

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Melicope lydgatei* (alani)

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):

Jiny Kim, Fish and Wildlife 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 *Melicope lydgatei* (USFWS 2009). 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 Fish and Wildlife 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 *Melicope lydgatei* published on July 21, 2009 (available at http://ecos.fws.gov/docs/five_year_review/doc2448.pdf) and the recovery plan for the Oahu plants (USFWS 1998), 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 *Melicope lydgatei*.

This short-lived shrub is endangered and occurs on the island of Oahu. The current status and trends for *M. lydgatei* are provided in the tables below.

New status information:

- This species has experienced a recent sharp decline in numbers of extant individuals. In 2007 two populations, Kawaiiki / Opaepala and Kawaikoele-Kawai Nui Ridge, contained a total of 46 individuals (Oahu Army Natural Resources Program [OANRP] 2012c).
- In 2010, Kawaiiki / Opaepala contained 42 individuals and the Kawaikoele-Kawai Nui Ridge population contained three mature individuals, but those three individuals were not relocated in a 2012 survey (OANRP 2012c).
- By 2012, the total number of known wild individuals had declined to 24 (OANRP 2012c). No seedlings or juveniles are known in the wild (U.S. Army Garrison 2008).

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 in 2013.

New management actions:

- Ungulate exclosures - Fences proposed in 2008, for construction in 2011 required environmental assessment and license agreement with Kamehameha Schools. One environmental assessment was completed (U.S. Army Garrison 2008), but as of 2010 a longer-term license agreement that will cover fencing actions still needed to be completed. The agreement will allow Oahu Army Natural Resources Program and Koolau Mountains Watershed Partnership to pursue fencing to protect about half of the plants in the Kawaiiki to Opaepala population unit (U.S. Army Garrison 2010).
- Captive propagation for genetic storage and reintroduction
 - OANRP seed storage and nursery reported in 2009 that two plants were established from cuttings from a single plant in the Kawaikoele-Kawainui Ridge area and are being kept as a living collection in the nursery to use to produce fruit for germination testing (U.S. Army Garrison 2009).
 - Seeds collected in 2006 were still germinating in 2009, with the latest seed germinating 680 days after sowing (U.S. Army Garrison 2009).
 - Only 1 percent of individuals were represented in seed storage in 2011 (U.S. Army Garrison 2011; OANRP 2012a).
 - One individual was growing in the Oahu Army nursery in 2012 (OANRP 2012b).

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. *Melicope*

lydgatei is a long-lived perennial, and to be considered stable, the taxon must be managed to control threats (e.g. fenced, weeding, etc.) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on 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, since there are no populations of 50 or more mature individuals (Table 1) and all threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Melicope lydgatei* 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:
 - Continue to collect seeds 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 facilities for propagation.
 - Continue research into seed dormancy and germination issues in collaboration with the National Center for Genetic Resource Preservation and others.
- Reintroduction / translocation site identification
 - Augment existing populations.
 - Continue to reintroduce more *Melicope lydgatei* individuals back into its known historical range.
- Population viability monitoring – Monitor current *Melicope lydgatei* populations.
- Ungulate and human exclosures – Continue to construct fenced exclosures around existing and reintroduced populations to provide protection from feral ungulates and military and other pedestrian activity.
- Ecosystem-altering invasive plant species control – Continue to control invasive introduced plant species around all populations.
- Surveys / inventories – Continue to conduct thorough surveys of all suitable habitats where *Melicope lydgatei* historically existed.
- Threats research:
 - Research effective controls for black twig borer and its associated fungus.
 - Research seed dormancy and germination issues.
- Fire protection – Continue to implement the wild land fire management plan developed by the U.S. Army for *Melicope lydgatei*.
- Population viability monitoring – Study populations of *Melicope lydgatei* in regard to 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 - Initiate planning and contribute to implementation of ecosystem level restoration and management to benefit this taxon.

Table 1. Status of *Melicope lygatei* from listing through current 5-year review.

Date	No. individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1994 (listing)	<10	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	<45	0	All threats managed in all 3 populations	No
9			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	18	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2009 (5-yr review)	41	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)	24	0	All threats managed in all 3 populations	Partially (see Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature	Partially

Date	No. individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
			individuals each	

Table 2. Threats to *Melicope lydgatei* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – Degradation of habitat and herbivory	A, C, D	Ongoing	Partially
Established invasive plant species competition	A, E	Ongoing	Partially
Black twig borer (<i>Xylosandrus compactus</i>) and associated fungus	C	Ongoing	Partially
Military activity, trampling	C	Ongoing	Partially: Kawaihoa
Random catastrophes & demographic fluctuations	A, E	Ongoing	None
Low numbers combined with fact that almost all (97%) of individuals are in one location (Kawaihoa)	E	Ongoing	Trend is decline
Dormancy issues in seed	E	Ongoing	Partially
Climate change	A, E	Increasing	None

References:

See previous 5-year review for a full list of references (USFWS 2007). Only references for new information are provided below.

[OARNP] Oahu Army Natural Resources Program. 2012a. Genetic storage summary. 9 pages. Unpublished.

[OARNP] Oahu Army Natural Resources Program. 2012b. Army nursery inventory summary. 1 page. Unpublished.

[OARNP] Oahu Army Natural Resources Program. 2012c. Oahu implementation plan - population unit status; *Melicope lydgatei*. 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. 2009. 2009 status report for the Makua and Oahu implementation plans. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 711 pages. Available online at <http://manoa.hawaii.edu/hpicesu/DPW/2009_OIP/2009_OIP_Edited.pdf>.

U.S. Army Garrison. 2010. 2010 status report for the Makua and Oahu implementation plans. U.S. Army Garrison, Hawaii and Pacific Cooperative Park Studies Unit. Schofield Barracks, Hawaii. 588 pages. Available online at <http://manoa.hawaii.edu/hpicesu/DPW/2010_YER/2010_YER_Edited.pdf>.

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

[USFWS] U.S. Fish and Wildlife Service. 2009. *Melicope lydgatei* (alani) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 14 pages. Available online at <http://ecos.fws.gov/docs/five_year_review/doc2448.pdf>.

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

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