.* 2005).

New management actions:

- Captive propagation for genetic storage and reintroduction
 - The National Tropical Botanical Garden (2012) sent seeds from the wild individual on Kauai to Dr. Zettler's Laboratory at Illinois College. Seeds of *P. holochila* remain in storage at the National Tropical Botanical Garden (2013).
 - The Harold L. Lyon Arboretum Micropropagation Lab (2013) has 500 propagules of *P. holochila* in captive propagation.
 - Sixty-four individuals propagated by Dr. Zettler's Laboratory at Illinois College were delivered to Olinda Rare Plant Nursery on Maui and 32 of these subsequently to Oahu and Molokai (PEPP 2011). Fourteen of these were transported to Harold L. Lyon Arboretum on Oahu and 18 to Molokai for outplanting (PEPP 2011).
 - Twenty-six seedlings propagated by Dr. Zettler's Laboratory at Illinois College were delivered to the Plant Extinction Prevention Program (2012) on Maui.

- The Olinda Rare Plant Facility (2013) has 32 individuals in propagation at their nursery.
- Reintroduction / translocation
 - Individuals propagated by Dr. Zettler's laboratory in Illinois were delivered to Olinda Rare Plant Nursery in Maui, and subsequently transported by Plant Extinction Prevention Program staff to Molokai (see captive propagation above). Eighteen of those individuals were delivered to Molokai and were outplanted at The Nature Conservancy's Kamakou Preserve in 2011 (PEPP 2011).
 - Eight outplanted individuals of *P. holochila* were monitored on Kauai by the Plant Extinction Prevention Program (2011).
 - Direct seed sowing and seed packet trials were attempted at the Kilohana Bog on Kauai by the Plant Extinction Prevention Program (2012). Sixteen plots of direct seed sowing were attempted and nine were relocated in May 2012 and none of the seeds germinated. Eight seed packets were tested and none germinated as of March 2012. The seed packets were reburied.
 - In April 2013, the seed sowing and seed packet trials were monitored and no germination was recorded (PEPP 2013). A single seed packet was possibly destroyed by mice or rats.
- Invasive plant monitoring and control – Weeds were controlled around the population on Kauai by the Plant Extinction Prevention Program (2010).
- Surveys / inventories – Surveys of historical locations were conducted on Maui by the Plant Extinction Prevention Program (2009, 2010). On West Maui, three new individuals were discovered at a site containing previously known individuals (PEPP 2009). During the 2010 surveys, no new individuals were discovered.
- Population viability monitoring and analysis
 - The Plant Extinction Prevention Program (2010) monitored the wild populations of *P. holochila* on Kauai and Molokai.
 - In 2011, outplanted and wild individuals on Kauai and Molokai were monitored (PEPP 2011).
 - The Plant Extinction Prevention Program (2012, 2013) monitored the wild and outplanted populations of *P. holochila* on Kauai, Maui, and Molokai.
- Population biology research – Soil samples were collected by the Plant Extinction Prevention Program (2009, 2012) on Maui in an attempt to isolate the mycorrhizal fungi associated with *P. holochila* for cultivation of nursery stock. The status of this activity is unknown; however Olinda Rare Plant Facility (2013) reportedly has individuals growing in their nursery.
- Listing and critical habitat designation – Three units of unoccupied and occupied areas of critical habitat for *P. holochila* were proposed in the montane wet ecosystem on Molokai and 12 units of unoccupied and occupied areas in the montane wet and wet cliff ecosystems on Maui (USFWS 2012). The final rule for critical habitat designations has not been published at the time of this review.

Synthesis:

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for multi-island plants (USFWS 1999), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Platanthera holochila* is

a short-lived perennial, and to be considered stable, this species must be managed to control threats (e.g. fenced) and be represented in an *ex situ* (at other than the plant's natural location, such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on the islands 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.

The interim stabilization goals for this species have not been met, as currently no population of 50 mature individuals exists (Table 1) and all threats are not sufficiently managed throughout its range (Table 2). Therefore, *Platanthera holochila* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Captive propagation for genetic storage and reintroduction
 - Continue collection of genetic resources for storage, propagation, and reintroduction into protected suitable habitat within historical range.
 - Evaluate genetic resources currently in storage to determine the need to place additional genetic resources in long-term storage due to this species' vulnerability to climate change.
- Reintroduction/translocation – Continue to augment current natural populations to increase numbers of individuals.
- Invasive plant monitoring and control – Control invasive introduced plant species within enclosures.
- Stochastic events – Build resiliency and redundancy – Increase numbers of individuals and populations in suitable habitat to reduce impacts from landslides.
- Predator / herbivore monitoring and control – Control slugs and rodents within the vicinity of all known *P. holochila* populations.
- Population viability monitoring and analysis – Continue to monitor outplanted individuals on Kauai and Molokai.
- Climate change adaptation strategy – Research the suitability of habitat for reintroducing this species in the future due to the impacts of climate change.
- Alliance and partnership development – Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this taxon.

