

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Myrsine juddii* (kolea)

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 *Myrsine juddii* (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, 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 *Myrsine juddii* published on January 18, 2008 (available at http://ecos.fws.gov/docs/five_year_review/doc1851.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 *M. juddii*.

This short-lived shrub is endangered and occurs on in the Koolau Mountains on Oahu. The current status and trends for *Myrsine juddii* are provided in the tables below.

New status information:

- Thirty-one new individuals were located during surveys in 2011. The Oahu Army Natural Resources Program (OANRP) staff considers the 486 individuals located from Kaukonahua to Kamananui-Koloa, along the ridge of the Koolau Mountain range, to be one extended population (OANRP 2012b). Two subpopulations, Opaepa and Helemano, have at least 100 individuals each (U.S. Army Garrison 2008). This represents a decline from the approximately 3,000 reported in the last five-year review.

New threats:

- Climate change - Climate change may also 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 sometime in 2013.
- Hybridization - It has been suggested that *Myrsine juddii* hybridizes with several other species of *Myrsine* in the Koolau Mountains (U.S. Army Garrison 2008; Lau 2011). Five other *Myrsine* species can be found within *M. juddii*'s range: *M. degeneri*, *M. fosbergii*, *M. lessertiana*, *M. pukooensis*, and *M. sandwicensis*. It is not known whether hybridization has been confirmed with genetic studies or what the implications are for species recovery.

New management actions:

- Ungulate exclosures
 - The OANRP reports that ungulates (pigs) are partially controlled for this species (U. S. Army Garrison 2011).
 - The OANRP staff reports that ungulate control has been partially achieved in the Kaukonahua to Kamananui-Koloa population (U. S. Army Garrison 2011).
- Captive propagation for genetic storage and reintroduction - There are seven individuals in the OANRP nursery facility (OANRP 2012a).

Synthesis:

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Oahu (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Myrsine juddii* is a short lived perennial, and to be considered stable, 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 island of Oahu. 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 only one population of 50 or more mature individuals exists (Table 1) and all threats are not sufficiently managed

throughout its range (Table 2). Therefore *Myrsine juddii* 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
 - Collect cuttings or seed from tagged individuals, keeping close track of the maternal source for use in *ex situ* propagation.
 - Continue to collect seeds from all existing populations and send to at least two or three different venues for propagation and storage.
- Ungulate exclosures – Construct ungulate-proof fenced exclosures around each population and monitor the fences for any signs of breaching.
- Ecosystem-altering invasive plant species control – Control invasive introduced plant species around all populations.
- Fire protection – Develop and implement fire management plans for all wild and reintroduced populations.
- Genetic research – Assess genetic variability within extant populations, and evaluate extent of risk posed by possible hybridization with other *Myrsine* species.
- Threats research – Assess the modeled effects of climate change on this species, and use results to determine future landscape needed for the recovery of the species.
- Alliance and partnership development - Initiate planning and contribute to implementation of ecosystem-level management and restoration to benefit this species.

Table 1. Status of *Myrsine juddii* from listing through current 5-year review.

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1996 (listing)	500-3,000	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially
1998 (recovery plan)	500-3,000	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2003 (critical habitat)	~5,000	Unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2008 (5-yr review)	~3,000	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2013 (5-yr review)	486	0	All threats managed in all 3 populations	No (see Table 2)
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially

Table 2. Threats to *Myrsine juddii* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – Feral pigs degrade habitat, feed, trample and uproot plants	A, C, D	Ongoing	Partially
Established ecosystem-altering invasive plant species	A, E	Ongoing	Partially
Fire	A, E	Ongoing	None, but risk low
Military training activity	E	Ongoing	Partially
Possible hybridization	E	Ongoing	Unknown
Climate change	A, E	Increasing	None

References:

See previous 5-year review for a full list of references (USFWS 2010). Only references for new information are provided below.

Lau, J. 2011. Native Hawaiian flowering plants. Available on line at <http://www.flickr.com/photos/53193377@N02/sets/72157626804153438/>. Accessed between May 18, 2011 and September 26, 2011.

[OANRP] Oahu Army Natural Resources Program. 2012a. Oahu implementation plan – Army nursery inventory summary. 1 page. Unpublished.

[OANRP] Oahu Army Natural Resources Program. 2012b. Oahu implementation plan - population unit status; *Myrsine juddii*. 1 page. Unpublished.

U.S. Army Garrison. 2008. Final implementation plan for Oahu training areas: Schofield Barracks Military Reservation, Schofield Barracks East Range, Kawaihoa Training Area, Kahuku Training Area, and Dillingham Military Reservation. 624 pages. Available online at http://manoa.hawaii.edu/hpicesu/DPW/2008_OIP/2008_OIP_edited.pdf.

U.S. Army Garrison. 2011. 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/2011_YER_Edited.pdf.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages + appendices.

[USFWS] U.S. Fish and Wildlife Service. 2008. *Myrsine juddii* (kolea) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 12

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<http://ecos.fws.gov/docs/five_year_review/doc1851.pdf>.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Myrsine juddii* (kolea)

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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Date *2013-08-19*