

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Viola kauaensis* var. *wahiawaensis* (Nani wai`ale`ale)

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
Gina Shultz, Pacific Islands Fish and Wildlife Office, 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 (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) on March 8, 2007. The review was based on the final critical habitat designation for *Viola kauaensis* var. *wahiawaensis* 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 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).

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 *Viola kauaensis* var. *wahiawaensis* 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 *V. kauaensis* var. *wahiawaensis*.

At the time it was federally listed as endangered (USFWS 1996), there were reportedly fewer than 100 individuals of *Viola kauaiensis* var. *wahiawaensis*, primarily in Kanaele Swamp (Wahiawa Bog), and another 8 mature individuals on a nearby ridge between Mount Kapalaoa and Mount Kahili in wet shrubland dominated by *Dicranopteris linearis* (uluhe). In 2003, the USFWS reported two populations totaling only 13 individuals (USFWS 2003). Perlman (2006) estimated the two populations at fewer than 50 individuals with no material in cultivation as of February 2004. The one known population occurs on private land managed by The Nature Conservancy of Hawaii.

This short-lived perennial herb has been observed to flower in December, but there is little else known about its life history, such as flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, or limiting factors (USFWS 1998).

The main threats to *Viola kauaiensis* var. *wahiawaensis* remain reduced reproductive vigor due to the small number of existing populations and individuals (Factor E); habitat degradation from the rooting activities of feral pigs (*Sus scrofa*) (Factors A and D); and competition with introduced invasive plants such as *Juncus planifolius* (broadleaf rush) and *Pterolepis glomerata* (False meadowbeauty) (Factor E) (Lorence and Flynn 1991; Wood 1994; USFWS 1996, 1998, 2003). Collection other than for conservation purposes is considered a threat to this species due to the detrimental effect that collection may pose to the small population (Factor B) (USFWS 1998, 2003).

In addition to all of the other threats, species such as *Viola kauaiensis* var. *wahiawaensis* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes, landslides, flooding and disease outbreaks (Factor E). When considered on their own, the natural processes associated with being a single island endemic do not affect *V. kauaiensis* var. *wahiawaensis* to such a degree that it is threatened or endangered with extinction in the foreseeable future, but these natural processes can exacerbate the threat from anthropogenic factors, such as habitat loss from or predation by introduced species (Factor E) (USFWS 1998).

There have not been any individuals of *Viola kauaiensis* var. *wahiawaensis* in controlled propagation or in genetic storage since it was federally listed as endangered in 1996. In 2008, a 23-hectare (57-acre) enclosure fence was built by The Nature Conservancy around the Wahiawa Bog and could potentially benefit this species by creating a potential reintroduction site (J. Schlueter, The Nature Conservancy of Hawaii, pers. comm. 2008).

Stabilizing, downlisting, and delisting objectives are provided in the Kauai II addendum to the recovery plan for plants for the Kauai plant cluster (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *V. kauaiensis* var. *wahiawaensis* 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 the island of Kauai. 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 less than 50 individuals, most of the threats have not been managed, and there are no plants in *ex situ* (see Table 1). Therefore, *Viola kauaiensis* var. *wahiawaensis* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Collect genetic resources for storage, future propagation and reintroducing into protected suitable habitat within historical range.
- Enhance current natural population to increase numbers of individuals and establish new populations as material becomes available from propagation.
- Expand existing exclosure fences to protect all individuals from the negative impacts of feral pigs and construct new fences within suitable habitat, and eradicate introduced invasive plant species within the exclosures.
- Work with the Kauai Watershed Alliance to continue and expand ecosystem-level management of the Wahiawa Bog area.
- Survey geographical and historical range for a thorough current assessment of the species.
- Assess genetic variability of extant populations.
- Study *Viola kauaiensis* var. *wahiawaensis* 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:

Lorence, D.H., and T. Flynn. 1991. Botanical survey of the Wahiawa Drainage, Kauai. Prepared for State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife. Unpublished report, 78 pages.

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

[USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered or threatened status for nineteen plant species from the island of Kauai, Hawaii; final rule. Federal Register 61(198):53070-53089.

[USFWS] U.S. Fish and Wildlife Service. 1998. Kauai II addendum to the recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, OR. 84 pp + appendices.

[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.

Wood, K. 1994. National Tropical Botanical Garden Provenance Report. Unpublished. .

Personal Communications:

Schlueter, Jeff. 2008. Natural Resources Assistant Manager, The Nature Conservancy of Hawaii. August 5, 2008.

Table 1. Status of *Viola kauaensis* var. *wahiawaensis* from listing through 5-year review.

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 – listing	< 100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 – recovery plan	< 100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 – critical habitat	13	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2008 – 5-yr review	< 50	0	All threats managed	Partially
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No

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SIGNATURE PAGE for 5-YEAR REVIEW of *Viola kauaensis* var. *wahiawaensis*

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

Acting Field Supervisor, Pacific Islands Fish and Wildlife Office

 Patrick Sousa

Date 6/2/09