

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Nothocestrum peltatum* (ʻAiea)

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):

Jay Nelson, Fish and Wildlife Biologist

Marie Brueggemann, Plant Recovery Coordinator

Marilet A. Zablan, Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species

Gina Shultz, Deputy Field Supervisor

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 *Nothocestrum peltatum* and other species from the island of Kauai, as well as a review of current, available information (USFWS 2003). The Bernice P. Bishop Museum provided an initial draft of portions of the 5-year review and provided recommendations for conservation actions needed prior to the next 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, and Deputy Field Supervisor, 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).

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 *Nothocestrum peltatum* published in the Federal Register on February 27, 2003 (USFWS 2003) 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 *N. peltatum*.

First collected on Kauai prior to 1900, *Nothocestrum peltatum* was not described scientifically until 1944. Historically, *N. peltatum* was known from Kauai at Kumuwela, Kaholuamanu, and Nualolo. At the time this long-lived perennial tree was federally listed in 1994 (USFWS 1994), it was known from five populations totaling about 15 individuals, from near the Kalalau Lookout area, Awaawapuhi and Makaha Valleys, and Waimea Canyon. At time of critical habitat designation for Kauai and Niihau (USFWS 2003) 10 occurrences with 20 individuals were reported from Kahuamaa Flats, Awaawapuhi Trail, Awaawapuhi Valley, Kawaiula Valley, and Makaha Valley on State-owned land within Kokee and Na Pali Coast State Parks, Kuia Natural Area Reserve, and Na Pali-Kona and Puu Ka Pele Forest Reserves. A recent estimate lists seven populations totaling 23 individuals (Perlman 2006; USFWS 2008); the largest population (15 individuals) is in upper Nualolo; Awaawapuhi has three individuals; and there are five single individuals scattered in northwestern Kauai.

Herbarium vouchers at Bernice Pauahi Bishop Museum (C. Imada, Bernice Pauahi Bishop Museum, pers. comm. 2008) and data from the National Tropical Botanical Garden (2008) and the Hawaii Natural Heritage Program (2007) revealed flowering in February, March, and July through November; fruiting specimens were noted from February, March, and August through November.

Lilleeng-Rosenberger (2005) reported no success with cuttings of this species, which failed to root. The ripe seed are destroyed by caterpillars. Air layering in the spring on new growth works in conjunction with concentrated rooting powders. National Tropical Botanical Garden (2008) reported 149 seeds in storage. Lyon Arboretum (2008) reported 17 accessions collected on the same date in 2001 from Puu Kapele, Kauai, totaling 56 plants in micropropagation. Perlman (2006) reported three plants in the Lyon Arboretum greenhouse.

The major threats to this species are competition with invasive introduced plants such as *Passiflora tarminiana* (banana poka), *P. edulis* (passion fruit), *Erigeron karvinskianus* (daisy fleabane), *Lantana camara* (lantana), *Rubus argutus* (blackberry), *R. rosifolius* (thimbleberry), *Hedychium gardnerianum* (kahili ginger), *Psidium cattleianum* (strawberry guava), *Corynocarpus laevigatus* (karakanut), and *Bryophyllum pinnatum* (air plant)(Factors A, C, and D) ; fire, both natural and human-induced (Factor E); risk of extinction from naturally occurring events such as storms, hurricanes, or landslides (Factor E); and reduced reproductive vigor due to the small number of existing individuals (Factor E) (USFWS 1995, 2003; Hawaii Natural Heritage Program 2007).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants for the Kauai plants (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Nothocestrum peltatum* is a long-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 25 mature individuals per population.

The stabilization and recovery goals for this species have not been met, as only 23 individuals are known and no threats are being managed. Therefore, *Nothocestrum peltatum* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Collect fruit from all wild individuals that set seed.
- Control introduced invasive plant species around wild and outplanted plants.
- Construct large-scale fences around all naturally occurring and reintroduced individuals to control feral ungulates.
- Enhance current natural populations to increase numbers of individuals.
- Reintroduce individuals into protected suitable habitat within historical range.
- Work with the Kauai Watershed Alliance and the Hawaii Division of Forestry and Wildlife to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Investigate techniques to improve natural recruitment.
- Assess genetic variability within extant population.
- Study *Nothocestrum peltatum* 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:

Hawaii Biodiversity and Mapping Program. 2007. Program Database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Lilleeng-Rosenberger, K.E. 2005. Growing Hawaii's native plants. Mutual Publishing, Honolulu, HI.

Lyon Arboretum Micropropagation Facility 2008. Micropropagation database. Lyon Arboretum, University of Hawaii at Manoa, Honolulu, HI. Unpublished.

National Tropical Botanical Garden. 2008a. Herbarium database; <http://ntbg.org/herbarium/>. Accessed 10 March 2008.

National Tropical Botanical Garden. 2008b. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished.

Perlman, S. 2006. Plant Extinction Prevention status of Kauai species. August 28, 2006. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; determination of endangered or threatened status for 24 plants from the island of Kauai, HI. Federal Register 59(38):9304–9329.

[USFWS] U.S. Fish and Wildlife Service. 1995. Recovery Plan for the Kauai Plant Cluster. U. S. Fish and Wildlife Service, Portland, OR. 270 pp.

[USFWS] U.S. Fish and Wildlife Service. 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, HI; final rule. Federal Register 68(39):9116–9479.

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

Personal Communications

Imada, Clyde. 2008. Research Specialist, Department of Natural Science/Botany, Bernice P. Bishop Museum, e-mail communication to C. Torres-Santana (USFWS) on June 30, 2008.

Table 1. Status of *Nothocestrum peltatum* (Aiea) from listing through 5-year review.

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1994 (listing)	15	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1995 (recovery plan)	15	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	20	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2008 (5-year review)	23	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

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SIGNATURE PAGE for 5-YEAR REVIEW of *Nothocestrum peltatum* (ʻAiea)

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



Date 21 July 2009