

Melicope lydgatei
(Alani)

**5-Year Review
Summary and Evaluation**

**U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii**

5-YEAR REVIEW
Species reviewed: *Melicope lydgatei* (Alani)

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5-YEAR REVIEW
***Melicope lygatei*/ Alani**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

Region 1, Endangered Species Program, Division of Recovery, Jesse D'Elia, (503) 231-2071

Lead Field Office:

Pacific Islands Fish and Wildlife Office, Gina Shultz, Deputy Field Supervisor, (808) 792-9400

Cooperating Field Office(s):

N/A

Cooperating Regional Office(s):

N/A

1.2 Methodology used to complete the review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) beginning on March 8, 2007. The Bernice P. Bishop Museum provided most of the updated information on the current status of *Melicope lygatei* and provided recommendations for conservation actions needed prior to the next 5-year review. The evaluation of the status of the species was prepared by the lead PIFWO biologist and reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species, and Deputy Field Supervisor, before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

USFWS. 2007. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 71 species in Oregon, Hawaii, Commonwealth of the Northern Mariana Islands, and Territory of Guam. Federal Register 72(45):10547-10550.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1994. Endangered and threatened wildlife and plants; endangered status for 11 plant species from Koolau mountain range, island of Oahu, Hawaii; final rule. Federal Register 59(59):14482-14493.

Date listed: March 28, 1994

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

1.3.3 Associated rulemakings:

USFWS. 2003. Endangered and threatened wildlife and plant; final designations or nondesignations of critical habitat for 101 plant species from the Island of Oahu, Hawaii; final rule. Federal Register 68(116) 35949-36406.

1.3.4 Review history:

Species status review [FY 2008 Recovery Data Call (September 2008)]:
Declining

Recovery achieved:

1 (0-25%) (FY08 Recovery Data Call)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

5

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Recovery Plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages; plus appendices.

Date issued: August 10, 1998

Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Yes
 No

2.1.2 Is the species under review listed as a DPS?

Yes
 No

2.1.3 Was the DPS listed prior to 1996?

Yes
 No

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes
 No

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes
 No

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

Yes
 No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes
 No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

Yes

___ *No*

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery?

 X *Yes*

___ *No*

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

A synthesis of the threats (Factor A, C, D, and E) affecting this species is presented in section 2.4. Factor B (Overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for the Oahu plants (USFWS1998), based on whether the species is an annual, or 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 25 mature individuals per population.

This recovery objective has partially been met.

For downlisting, a total of five to seven populations of each taxon should be documented on Oahu and at least one other island where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 100 mature individuals per population for long-lived perennials. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery objective has not been met.

A total of eight to ten populations of each taxon should be documented on Oahu and at least one other island where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 100 mature individuals per population for long-lived. Each

population should persist at this level for a minimum of five consecutive years.

This recovery objective has not been met.

2.3 Updated Information and Current Species Status

In addition to the status summary table below, information on the species' status and threats was included in the final critical habitat rule referenced above in section 1.3.3 ("Associated Rulemakings") and in section 2.4 ("Synthesis") below, which also includes any new information about the status and threats of the species.

Table 1. Status of *Melicope lydgatei* (Alani) from listing through 5-year review.

Date	No. wild individuals	No. Outplanted	Stability criteria identified in Recovery Plan	Downlisting criteria completed?
1994 (listing)	< 10	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	No
1998 (recovery plan)	< 45	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2003 (critical habitat)	18	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2008 (5-year review)	41	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	Partially

2.3.1 Biology and Habitat [see note in section 2.3]

2.3.1.1 New information on the species' biology and life history:

No new information.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

2.3.1.4 Taxonomic classification or changes in nomenclature:

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

2.3.1.7 Other:

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms) [see note in section 2.3]

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

2.3.2.3 Disease or predation:

2.3.2.4 Inadequacy of existing regulatory mechanisms:

2.3.2.5 Other natural or manmade factors affecting its continued existence:

2.4 Synthesis

Historically, *Melicope lydgatei* was known throughout the Koolau Mountains, Oahu from Hauula to Kahana, Kipapa Gulch to Waimano, and Kalihi Valley to Wailupe Valley. By 2003, only 18 populations were documented (USFWS 2003b). While recent surveys have not been undertaken (Plant Extinction Prevention Program 2007), 2 populations of 41 individuals are known. The Kawaikoele-Kawai Nui Ridge (Manana) population consists of three mature individuals and the Kawai Iki and Opaepala/lower Peahinaia Trail population has 38 mature individuals. No seedlings or juveniles are known (U.S. Army Garrison 2007).

