

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Myrsine mezii* (kōlea)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2020. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

Lead Region/Field Office:

Interior Region 12/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

Name of Reviewer:

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Megan Laut, Conservation & Restoration Team Manager, PIFWO

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 (Service or USFWS) beginning in October 2021. The review was based on a review of current, available information since the last 5-year review for *Myrsine mezii* (USFWS 2017). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Conservation and Restoration Team Manager.

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 (<https://ecos.fws.gov/ecp/species/1281>).

Review Analysis:

Please refer to the previous 5-year review for *Myrsine mezii* published in the Federal Register on September 16, 2017 (available at http://ecos.fws.gov/docs/tess/species_nonpublish/2480.pdf) for a complete review of the species’ status, threats, management efforts, and references cited. We are not aware of any significant new information regarding the species’ biological status since listing to warrant a change in the Federal listing status of *M. mezii*.

This short-lived perennial shrub in the Primulaceae (primrose) family is listed as endangered and is known from the island of Kaua‘i. The status and trends for *Myrsine mezii* are provided in the tables below.

New Status Information:

- Currently, there is one individual of *Myrsine mezii* on Kaua‘i (Heintzman et al. 2020). The few collections that match the description of *M. mezii* were historically found west of the Hanapēpē river and at Awa‘awapuhi (Heintzman et al. 2020). Those individuals identified as *M. mezii* at Kawai Iki and Nāwaimaka in the 2017 5-year review are now considered to be a new, undescribed species of *Myrsine* (Plant Extinction Prevention Program [PEPP] 2021).
- In 2015, the Service published a report updating species taxonomy and other technical corrections, including updating plant family reassignments. The family Myrsinaceae is now revised to Primulaceae for *Myrsine mezii* (80 FR 35860, June 23, 2015). This change is also accepted in Wagner *et al.* (2012) and by the Angiosperm Phylogeny Group (2009) and does not affect the range or status of *M. mezii*.

New Threats:

- None reported.

New Management Actions:

- Surveys and monitoring—The National Tropical Botanical Garden (NTBG) and the Plant Extinction Prevention Program (PEPP) monitor and survey for populations of *Myrsine mezii* on Kaua‘i (NTBG 2018, 2019; Perlman 2019; PEPP 2017).
- Captive propagation for genetic storage and reintroduction—
 - PEPP and NTBG collect seeds and cuttings for storage and propagation (Perlman 2018; Perlman and Wood 2017).
 - In 2022, the Lyon Arboretum Micropropagation Laboratory reported propagation and storage of two explants representing one founder at Awa‘awapuhi (Lyon Arboretum 2022).
 - In 2021, the Kōke‘e Mid-Elevation Nursery (KMEN) reported propagation of one plant representing one founder from Awa‘awapuhi (KMEN 2021).

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

Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2010 (listing and critical habitat)	5	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 100 mature individuals each	No

2017 (5-year review)	7	0	All threats managed in all 3 populations	Partially
art			Complete genetic storage	Partially
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	Unknown
			3 populations with 100 mature individuals each	No
2022 (5-year review)	1	0	All threats managed in all 3 populations	None
			Complete genetic storage	Yes, 1 founder represented
			Natural reproduction at all 3 populations	Unknown
			3 populations with 50 mature individuals each	No

* The Preventing Extinction Stage was established in 2011. Prior to 2011, the Interim Stabilization Stage was the first stage towards recovery (now it is the second stage after Preventing Extinction).

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

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	None
Established ecosystem altering invasive plant species degradation of habitat and competition	A, E	Ongoing	None
Climate change degradation and destruction of habitat, including hurricanes	A	Ongoing	None
Rodent predation and herbivory	C	Ongoing	None
Invertebrate predation or herbivory	C	Ongoing	None currently
Inadequacy of exiting regulatory mechanisms—lack of adequate hunting and biosecurity legislation	D	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, collection and propagation

Synthesis:

Currently, there is one wild individual of *Myrsine mezii* on Kaua‘i. Seed and cuttings collections and propagation are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Kaua‘i Islandwide Recovery Plan (USFWS 2021) and have been updated according to the draft revised recovery objective guidelines developed by the Hawai‘i and Pacific Plants Recovery Coordinating Committee (HPPRCC 2011). The HPPRCC identifies an additional initial objective, the Preventing Extinction Stage, in addition to the Interim Stabilization, Delisting, and Downlisting objectives. Furthermore, life history traits such as breeding system, population size fluctuation or decline, and reproduction type (sexual or vegetative), have been included in the calculation of goals for the number of populations and reproducing individuals for each stage. The goals for each stage remain grouped by life span defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

