5-YEAR REVIEW

Short Form Summary

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

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 70 species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

Lead Region/Field Office:

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

Name of Reviewer(s):

Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Assistant Field Supervisor for Endangered Species
Jeff Newman, Pacific Islands Fish and Wildlife Office, Acting 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 of the U.S. Fish and Wildlife Service (USFWS), beginning on April 29, 2008. The review was based on the final critical habitat designation for *Remya montgomeryi* and other species from the island of Kauai (USFWS 2003), as well as a review of current, available information. The National Tropical Botanical Garden provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Samuel Aruch, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Assistant Field Supervisor for Endangered Species and Acting Deputy Field Supervisor 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 *Remya montgomeryi* 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 *R. montgomeryi*.

Remya montgomeryi is one of three species of the endemic genus *Remya* in Hawaii, and one of two species endemic to Kauai. A discussion of the floral characteristics of *R. montgomeryi* in comparison to the two other *Remya* species was published in 1987. It is a weakly erect shrub, growing in sprawling clumps (Wagner and Herbst 1987).

Remya montgomeryi was known from only one population on steep cliffs above Kalalau Valley northwest of Puu O Kila, Kokee (Wagner *et al.* 1990). It was discovered in 1985 by biologist Steve Montgomery and described subsequently by Wagner and Herbst (Wagner and Herbst 1987). At the time of listing, seven populations with a total of less than 200 individuals were known (USFWS 1991). In 2003, six populations with 143 individuals were known, located in the left and right branches of the Kalalau Valley, Koaie Canyon, and Kuia Valley, all on State-owned land (USFWS 2003). Currently, there are four populations known in Kalalau with a total of 13 individuals, one population of one individual in Koaie, and one population in Kuia with four individuals, for a total of six populations and 18 individuals (Wood 2009).

In Kuia drainage, four clumps of *Remya montgomeryi* were observed 15 meters (50 feet) above the gulch bottom at 808 meters (2,650 feet) elevation in April 2000 (Wood 2009). In Koaie Canyon, upper drainage, a single clump of one to three individuals was seen along the stream bank below a small waterfall at 975 meters (3,200 feet) elevation in September 2006 (Tangalin 2009; Wood 2009). Two individuals of *Remya montgomeryi* were observed at 920 meters (3,020 feet) in December 2004 (Perlman 2009; Tangalin 2009). Three plants had been seen there at 896 to 975 meters (2,940 to 3,200 feet) in 1994 (Perlman 2009; Wood 2009).

On Kalalau Rim, four locations of *Remya montgomeryi* have been observed (Wood 2009). On the Kalalau Valley Rim at 1,091 meters (3,580 feet) elevation, five individuals of *R. montgomeryi* were observed in November 2008. Six to 10 individuals were seen in July 2007 at 1,113 meters (3,650 feet) elevation. In May 2004, it was seen on a north-facing cliff at 1,079 meters (3,540 feet) elevation. In August 1999, a collection and voucher were made (Perlman 2009). East of the first Kalalau lookout, below and west of Puu O Kila, 30 individuals of *R. montgomeryi* were seen scattered in a forest patch between steep cliffs at 1,090 to 1,128 meters (3,576 to 3,701 feet) elevation in December 1998 (Wood 2009). In 1991, *R. montgomeryi* was observed at 1,100 meters (3,609 feet) and at 950 to 1,150 meters (3,117 to 3,773 feet) elevation. Seventy or more individuals were seen in the area, from a rappel on a west-facing cliff below Puu o Kila (Wood 2009). In 1990, 50 individuals of *R. montgomeryi* were seen scattered between steep cliffs at 1,090 meters (3,576 feet) elevation (Wood 2009). In Kalalau Valley, one individual was seen at 914 meters (3,000 feet) elevation in June 1994 (Wood, 2009). In 1992, *R. montgomeryi* was observed at 1,100 meters (3,609 feet) on Kalalau Rim, north of Kahuamaa Flat. On the Kalahu side below the first Kalalau lookout, *R. montgomeryi* was seen at 1,100 to 1,150 meters (3,609 to 3,773 feet) elevation in 1991 (Wood 2009).

