

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Melicope makahae*

COMMON NAME: Alani

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: February 2003

STATUS/ACTION (Check all that apply):

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: ____

90-day positive - FR date: ____

12-month warranted but precluded - FR date: ____

Is the petition requesting a reclassification of a listed species?

Listing priority change

Former LP: ____

New LP: ____

Latest date species first became a Candidate: _____

Candidate removal: Former LP: ____ (Check only one reason)

A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

F - Range is no longer a U.S. territory.

M - Taxon mistakenly included in past notice of review.

N - Taxon may not meet the Act's definition of "species."

X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Plant, Rutaceae (Rue family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Oahu

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Oahu

LEAD REGION CONTACT (Name, phone number): Scott McCarthy, 503-231-6131

LEAD FIELD OFFICE CONTACT (Office, name, phone number): Pacific Islands (Ecological Services), Christa Russell, 808-541-3441

BIOLOGICAL INFORMATION (Describe habitat, historic vs. current range, historic vs. current population estimates (# populations, #individuals/population), etc.):

Melicope makahae was historically found throughout the central Waianae Mountains, on the island of Oahu. Typically found in mesic forest, this species has declined precipitously and is extremely threatened. Currently *Melicope makahae* is known from three populations on three discrete ridges, totaling approximately 200 individuals (Joel Lau, The Nature Conservancy, pers. comm., 1996; Ken Wood, National Tropical Botanical Garden, pers. comm., 1999).

THREATS (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change):

A. The present or threatened destruction, modification, or curtailment of its habitat or range. This species is highly and imminently threatened by feral goats that adversely modify habitat (J. Lau, pers. comm., 1996). As early as 1778, European explorers introduced livestock, which became feral, increased in number and range, and caused significant changes to the natural environment of Hawaii. Past and present activities of introduced alien mammals are the primary factor altering and degrading vegetation and habitats on Oahu. Feral ungulates trample and eat native vegetation and disturb and open areas. This causes erosion and allows the entry of alien plant species (Cuddihy and Stone 1990; Wagner *et al.* 1990).

The goat (*Capra hircus*), a species originally native to the Middle East and India, was successfully introduced to the Hawaiian Islands in 1792. Currently, populations exist on Kauai, Oahu, Maui, Molokai, and Hawaii. On Oahu, feral goats have been present in drier, more rugged areas since the 1820s. The goat population in the Waianae Mountains area is apparently increasing, becoming an even greater threat to the rare plants that grow there (J. Lau, pers. comm., 1994). Goats are managed in Hawaii as a game animal, but many herds populate inaccessible areas where hunting has little effect on their numbers (Hawaii Heritage Program 1990c). Goat hunting is allowed year-round or during certain months, depending on the area (Hawaii, Department of Land and Natural Resources n.d.-a, n.d.-b, n.d.-c). Goats browse on introduced grasses and native plants, especially in drier and more open ecosystems. Feral goats eat native vegetation, trample roots and seedlings, cause erosion, and promote the invasion of alien plants. They are able to forage in extremely rugged terrain and have a high reproductive capacity (Clarke and Cuddihy 1980; Cuddihy and Stone 1990; Culliney 1988; Scott *et al.* 1986; Tomich 1986; van Riper and van Riper 1982).

Although many plant species survive on steep cliffs inaccessible to goats, the original range of these plants was probably much larger. These species are now vulnerable to the long-term, indirect effects of goats, such as large-scale erosion (Corn *et al.* 1979). The habitats of many native plants were damaged in the past by goats, and these effects are still apparent in the form of alien vegetation and erosion (Clarke and Cuddihy 1980; Culliney 1988; Scott *et al.* 1986; van Riper and van Riper 1982).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

None known.

C. Disease or predation.

Disease is not known to be a significant threat to this species. However, a tiny beetle, the black twig borer (*Xylosandrus compactus*) is known to infest a wide variety of common plant taxa, including *Melicope* in the Koolau Mountains on Oahu (Davis 1970). The black twig borer burrows into branches, introduces a pathogenic fungus as food for its larvae, and lays its eggs. Twigs, branches, and even entire plants can be killed from an infestation. In the Hawaiian Islands, the black twig borer has many hosts, disperses easily, and is probably present at most elevations up to 762 meters (2,500 feet) (Howarth 1985). The black twig borer occurs throughout the Waianae Mountains and may pose a threat to all *Melicope makahae* plants that occur there.

Predation of Hawaii's native vegetation by goats and the extensive damage caused by them have been well documented (Tomich 1986; van Riper and van Riper 1982). Although there is no evidence of predation on *Melicope makahae*, these plants are not known to be unpalatable. Direct predation by goats is a possible threat to this species.

D. The inadequacy of existing regulatory mechanisms.

Currently, there is no Federal or State protection for this taxon. The State of Hawaii does not recognize this species as endangered until it is federally listed as endangered.

