

## **5-YEAR REVIEW**

Short Form Summary

**Species Reviewed:** *Melicope saint-johnii* (alani)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 2009. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 103 species in Hawaii. Federal Register 74(49):11130-11133.

### **Lead Region/Field Office:**

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

### **Name of Reviewer(s):**

Marie Bruegmann, Plant Recovery Coordinator, PIFWO

Jess Newton, Recovery Program Lead, PIFWO

Assistant Field Supervisor for Endangered Species, 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 March 16, 2009. The review was based on final critical habitat designation for *Melicope saint-johnii* and other species from the island of Oahu (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 Tamara Sherrill, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Lead and the Assistant Field Supervisor for Endangered Species 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](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 *Melicope saint-johnii* published in the Federal Register on June 17, 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 *M. saint-johnii*.

*Melicope saint-johnii* was listed as endangered in 1996. At that time there were 8 populations containing fewer than 150 individuals (USFWS 1996) on the island of Oahu. Historically, *Melicope saint-johnii* was known from the Waianae Mountains from Makaha to Mauna Kapu and in the Koolau Mountains in the Papali Gulch in Hauula, as well as Manoa-Aihualama, Wailupe, and Niu Valley. By 1998, this species appears to have been extirpated from the Koolau Mountains (USFWS 1998). At that time, six populations of this species were found on Federal (Lualualei Naval Reservation), State, and private land from the region between Puu Kaua and Puu Kanehoa to Mauna Kapu in the southern Waianae Mountains. In 1998, fewer than 150 individuals of this species were known (USFWS 1998).

In 1994, two locations in Lualualei between 732 and 838 meters (2,400 and 2,750 feet) elevation contained 11 individuals and the other location contained between 20 to 50 individuals (Hawaii Biodiversity and Mapping Program 2009), which may be located on Navy lands, but this has not been confirmed.

In 2000, three individuals were observed in the Ekahanui management unit, which was owned by the Campbell Estate and leased to The Nature Conservancy of Hawaii. This unit is part of the Honouliuli Preserve and was recently acquired by the Hawaii Division of Forestry and Wildlife. The three individuals were located at 671 to 800 meters (2,200 to 2,625 feet) elevation. The species was still known to occur there as of 2008 (Hawaii Biodiversity and Mapping Program 2009; U.S. Army Garrison 2008).

Twelve individuals were seen in North Palawai Gulch in the south fork and south branch in 1991 at 750 to 850 meters (2,461 to 2,789 feet) elevation (Wood 2009). In 1999, as many as 100 mature individuals were estimated to occur at the same location (Hawaii Biodiversity and Mapping Program 2009). *Melicope saint-johnii* was observed in South Palawai at 823 meters (2,700 feet) elevation in 1997 (Wood 2009). Only one individual was observed at Napepeiauolelo summit in the upper Palikea drainage at 732 meters (2,400 feet) elevation in 2000 (Wood 2009).

Currently, less than 200 individuals of *Melicope saint-johnii* are estimated to occur in four populations on Oahu.

In Lualualei, the natural community is dominated by *Eragrostis variabilis* (kawelu) - *Metrosideros polymorpha* (ohia) - *Artemisia* sp. (ahinahina) with associated native species including *Alyxia stellata* (maile), *Bidens torta* (kookoolau), *Carex wahuensis* (no common name [NCN]), *Chamaesyce celastroides* subsp. *amplectens* (akoko), *Coprosma longifolia* (pilo), *Kadua cordata* (kopa), *Lysimachia hillebrandii* (kolokolo lehua), *Labordia kaalae* (kamakahala), *Panicum beecheyi* (NCN), *Pipturus albidus* (mamake), *Pittosporum* sp. (hoawa), *Plantago princeps* var. *princeps* (laukahi kuahiwi), *Pleomele halapepe* (halapepe), *Psychotria* sp. (kopiko), *Rumex albescens* (huahuako), and *Stenogyne kaalae* (NCN) (Hawaii Biodiversity and Mapping Program 2009).

North Palawai Gulch has primarily invasive introduced vegetation dominated by *Schinus terebinthifolius* (Christmasberry) in remnant *Acacia koa* (koa) - *Metrosideros*

*polymorpha* lowland mesic forest with *Cyanea membranacea* (haha), *Dodonaea viscosa* (aalii), *Diellia falcata* (NCN), *Neraudia* sp. (NCN), *Plantago princeps*, *Pritchardia* sp. (loulou), *Silene perlmanii* (NCN), and *Solanum sandwicense* (popolo aiakeakua) (Hawaii Biodiversity and Mapping Program 2009; Wood 2009).

In South Palawai the vegetation where *Melicope saint-johnii* occurs is *Metrosideros* spp. lowland mesic forest with *Carex* sp., *Chamaesyce multiformis* (akoko), *Coprosma* spp., *Cyanea membranacea* (haha), *Dianella sandwicensis* (uki uki), *Diplazium sandwicensis* (hoio), *Melicope* spp. (alani), *Panicum beecheyi*, and *Psychotria* spp. (kopiko) (Wood 2009).