In Kuia, *Remya montgomeryi* grows in *Metrosideros polymorpha* (ohia) - *Acacia koa* (koa) montane mesic forest, associated with *Alphitonia ponderosa* (kauila), *Carex meyenii* (no common name [NCN]), *Cheirodendron* spp. (olapa), *Cyperus phleoides* (NCN), *Diospyros* spp. (lama), *Dodonaea viscosa* (aalii), *Eragrostis variabilis* (kawelu), *Leptecophylla tameiameiae* (pukiawe), *Melicope ovata* (alani), *M. barbigera* (uahiapele), *Microlepia strigosa* (palapalai), *Pouteria sandwicensis* (alaa), *Psychotria greenwelliae* (kopiko), *Tetraplasandra kavaiensis* (ohe ohe), *Wikstroemia furcata* (akia), and *Wilkesia gymnoxiphium* (iliau) (Wood 2009).

In Koaie Canyon, the habitat is closed to open *Metrosideros polymorpha – Diospyros sandwicensis* mixed mesic forest with riparian vegetation, associated with *Alectryon macrococcus* (mahoe), *Antidesma platyphylla* (hame), *Artemisia australis* (ahinahina), *Bobea* spp. (akahea), *Boehmeria grandis* (akolea), *Cheirodendron fauriei*, *Cryptocarya mannii* (holio), *Diplazium sandwichianum* (hoio), *Dodonaea viscosa*, *Dryopteris fusco-atra*, *Doodia kunthiana*, *Kadua* spp. (manono), *Microlepia strigosa*, *Melicope* spp.(alani), *Nestegis sandwicensis* (olopua), *Pleomele aurea* (hala pepe), *Pouteria sandwicensis*, *Pritchardia* sp. (loulu), *Psychotria* spp.(kopiko), *Syzygium sandwicensis* (ohia ha), *Tetraplasandra kavaiensis* (ohe), *Xylosma* sp. (maua), *Zanthoxylum dipetalum* (kawau), and various moss species (Wood 2009).

On Kalalau Rim, *Remya montgomeryi* grows in mesic forest and on mesic cliffs with *Artemisia australis*, *Boehmeria grandis*, *Chamaesyce eleanoriae* (akoko), *Charpentiera elliptica* (papala), *Coprosma* spp. (pilo), *Cyperus phleoides*, *Dryopteris unidentata* (akole), *Dubautia laevigata* (naenae), *D. microcephala* (naenae), *Eragrostis variabilis*, *Euphorbia haeleeleana* (NCN), *Eurya sandwicensis* (anini), *Exocarpos luteolus* (heau), *Hibiscadelphus woodii* (hau kuahiwi), *Kadua acuminata* (au), *K. flynnii* (NCN), *Labordia helleri* (kamakahala), *Lepidium serra* (anaunau), *Lobelia niihauensis* (NCN), *Lobelia yuccoides* (panaunau), *Lysimachia glutinosa* (NCN), *L. kalalauensis* (NCN), *L. scopulensis* (kolokolo kuahiwi), *Melicope pallida* (alani), *Melanthera* spp. (nehe), *Myrsine linearifolia* (kolea), *Nothocestrum longifolium* (aiea), *Nototrichium divaricatum* (kului), *Peucedanum sandwicense* (makou), *Phyllostegia electra* (NCN), *Plantago princeps* var. *anomala* (laukahi kuahiwi), *Poa mannii* (NCN), *Rauvolfia sandwicensis* (hao), *Schiedea membranacea* (NCN), *Stenogyne campanulata* (NCN), *Vaccinium dentatum* (ohelo), *Xylosma hawaiiense*, *Zanthoxylum dipetalum*, and *Z. kauaense* (ae) (Perlman 2009; USFWS 2003; Wood 2009).

