

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Eugenia koolauensis* (nioi)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 58 species in Washington, Oregon, California, and Hawaii. Federal Register 75(226):71726-71729.

Lead Region/Field Office:

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

Name of Reviewer(s):

Vickie Caraway, Plant Biologist, PIFWO

Daniel Clark, Oahu, Kauai, Northwest Hawaiian and American Samoa Islands Team
Manager, PIFWO

Marie Brueggemann, 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 January 31, 2012. The review was based on a review of current, available information since the last five-year review for *Eugenia koolauensis* (USFWS 2008). The National Tropical Botanical Garden provided an initial draft of portions of the five-year review and recommendations for conservation actions needed prior to the next five-year review. The document was reviewed by the Plant Biologist, Islands 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 *Eugenia koolauensis* published on January 18, 2008 (http://ecos.fws.gov/docs/five_year_review/doc1823.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 *E. koolauensis*.

This long-lived tree is endangered which currently occurs on the island of Oahu and historically was found on Molokai. The current status and trends for *Eugenia koolauensis* are provided in the tables below.

New status information:

- Pahipahialua contains 50 mature individuals, Oio has 22 and Kaunala has 54. A number of new plants were discovered (Oahu Army Natural Resource Program [OANRP] 2012a; U.S. Army Garrison 2011).
- Three other populations (Hanaimoa, Palikea/Kaimuhole, Papali) outside the designated military action area include five mature individuals, one immature individual, and one seedling (U.S. Army Garrison 2010).

The OANRP staff identifies ten populations on north Oahu, with a total of 272 mature, 388 immature individuals and 552 seedlings, for an overall total of 1,202 individuals. This is a decrease from the 2,166 individuals reported in the last five-year review.

New threats:

- Climate change - Climate change may pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) funded climate modeling that will help resolve these spatial limitations. High spatial resolution climate outputs are expected to be available in 2013.

New management actions:

- Ungulate exclosures - Three populations (Pahipahialua, Oio, and Kaunala) are reported to be ungulate free (U.S. Army Garrison 2010).
- Ecosystem-altering invasive plant species control - Monitoring, detection and control of incipient weeds is ongoing within the Kahuku Training Area (U.S. Army Garrison 2010).
- Threats research - Research into the rust disease, *Puccinia psidii*, has been initiated. Many members of the Myrtaceae family have shown susceptibility to this disease, including this species (U.S. Army Garrison 2010).
Captive propagation for genetic storage and reintroduction - A total of 42 plants are in the OANRP nursery (OANRP 2012b).

Synthesis:

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. *Eugenia koolauensis* is a long-lived perennial, and to be considered stable, threats to the taxon must be managed (*e.g.*, fenced) and the taxon must be represented in an *ex situ* (offsite) collection. In addition, a minimum of three populations should be documented on Oahu and on Molokai where the species occurred historically. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

While three population units on Oahu have over 25 mature individuals, a successful reintroduction on Molokai is required to meet this stabilization goal (Table 1). The three populations on Oahu are protected from ungulates by fences. Other threats are still uncontrolled, a control method for the rust disease is still being researched, and genetic storage goals are not met (Table 2). Therefore, *Eugenia koolauensis* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Threats research
 - Continue research on the effects and impacts of the rust disease *Puccinia psidii* on *Eugenia koolauensis*
 - Investigate potential rust control methods and permit options for using Tebuconazole to control rust in natural areas in the State of Hawaii.
- Biosecurity legislation - Continue prohibition of importation of ornamental species in the family Myrtaceae into the State of Hawaii to avoid the accidental introduction of additional strains of the *Puccinia psidii* rust.
- Captive propagation for genetic storage and reintroduction
 - Increase the living collection of trees in nurseries by collecting cuttings from additional founders, prioritizing those that may otherwise be lost.
 - Collect mature fruit from wild trees when available.
 - Send seed from greenhouse plants to USDA-ARS National Center for Genetic Resources Preservation for liquid nitrogen seed storage testing.
- Surveys / Inventories
 - Search for additional populations of *Eugenia koolauensis* on Molokai, particularly in poorly surveyed potential habitat on East Molokai.
 - Search for new individuals of *Eugenia koolauensis* in the Waianae Mountains.
- Hybrid removal
 - Research hybridization between *Eugenia koolauensis* and *Eugenia reinwardtiana* and study their taxonomic relationship.
 - Eliminate plantings of potentially introduced invasive species of *Eugenia* near *Eugenia koolauensis* habitat to prevent hybridization.
- Population biology research - Study *Eugenia koolauensis* 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.
- Alliance and partnership development - Initiate planning and contribute to implementation of ecosystem-level management and restoration to benefit this species.

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

Date	No. wild indivs	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1994 (listing)	<60	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
1998 (recovery plan)	<220	1	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3populations with 25 mature individuals each	No
2003 (critical habitat)	<70	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2008 (5-yr review)	2,166	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2013 (5-yr review)	1,202	0	All threats managed in all 3 populations	Partially (Table 2)
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	Yes on Oahu but not on Molokai

Table 2. Status of threats to *Eugenia koolauensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification by pigs and goats	A, D	Ongoing	Yes, three are managed
Rust disease, <i>Puccinia psidii</i>	C	Ongoing	Control and research ongoing
Fire – habitat modification and plant destruction	A, E	Ongoing	Partially:
Foot and motorcycle traffic in Kahuku Training Area and vicinity	E	Ongoing	None
Genetic swamping by a non-native <i>Eugenia</i> stock	E	Unknown	Unknown
Invasive introduced plants	A, E	Ongoing	Partially
Climate change	A, E	Increasing	None

References:

See previous 5-year review for a full list of references (USFWS 2008). Only references for new information are provided below.

[OANRP] Oahu Army Natural Resources Program. 2012a. Oahu implementation plan - population unit status. 1 page. Unpublished.

[OANRP] Oahu Army Natural Resources Program. 2012b. Army nursery inventory summary. 1 page. Unpublished.

U.S. Army Garrison. 2010. Status report for the Makua and Oahu implementation plans. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 588 pages. Available online at http://manoa.hawaii.edu/hpicesu/DPW/2010_YER/default.htm.

U.S. Army Garrison. 2011. Status report for the Makua and Oahu implementation plans. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 269 pages. Available online at http://manoa.hawaii.edu/hpicesu/DPW/2011_YER/default.htm.

[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. 2008. *Eugenia koolauensis* (nioi) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu,

Hawaii. 13 pages. Available online at
<http://ecos.fws.gov/docs/five_year_review/doc1823.pdf>.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Eugenia koolauensis* (nioi)

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

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