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

| Date | No. wild indivs | No. outplanted | Stabilization Criteria identified in Recovery Plan | Stabilization Criteria Completed? |
|------------------------------------|------------------------|-----------------------|---|--|
| 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 | Partially |
| | | | 3 populations with 50 mature individuals each | No |
| 2008 (5-year review) | 26 | 0 | All threats managed in all 3 populations | Partially |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | No |
| 2012 (critical habitat – proposed) | 44 (Molokai & Maui) | Unknown | All threats managed in all 3 populations | Partially |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | No |
| 2014 (5-yr review) | 35 | 26 | All threats managed in all 3 populations | Partially |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | No |

Table 2. Threats to *Platanthera holochila* and ongoing conservation efforts.

| Threat | Listing factor | Current Status | Conservation/ Management Efforts |
|--|-----------------------|-----------------------|---|
| Ungulates – degradation of habitat and herbivory | A, C, D, E | Ongoing | Yes, all known extant populations are fenced |
| Invasive introduced plants | A, E | Ongoing | Partially, weeds controlled on Kauai |
| Rodent predation or herbivory – rats and mice | C | Ongoing | None |
| Slugs herbivory | C | Ongoing | None |
| Low numbers | E | Ongoing | Partially, captive propagation for genetic storage and reintroduction |
| Landslides and erosion | E | Ongoing | None |
| Lack of mycorrhizal fungi | E | Ongoing | Partially, soil samples collected on Maui |
| Climate change | A, E | Increasing | None |

References:

See previous 5-year review for a full list of references (USFWS 2009). Only references for new information are provided below.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change vulnerability for all native Hawaiian plants. Technical report HCSU-044. Hawaii Cooperative Studies Unit, University of Hawaii at Hilo, Hawaii. 141 pages.

Harold L. Lyon Arboretum Micropropagation Laboratory. 2013. Micropropagation database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

National Tropical Botanical Garden. 2012. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 27 pages. Unpublished.

National Tropical Botanical Garden. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 30 pages. Unpublished.

Olinda Rare Plant Facility. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 5 pages. Unpublished.

- [PEPP] Plant Extinction Prevention Program. 2009. Annual report for Plant Extinction Prevention Program, fiscal year 2009 (July 1, 2008-June 30, 2009). 115 pages. Unpublished.
- [PEPP] Plant Extinction Prevention Program. 2010. Plant Extinction Prevention Program annual report, fiscal year 2010 (July 1, 2009-June 30, 2010). 122 pages. Unpublished.
- [PEPP] Plant Extinction Prevention Program. 2011. Plant Extinction Prevention Program annual report, fiscal year 2011 (July 1, 2010-June 30, 2011). 200 pages. Unpublished.
- [PEPP] Plant Extinction Prevention Program. 2012. Plant Extinction Prevention Program annual report, fiscal year 2012 (July 1, 2011-June 30, 2012). 169 pages. Unpublished.
- [PEPP] Plant Extinction Prevention Program. 2013. Plant Extinction Prevention Program annual report, fiscal year 2013 (July 1, 2012-June 30, 2013). 207 pages. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 1999. Recovery plan for multi-island plants. U.S. Fish and Wildlife Service, Portland, Oregon. 206 pages + appendices.
- [USFWS] U.S. Fish and Wildlife Service. 2009. *Platanthera holochila* 5-year review short form summary. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 7 pages.
- [USFWS] U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; listing 38 species on Molokai, Lanai, and Maui as endangered and designating critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species; proposed rule. Federal Register 77(112):34464-34775.
- Zettler, L.W., S. Perlman, D.J. Dennis, S.F. Hopkins, and S.B. Poulter. 2005. Symbiotic germination of a federally endangered Hawaiian endemic, *Platanthera holochila* (Orchidaceae), using a mycobiont from Florida: a conservation dilemma. *Selbyana* 26(1-2):269-276.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Platanthera holochila* (no common name)

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
- X No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable:

for

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