E. Other natural or manmade factors affecting its continued existence.

This species is threatened by alien plant species (J. Lau, pers. comm., 1996; John Obtata, pers. comm., 1996). The original native flora of Hawaii consisted of about 1,000 species, 89 percent of which were endemic. Of the total native and naturalized Hawaiian flora of 1,817 species, 47 percent were introduced from other parts of the world and nearly 100 species have become pests (Smith 1985; Wagner *et al.* 1990). Naturalized, introduced species compete with native plants for space, light, water, and nutrients (Cuddihy and Stone 1990). Some of these species were brought to Hawaii by various groups of people, including the Polynesian immigrants, for food or cultural reasons. Plantation owners, alarmed at the reduction of water resources for their crops caused by the destruction of native forest cover by grazing feral animals, supported the introduction of alien tree species for reforestation. Ranchers intentionally introduced pasture grasses and other species for agriculture, and sometimes inadvertently introduced weed seeds as well. Other plants were brought to Hawaii for their potential horticultural value (Cuddihy and Stone 1990; Scott *et al.* 1986; Wenkam 1969).

FOR RECYCLED PETITIONS:

- a. Is listing still warranted? ___
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? ___
- c. Is a proposal to list the species as threatened or endangered in preparation? ___
- d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP (Estimate proportion Federal/state/local government/private, identify

non-private owners): *Melicope makahae* occurs on City and County of Honolulu, State, and Federal lands.

PRELISTING (Describe status of conservation agreements or other conservation activities):
None.

REFERENCES (Identify primary sources of information (e.g., status reports, petitions, journal publications, unpublished data from species experts) using formal citation format):

The information in this form is based on the results of a meeting of 20 botanical experts held by the Center for Plant Conservation in December of 1995, and has been updated by personal communication with Joel Lau of The Nature Conservancy, John Obata, highly respected amateur botanist, and Ken Wood of National Tropical Botanical Garden.

Clarke, G., and L.W. Cuddihy. 1980. A botanical reconnaissance of the Na Pali coast trail: Kee Beach to Kalalau Valley (April 9-11, 1980). Division of Forestry and Wildlife, Department of Land and Natural Resources, Hilo, Hawaii.

Corn, C.A., G. Clarke, L. Cuddihy, and L. Yoshida. 1979. A botanical reconnaissance of Kalalau, Honopu, Awaawapuhi, Nualolo and Milolii Valleys and shorelines--Na Pali, Kauai. Unpublished report. Division of Forestry and Wildlife, Department of Land and Natural Resources, Endangered Species Program, Honolulu. 14 pp.

Cuddihy, L.W., and C.P. Stone. 1990. Alteration of native Hawaiian vegetation; effects of humans, their activities and introductions. Coop. Natl. Park Resources Stud. Unit, Hawaii. 138 pp.

Culliney, J.L. 1988. Islands in a far sea; nature and man in Hawaii. Sierra Club Books, San Francisco. 410 pp.

Davis, C.J. 1970. Black twig borer threatens native trees. Newsl. Hawaiian Bot. Soc. 9:38-39.

Hawaii, Department of Land and Natural Resources. N.d.-a. Summary of Title 13, Chapter 123, Game mammal hunting rules, island of Oahu. Division of Forestry and Wildlife, Honolulu. 2 pp.

Hawaii, Department of Land and Natural Resources. N.d.-b. Summary of Title 13, Chapter 123, Game mammal hunting rules, island of Molokai. Division of Forestry and Wildlife, Honolulu. 2 pp.

Hawaii, Department of Land and Natural Resources. N.d.-c. Summary of Title 13, Chapter 123, Game mammal hunting rules, island of Maui. Division of Forestry and Wildlife, Honolulu. 2 pp.

Hawaii Heritage Program, The Nature Conservancy of Hawaii. 1990c. Management recommendations for Na Pali Coast State Park, island of Kauai. Unpublished report

prepared for Hawaii, Department of Land and Natural Resources, Division of State Parks, Honolulu. 18 pp.

- Howarth, F.G. 1985. Impacts of alien land arthropods and mollusks on native plants and animals in Hawai'i: in Stone, C.P. and J.M. Scott (eds.), Hawai'i's terrestrial ecosystems: preservation and management. Coop. Natl. Park Resources Stud. Unit, Hawaii, Honolulu, pp. 149-179.
- Scott, J.M., S. Mountainspring, F.L. Ramsey, and C.B. Kepler. 1986. Forest bird communities of the Hawaiian Islands: Their dynamics, ecology, and conservation. Studies in Avian Biology 9:1-429. Cooper Ornithological Society, Los Angeles.
- Smith, C.W. 1985. Impact of alien plants on Hawai'i's native biota: in Stone, C.P., and J.M. Scott (eds.), Hawai'i's terrestrial ecosystems: preservation and management. Coop. Natl. Park Resources Stud. Unit, Univ. Hawaii, Honolulu, pp. 180-250.
- Tomich, P.Q. 1986. Mammals in Hawai'i; a synopsis and notational bibliography. Bishop Museum Press, Honolulu. 375 pp.
- van Riper, S.G., and C. van Riper III. 1982. A field guide to the mammals in Hawaii. The Oriental Publishing Company, Honolulu. 68 pp.
- Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. University of Hawaii Press and Bishop Museum Press, Honolulu. Bishop Mus. Spec. Publ. 83:1-1853.
- Wenkam, R. 1969. Kauai and the park country of Hawaii. Sierra Club, San Francisco. 160 pp.

LISTING PRIORITY (* after number)

THREAT

Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2 *
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude:

Imminence:

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, removal of candidates, and listing priority changes.

Approve: Rowan Gould March 6, 2003
Regional Director, Fish and Wildlife Service Date

Concur: _____
Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

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Date of annual review: 2/03
Conducted by: _____

Comments:

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