The primary threats to *Melicope lydgatei* include loss of habitat and degradation of the remaining habitat by invasive introduced plant species such as *Clidemia hirta* (Koster's curse) and *Psidium cattleianum* (strawberry guava) (Factor E), and feral pigs (*Sus scrofa*) which consume fruits and other plant parts and root in the soil, which degrades the habitat (Factors A and D) (U.S. Army Garrison 2007; USFWS 2003a, 2008). The black twig borer (*Xylosandrus compactus*) burrows into the branches and introduces a pathogenic fungus, pruning the host severely and often killing branches or whole plants (USFWS 2003a). The individuals located on military land have negligible threat from fire caused by military activities (USFWS 2003a). Ninety-seven percent (38 individuals) of the known individuals of *Melicope lydgatei* are found along Opaepala/lower Peahinaia trail within the Kawaioloa action area, and are at risk from trampling by military foot maneuvers (USFWS 2007).

In addition to the threats described above, taxa such as *Melicope lydgatei* that are restricted to a small portion 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 fires, hurricanes, landslides, flooding and disease outbreaks (Factor E). When considered on their own, the natural processes associated with being a single island endemic do not affect *M. lydgatei* to such a degree that it is threatened or endangered with extinction in the foreseeable future, but these natural processes can exacerbate the threat from anthropogenic factors (USFWS 1998).

There are currently limited numbers of seeds or plants in storage (Lyon Arboretum Micropropagation Facility 2008; National Tropical Botanical Garden 2008; Center for Conservation Research and Training Seed Storage Laboratory 2008). Two cuttings collected from Kawai Iki

and Opaepala individuals have been established and have flowered and produced fruit in the Pahole Rare Plant Facility (U.S. Army Garrison 2007). Several seeds were also collected from two different plants for storage and propagation testing. Seeds likely have some type of dormancy, yet this is hard to determine as large amounts of seed are not possible to collect. *M. lydgatei* has a very thick seed coat, which suggests that it is impermeable to water and may have physical dormancy. Often seeds that are scarified (as seed coat is very thick) rot quickly, whereas seeds left untreated may take months to germinate or not germinate at all. Seeds may have some combination of morphological and physical dormancy, and scarification prior to complete embryo development may inhibit germination. An enclosure fence for the Peahinaia management unit has been proposed and will protect approximately 31 plants from trampling and feral pig activities (USFWS 2007).

The stabilization and recovery goals for this species have not been met, as only 41 mature individuals are known and not all threats are being managed. Therefore, *Melicope lydgatei* meets the definition of endangered as it remains in danger of extinction throughout its range.

3.0 RESULTS

3.1 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number: N/A

Brief Rationale:

3.3 Listing and Reclassification Priority Number: N/A

Reclassification (from Threatened to Endangered) Priority Number: _____

Reclassification (from Endangered to Threatened) Priority Number: _____

Delisting (regardless of current classification) Priority Number:

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Continue collection of genetic resources for storage, future propagation and reintroducing into protected suitable habitat within historical range.
- Construct enclosure fences to protect individuals from the negative impacts of feral pigs, goats, axis deer, mouflon sheep, and cattle; and eradicate introduced invasive plant species within the enclosures.
- Enhance current natural populations to increase numbers of individuals.
- Establish populations in protected habitat within historical range.
- Survey geographical and historical range for a thorough current assessment of the species.
- Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Research seed storage and germination methods.
- Study the life history and biology of the species, including pollination, seed storage and seed viability.

5.0 REFERENCES

Center for Conservation Research and Training Seed Storage Facility. 2007. Seed conservation lab database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Lyon Arboretum Micropropagation Facility 2008. Micropropagation database. Lyon Arboretum, University of Hawaii at Manoa, Honolulu, HI. Unpublished.

National Tropical Botanical Garden. 2008. 2008 report on controlled propagation of listed and candidate species, as designated under the U.S. endangered species act. National Tropical Botanical Garden, Lawai, HI. Unpublished.

Plant Extinction Prevention Program. 2007. Annual performance report (July 1, 2006 to June 30, 2007), Plant Extinction Prevention (PEP) program for Oahu, Maui Nui, Hawaii. Unpublished.

- [U.S. Army] U.S. Army Garrison. 2007. 2007 Status reports for the Makua Implementation Plan and the draft Oahu Implementation Plan. U.S. Army Garrison, Directorate of Public Works, Environmental Division, Schofield Barracks, Hawaii. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; endangered status for 11 plant species from Koolau mountain range, Island of Oahu, HI; final rule. Federal Register 59(59):14482-14493.
- [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. 2003a. Biological Opinion of the U.S. Fish and Wildlife Service for routine military training and transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army installations, island of Oahu.
- [USFWS] U.S. Fish and Wildlife Service. 2003b. Endangered and threatened wildlife and plants; final designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, HI; final rule. Fed. Reg. 68:35950–36406.
- [USFWS] U.S. Fish and Wildlife Service. 2007. Reinitiation of the 1999 Biological Opinion of the U.S. Fish and Wildlife Service for U.S. Army military training at Makua Military Reservation, island of Oahu. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 2008. Rare plant tracking database. Pacific Islands Fish and Wildlife Office, Honolulu, HI. Accessed on April 28, 2008. Unpublished.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Melicope lydgatei* (Alani)

Current Classification: _____ E _____

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

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Approved  Date 21 July 2009
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