The habitat of Napepeiauolelo summit is *Metrosideros polymorpha* - *Dicranopteris linearis* (uluhe) forest with *Alyxia stellata*, *Antidesma platyphyllum* (hame), *Carex meyenii* (NCN), *Diospyros sandwicensis* (lama), *Freycinetia arborea* (ie ie), *Kadua acuminata* (au), *Leptecophylla tameiameia* (pukiawe), *Melicope peduncularis* (alani), *Peperomia sandwicensis* (ala ala wai nui), *Pouteria sandwicensis* (alaa), *Psychotria hathewayi* (kopiko), *P. mariniana*, *Sphenomeris chinensis* (pala), *Vaccinium dentatum* (ohelo), and *Zanthoxylum kauense* (heae) (Hawaii Biodiversity and Mapping Program 2009; Wood 2009).

Habitat where *Melicope saint-johnii* is found is typically degraded by feral goats (*Capra hircus*) (Listing Factors A, C and D) and pigs (*Sus scrofa*) (Listing Factors A and D) and competition with invasive introduced plants (Listing Factors A and E) such as *Ageratina adenophora* (sticky snakeroot), *Ageratina riparia* (spreading mist flower), *Clidemia hirta* (Koster's curse), *Erigeron karvinskianus* (daisy fleabane), *Grevillea robusta* (silk oak), *Lantana camara* (lantana), *Melinis minutiflora* (molasses grass), *Morella faya* (firetree), *Passiflora suberosa* (corksystem passionflower), *Psidium cattleianum* (strawberry guava), *Rubus rosifolius* (thimbleberry), and *Schinus terebinthifolius* (Wood 2009). There is a high fire threat for populations located at Ekahanui (Listing Factor E), where fires have occurred nearby (U.S. Army Garrison 2008).

Predation by the black twig borer (*Xylosandrus compactus*) has been a problem for various *Melicope* species (Listing Factor C) (USFWS 1998).

Climate change may also pose a threat to this species (Listing Factors A and E). 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) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

In addition to all of the other threats, species like *Melicope saint-johnii* 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 (Listing Factor E). The extent of these natural

processes on this single island endemic are exacerbated by anthropogenic threats, such as habitat loss for human development or predation by introduced species (USFWS 1998).

Currently, there are no seeds in storage or plants in cultivation for *Melicope saint-johnii*. There is a high level of weed control currently conducted in the Ekahanui management unit (U.S. Army Garrison 2008).

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 saint-johnii* is a long-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 Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

The interim stabilization goals for this species have not been met, as only one population contains more than 25 mature individuals (Table 1), all threats are not being managed (Table 2), and there is no *ex situ* representation of the species. Therefore, *Melicope saint-johnii* meets the definition of endangered as it remains in danger of extinction throughout its range.

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

- Survey to determine current status of all wild populations.
- Collect material for genetic storage and propagation for reintroduction.
- Propagate for reintroduction and augmentation.
- Develop a plan for conserving the species' genetic diversity in *ex situ* collections and in reintroduced populations.
- Control invasive introduced plant species around all populations.
- Fence all populations to provide protection from the negative impacts of feral ungulates.
- Develop and implement methods to control black twig borer.
- Develop and implement wildfire management plans for each population.
- Work with the U.S. Army Garrison, the U.S. Navy, Hawaii Division of Forestry and Wildlife, and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

- Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

**References:**

- Hawaii Biodiversity and Mapping Program. 2009. Program database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.
- U.S. Army Garrison, Hawaii. 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. Directorate of Public Works, Environmental Division, Schofield Barracks, Hawaii. 624 pages.
- [USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered status for twenty-five plant species from the island of Oahu, Hawaii; final rule. Federal Register 61(198):53089-53108.
- [USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages plus appendices. Available online at <<http://www.fws.gov/pacificislands/recoveryplans.html>>.
- [USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; 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.
- Wood, K.R. 2009. Notes on *Melicope saint-johnii*. National Tropical Botanical Garden, Kalaheo, Hawaii. 2 pages. Unpublished.

**Table 1. Status of *Melicope saint-johnii* from listing through 5-year review.**

<b>Date</b>	<b>No. wild indivs</b>	<b>No. outplanted</b>	<b>Stability Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1996 (listing)	<150	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	Unknown
1998 (recovery plan)	<150		All threats managed in all 3 populations	Unknown
			Complete genetic storage	No
			3 populations with 25 mature individuals each	Unknown
2003 (critical habitat)	<170	0	All threats managed in all 3 populations	Unknown
			Complete genetic storage	No
			3 populations with 25 mature individuals each	Unknown
2010 (5-year review)	<200	0	All threats managed in all 3 populations	Partially (Table 2)
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No: only 1 population with 25 individuals

**Table 2. Threats to *Melicope saint-johnii*.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Ungulates – habitat modification and herbivory	A, C, D	Ongoing	No
Black twig borer – predation	C	Ongoing	No
Fire	E	Ongoing	No
Invasive introduced plants	A, E	Ongoing	Partially: weeds controlled at the Ekahanui management unit only
Climate change	A, E	Increasing	No
Small population size	E	Ongoing	No

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

Field Supervisor, Pacific Islands Fish and Wildlife Office

  
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Stephen L. Mink

Date   8/29/11