5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Remya mauiensis* (no common name)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2021. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 77 Species in Oregon, Washington, Idaho, and Hawaii. Federal Register 86(120): 33726–33728, June 25, 2021.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

Name of Reviewer:

Daniel Adamski, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator; Acting, Recovery 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) beginning in October 2022. The review was based on a review of current, available information since the last 5-year review for *Remya mauiensis* (USFWS 2018). The evaluation by Daniel Adamski, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Acting Recovery 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 (*http://ecos.fws.gov/ecp/species/6689*).

Review Analysis:

Please refer to the previous 5-year reviews for *Remya mauiensis* published in the Federal Register on July 23, 2009, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1373.pdf*) June 5, 2014, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2205.pdf*) and October 23, 2018, (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/2656.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 *R. mauiensis*.

This short-lived perennial shrub in the Asteraceae (sunflower) family is endangered and is known from the island of Maui. The status and trends for *Remya mauiensis* are provided in the tables below.

New Status Information:

- At the time of the previous 5-year review in 2018, there were three populations at one location, Kauaʻula, Maui, totaling approximately 400 individuals and one population at Pāpalaua-Manawainui Gulches with an undetermined number of individuals (USFWS 2018). There is no new information regarding the status of these populations, except for one population at Kauaʻula, where seeds were collected in 2022, and the population was reported to be in decline with an unknown number of individuals (Plant Extinction Prevention Program (PEPP) 2022).

New Threats:

- During recent monitoring, PEPP identified drought and erosion to be new threats to the existence of populations of *Remya mauiensis* (PEPP 2022).

New Management Actions:

- Monitoring and surveys—PEPP monitors individuals of *Remya mauiensis* on Maui (PEPP 2022).
- Collection and propagation for genetic storage and reintroduction—
  - PEPP collected seeds from one population at Kauaʻula on Maui for genetic storage collection (PEPP 2022).
  - Lyon Arboretum Seed Conservation Laboratory reports over 100,000 seeds in storage from multiple individuals at Kauaʻula and Pōhākea (Lyon Arboretum 2022).
- National Tropical Botanical Garden (NTBG) reports 6,317 seeds in storage from seven individuals (NTBG 2022).

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1991 (listing)	9	X	All threats managed in all 3 populations	Partially
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No

Date	No. wild individuals	No. outplanted	Downlisting Criteria identified in Recovery Plan	Stability Criteria Completed?
2009 (5-year review)	ca 500	0	All threats managed in all 5-7 populations	Partially
			Complete genetic storage	No
			5-7 populations with 300 mature individuals each	No
2014 (5-year review)	ca 500	0	All threats managed in all 5-7 populations	Partially
			Complete genetic storage	No
			5-7 populations with 300 mature individuals each	No
Date	**No. wild individuals**	**No. outplanted**	***Preventing Extinction Criteria identified by HPPRCC**	***Preventing Extinction Criteria Completed?**
2018 (5-year review)	400+	0	All threats managed in all 3 populations	Partially
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 100 mature individuals each	Partially
2023 (5-year review)	< 400	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			Natural reproduction at all 3 populations	Unknown

			3 populations with 100 mature individuals each	Partially

* 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 *Remya mauiensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, one population fenced
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control within monitored populations
Drought destruction and degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat, including hurricanes	A	Ongoing	None
Degradation and destruction by fire	A	Ongoing	None
Degradation and destruction by erosion	A	Ongoing	None
Predation and herbivory by feral ungulates	C	Ongoing	Partial, on population fenced
Predation and herbivory by rats	C	Ongoing	Partial, control in two exclosures
Predation and herbivory by invertebrates—Slugs, snails, black twig borer	C	Ongoing	None

Synthesis:
Currently there are approximately 400 or possibly fewer wild individuals of *Remya mauiensis* on Maui. Some individuals are provided protection by fencing and nonnative plant control. Seed collections are ongoing.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Recovery Plan for the Maui Plant Cluster (USFWS 1997) 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.

Remya mauiensis is a short-lived perennial shrub that may be self-incompatible. 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 Maui where they now occur or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds and seedlings), with a minimum of 100 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. Although genetic storage is partially complete (Table 1), there are no single populations totaling at least 100 reproducing individuals, and all threats are not being managed (Table 1, Table 2). Therefore, *Remya mauiensis* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:
Drought and erosion have been identified as new threats for populations of *Remya mauiensis* (PEPP 2022). No significant new information regarding the species' biological status has been reported since the last 5-year review in 2018. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2023.

- Surveys and monitoring—Reassess the status of populations at Kaua‘ula and Pāpalaua-Manawainui Gulches and survey for additional populations of *Remya mauiensis* in areas of potentially suitable habitat.
- Ungulate monitoring and control—Continue to maintain fenced exclosures and construct new fences to protect individuals from the negative impacts of browsing by ungulates.
- Invasive nonnative plant monitoring and control—Continue control of established ecosystem-altering nonnative invasive plant species, and those that compete with *Remya mauiensis* within and around all wild populations.
- Fire prevention and control—Develop and implement fire prevention management plans and monitor populations after fire occurrence.
- Climate change adaptation strategy—Research suitability of habitat for viability of species, including where to conduct translocations in the future due to the impacts of climate change, including increasing temperatures, periods between

rain events, and frequency and intensity of hurricanes. Additional management actions may be needed, such as locating microsites that overlap with current and future climate envelopes for translocation efforts.

- Predator and herbivore monitoring and control—Continue to determine and implement effective methods for control of rodents and slugs around wild populations.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for initiation of reintroductions.
- Build resiliency, redundancy, and representation — Increase species' viability through habitat restoration, threat control, and reintroduction and translocation. Initiate reintroductions into suitable habitat that is being managed for known threats to this species to reduce impacts of erosion, treefall, flooding, and hurricanes.
- 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:

[HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

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. 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.

[PEPP] 2022. Plant Extinction Prevention Program fiscal year 2022 interim performance report (October 1, 2021-September 30, 2022), Cooperative Agreement F19AC00532 (Interim report), U.S. Fish and Wildlife Service CFDA Program #15.657 Endangered Species Conservation—Recovery Implementation Funds, University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 50 pp.

[USFWS] U.S. Fish and Wildlife Service. 1997. Recovery plan for the Maui plant cluster. U.S. Fish and Wildlife Service, Portland, OR. 130 pages + appendices.

[USFWS] 2009. *Remya mauiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/1373.pdf*.

[USFWS] 2014. *Remya mauiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/2205.pdf.*

[USFWS] 2018. *Remya mauiensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/2656.pdf*.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Remya mauiensis* (Maui remya)

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

For **Field Supervisor, Pacific Islands Fish and Wildlife Office**

LAUREN WEISENBERGER

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