The primary threats to *Remya montgomeryi* are habitat degradation by feral goats (*Capra hircus*), pigs (*Sus scrofa*), and mule deer (*Odocoileus hemionus*) (Factors A and C) and competition from invasive introduced plant species including *Bryophyllum pinnatum* (airplant), *Christella dentata* (downy wood fern), *Cyperus meyenianus* (NCN), *Erigeron karvinskianus* (daisy fleabane), *Holcus lanatus* (common velvet grass), *Lantana camara* (lantana), *Lonicera japonica* (honeysuckle), *Lythrum maritimum* (loosestrife), *Paspalum urvillei* (vasey grass), *Passiflora tarminiana* (banana poka), *Rubus argutus* (blackberry), *R. rosifolius* (thimbleberry), and *Setaria parviflora* (yellow foxtail) (Factor E) (USFWS 2003; Wood 2009). No regeneration has been observed (Wood 2009). Other threats include seed predation by rats (*Rattus* spp.) (Factor C), fire (Factor E), and an increased

risk of extinction from naturally occurring events (*e.g.*, landslides or hurricanes) because of the small size of the populations and their limited distribution (Factor E) (USFWS 2003; Wood 2009). The area above the Kalalau Valley cliffs was observed to be severely degraded by goats and pigs as early as 1992 (Factor A) (Wood 2009). No regeneration was observed near these plants, most likely due to habitat disturbance and herbivory by feral ungulates, and competition with invasive introduced plant species (Wood 2009).

Climate change may also pose a threat to *Remya montgomeryi* (Factors A and E). However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

In addition to all of the other threats, species like *Remya montgomeryi* 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). The effects of these processes on this single-island endemic are exacerbated by anthropogenic threats, such as habitat loss for human development or predation by introduced species (Factor E) (USFWS 1998).

To safeguard existing genetic material, propagation for genetic storage and reintroduction is occurring at the National Tropical Botanical Garden in Kalaheo. Thirty-seven cuttings and 30,950 seeds are in storage (National Tropical Botanical Garden 2009).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Kauai (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Remya montgomeryi* is a short-lived perennial, and to be considered stable, the taxon 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 Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The interim stabilization goals for this species have not been met (see Table 1). Although there are six populations, no population has more than 50 mature individuals, and all threats are not being managed. Therefore, *Remya montgomeryi* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Continue to collect cuttings or seeds from all known populations.
- Propagate for reintroduced into protected habitat.
- Fence existing plants to exclude feral ungulates.

- Control introduced invasive plants around existing plants.

- Work with Hawaii Division of Forestry and Wildlife to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

References:

Perlman, S. 2009. *Remya montgomeryi*. National Tropical Botanical Garden, Kalaheo, Hawaii. Unpublished. 2 pages

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[USFWS] U.S. Fish and Wildlife Service. 1995. Recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 270 pages.

[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, Oregon. 140 pages.

[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, Hawaii; final rule. Federal Register 68:9116-9479.

Wagner, W.L., D. Herbst, and S.H. Sohmer (editors). 1990. Manual of the flowering plants of Hawaii. University of Hawaii Press, Bishop Museum Press, Special Publication 97:1-1918.

Wagner, W.L. and D.R. Herbst. 1987. A new species of *Remya* (Asteraceae) on Kauai and a review of the genus. Systematic Botany 12:601-608.

Wood, K.R. 2009. Field observations and collections of *Remya montgomeryi* (Asteraceae), Kauai, Hawaii National Tropical Botanical Garden, Kalaheo, Hawaii. Unpublished. 14 pages.

Table 1. Status of *Remya montgomeryi* from listing through 5-year review.

Date	No. wild indivs.	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1991 (listing)	< 200	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1995 (recovery plan)	50-70	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	143	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2009 (5-year review)	18	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Remya montgomeryi*
(no common name)

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

Field Supervisor, Pacific Islands Fish and Wildlife Office

Date AUG 2 7 2010