Myrsine mezii is a short-lived perennial shrub. To prevent extinction, which is the first milestone in recovering the species, the taxon must be managed to control threats (e.g., fenced) and have 50 individuals (or the total number of individuals if fewer than 50 exist) from each of three populations represented in *ex situ* (secured off-site, such as a nursery or seed bank) collections that are well managed. In addition, a minimum of a total of three populations should be documented on Kaua‘i where this species now occurs or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, seedlings) with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for *Myrsine mezii* have not been met. There is only one known wild individual (Table 1). Collection and propagation are ongoing, but no reintroduction or augmentation (Table 1, Table 2). This species is susceptible ongoing threats, such as habitat destruction by feral ungulates, nonnative plant competition, rodent predation and herbivory, and climate change (Table 2). Therefore, *M. mezii* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

No new threats and no significant new information regarding the species’ biological status have been reported since the last 5-year review in 2017. Thus, the following recommendations for future actions are reiterated and updated for the 5-year review for 2022.

- Surveys and inventories—Continue to survey for populations of *Myrsine mezii* in areas of potentially suitable habitat.
- Ungulate monitoring and control—Construct and maintain an enclosure or strategic fencing to protect the last known individual from imminent extinction.

- Nonnative invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species and those that compete with *M. mezii* at the last known population.
- Predator and herbivore monitoring and control—Implement effective control measures for rats.
- Climate change adaptation strategy—Research suitability of habitat for viability of species, including where to conduct translocations in the future due to impacts of climate change.
- Captive propagation for genetic storage and reintroduction—Continue collection and storage of seeds and propagules for maintenance of genetic stock.
- Reintroduction and augmentation—Reintroduce individuals into protected suitable habitat that is being managed for known threats to this species.
- Build resiliency and redundancy—Increase numbers of individuals and populations throughout range to reduce impacts of feral ungulates, low numbers, and hurricanes.
- Population biology research—Study *M. mezii* populations to determine viable 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—Continue to work with partners and other land managers in planning and implementation of ecosystem-level restoration and management to benefit this species.

References:

- The Angiosperm Phylogeny Group. 2009. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Botanical Journal of the Linnean Society* 161: 105–121.
- [HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.
- Heintzman, S., B. Nyberg, and K. Wood. 2020. *Myrsine mezii*. The IUCN Red List of Threatened Species 2020: e.T30943A83803774. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T30943A83803774.en>.
- [KMEN] Kōke‘e Mid-Elevation Nursery. 2021. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.
- Lyon Arboretum. 2022. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

- [NTBG] National Tropical Botanical Garden. 2018. NTBG database herbarium record detail for *Myrsine mezii*, PTBG1000068314, 080031, 25 JAN 2018.
- [NTBG] 2019. NTBG database herbarium record detail for *Myrsine mezii*, PTBG1000078229, 082341, 26 NOV 2019.
- Perlman, S. 2018 Hawai'i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Myrsine mezii*, Pacific Islands Fish and Wildlife Office.
- Perlman, S. 2019. Hawai'i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Myrsine mezii*, Pacific Islands Fish and Wildlife Office.
- Perlman, S. and K. Wood. 2017. Hawai'i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Myrsine mezii*, Pacific Islands Fish and Wildlife Office.
- [PEPP] Plant Extinction Prevention Program. 2017. Plant Extinction Prevention Program FY 2017 Annual Report (Oct 1, 2016-Sep 30, 2017), Coop Agreement: F14A00174, U.S. Fish and Wildlife Service CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds. 235 pp.
- [PEPP] Plant Extinction Prevention Program. 2021. Fiscal year 2021 interim performance report (October 1, 2020-September 30, 2021) cooperative agreements F18AC00502 and F19AC00532, US Fish and Wildlife Service CFDA Program #15.657, Endangered species conservation—recovery implementation funds, University of Hawaii at Manoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program.
- [USFWS] U.S. Fish and Wildlife Service. 2015. Endangered and threatened wildlife and plants; Technical corrections for 54 wildlife and plant species on the list of Endangered and Threatened wildlife and plants; direct final rule. 80 FR 35860–35869, June 23, 2015.

[USFWS] 2017. *Myrsine mezii* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI.
https://ecos.fws.gov/docs/tess/species_nonpublish/2480.pdf.

[USFWS] 2020. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

[USFWS] 2021. Kaua'i Islandwide Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 65 pp. + appendices.

Wagner, W.L., D.R. Herbst, N. Khan, and T. Flynn. 2012. Hawaiian vascular plant updates: a supplement to the Manual of the Flowering Plants of Hawai'i and Hawai'i's Ferns and Fern Allies. 126 pp.

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

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

For Field Supervisor, Pacific Islands Fish and Wildlife Office

_____ Date _____