

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Melicope christophersenii* (alani)

**Current Classification:** Endangered

**Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 87(90): 28031–28034, May 10, 2022.

**Lead Region/Field Office:**

Region 1/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, Recovery Program 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 2023. The review was based on a review of current, available information since the last 5-year review for *Melicope christophersenii* (USFWS 2019). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Recovery Program 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/4185>).

**Review Analysis:**

Please refer to the previous 5-year review for *Melicope christophersenii* published in the Federal Register on August 30, 2019 (available at [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2792.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2792.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. christophersenii*.

This long-lived perennial shrub or tree in the Rutaceae (rue) family is endangered and is known from the island of O'ahu. The status and trends for *Melicope christophersenii* are provided in the tables below.

New Status Information:

- In 2019, there were 150 mature individuals at Ka‘ala, 50 to 60 individuals at Pu‘u Kalena, a few individuals at Mākaha, and one individual at ‘Ēkahanui. Two reintroduced individuals were surviving at a reintroduction site at Ka‘ala (USFWS 2019). In 2021, the Army Natural Resourced Program of O‘ahu (ANRPO) noted individuals were present at Ka‘ala; however, there were no estimates for numbers of individuals (ANRPO 2021 appendices, pp. 62, 82). In 2023, ANRPO noted that the species is present at Popouwela (Kalua‘a–Wai‘eli) (ANRPO 2023a appendices, p. 103).
- Currently, only a few founders from one or more populations are represented in seed collections (ANRPO 2023b; NTBG 2022).

New Threats:

- None reported.

New Management Actions:

- Monitoring and surveys—The ANRPO notes presence of this species opportunistically (ANRPO 2021 appendices, pp. 62, 82; ANRPO 2023a appendices, p. 103).
- Feral ungulate monitoring and control—*Melicope christophersenii* occurs in two exclosures at Ka‘ala and ‘Ēkahanui (ANRPO 2023b).
- Collection and propagation for genetic storage and reintroduction—
  - As of 2023, the ANRPO reported storage of 13 seeds representing one founder at Ka‘ala (ANRPO 2023b).
  - In 1992 and 1999, the National Tropical Botanical Garden (NTBG) reported storage of 56 seeds representing an unknown number of founders/populations on O‘ahu (NTBG 2022). The viability of these collections is uncertain.
- Translocation—As of 2023, the ANRPO reported two individuals representing a founder at Pu‘u Kalena remaining at a reintroduction site at Pu‘u Kalena (ANRPO 2023b).

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

<b>Date</b>	<b>No. wild individuals</b>	<b>No. Outplanted</b>	<b>*Preventing Extinction Targets identified by HPRCC</b>	<b>*Preventing Extinction Targets Completed?</b>
<b>2012 (listing)</b>	250	2	All threats managed in all 3 populations	No
			Complete genetic storage	No

			3 populations with 25 mature individuals each	No
<b>2019 (5-year review)</b>	>250	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially, some seed collection
			Reproduction (i.e., viable seeds, seedlings, saplings) at all 3 populations	No
			3 populations with 25 mature individuals each	Partially, 2 populations >25
<b>2024 (5-year review)</b>	Unknown	0, 2 remain	All threats managed in all 3 populations	Partially, fencing at Ka‘ala and ‘Ēkahanui with nonnative plant management
			Complete genetic storage	Partially, a few founders represented
			Natural reproduction at all 3 populations	No
			3 populations with 25 mature individuals each	Partially, 2 populations >25

\* 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 *Melicope christophersenii* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat by feral ungulates	A	Ongoing	Partial, fenced areas at Ka'ala and 'Ēkahanui
Degradation of habitat by established ecosystem-altering nonnative plants and competition	A, E	Ongoing	Partial, control in 2 fenced areas
Climate change degradation or loss of habitat	A	Ongoing	None
Human disturbance	E	Ongoing	Partially, presence in 2 exclosures
Reduced viability due to low numbers and no regeneration	E	Ongoing	Partially, seed collection and reintroduction

**Synthesis:**

Currently there are an unknown number of individuals, not exceeding approximately 212 wild individuals of *Melicope christophersenii* in four populations in the Wai'anae mountains on O'ahu. Two areas are fenced with some nonnative invasive plant control. Seed collections represent only a few founders. There are only two translocated individuals.

Stabilizing (interim) and preventing extinction targets, and downlisting and delisting criteria are recommended-based on 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.

*Melicope christophersenii* is a long-lived perennial shrub or tree. 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 O'ahu where they now occur or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, seedlings, saplings) with a minimum of 25 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. Only two populations have been known to total more than 25 mature individuals, however these populations have not been monitored recently. Only a few founders from at least one population are represented in collections (Table 1). Two individuals were outplanted more than 10 years ago; however, no recruitment is reported (Table 1). Not all threats are being addressed (Table 2). Therefore, *Melicope christophersenii* meets the definition of Endangered as it remains in danger of extinction throughout its range.

### **Recommendations for Future Actions:**

No significant new information regarding the species' biological status has been reported since the last 5-year review in 2019. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2024.

- Surveys and monitoring—Continue to monitor known populations of *Melicope christophersenii* to assess its current status.
- Ungulate monitoring and control—Continue to construct exclosures to protect habitat and plants from the negative impacts of feral ungulates.
- Invasive nonnative plant monitoring and control—Continue to control invasive nonnative plants at all populations of *M. christophersenii*.
- Climate change adaptation strategy—Research suitability of habitat in the future for viability of species due to the impacts of climate change.
- Predator and herbivore monitoring and control—Continue to construct exclosures to prevent herbivory and trampling by feral ungulates.
- Captive propagation for genetic storage and reintroduction—Continue collection and begin propagation efforts for maintenance of genetic stock and for reintroduction.
- Reintroduction and augmentation—Continue translocation into suitable habitat within historic range that is being managed for known threats to the species.
- Build resiliency, redundancy, and representation—Increase species' viability through habitat restoration, threat control, and reintroduction and translocation into suitable habitat that is being managed for known threats to this species to reduce impacts of predation and herbivory, low regeneration, and climate change.
- Alliance and partnership development—Continue to work with ANRPO, the State, and other land managers and partners to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

### **References:**

[ANRPO] Army Natural Resources Program of O'ahu. 2021. 2021 Status report for the Mākua and O'ahu Implementation Plans. Office of the Vice President for Innovation and Research, University of Hawai'i. 207 pp.

[ANRPO] 2023a. 2023 Status report for the Mākua and O'ahu Implementation Plans. Prepared by Army Natural Resources Program, O'ahu, Office of the Vice

President for Innovation and Research, University of Hawai‘i. 255 pp.,  
appendices 534 pp.

[ANRPO] 2023b. 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.

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

[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.

[USFWS] U.S. Fish and Wildlife Service. 2019. *Melicope christophersenii* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/five\\_year\\_review/doc/2792.pdf](https://ecos.fws.gov/docs/five_year_review/doc/2792.pdf).

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**U.S. FISH AND WILDLIFE SERVICE**  
SIGNATURE PAGE for 5-YEAR REVIEW of *Melicope christophersenii* (alani)

**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**

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