

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Astelia waialealae*

COMMON NAME: Pa`ini`u

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: 28-FEB-96

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, Liliaceae

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

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

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.):

*Astelia waialealae* is known from three populations in three bogs within the Alakai swamp region of Kauai, totaling 35 clumps which may only represent 10 - 15 genetically distinct individuals (Marie Bruegmann, Service, pers. obs. 2000). Thirty clumps are found in one bog (Perlman and Wood 1995). While the species has always been restricted to the bogs of the Alakai, it may have occurred in more than the current three bogs in the past. The number of individuals has declined and no reproductive individuals remain. This species was once considered the silversword of Kauai, because the large rosettes of silvery leaves were the size and shape of the genus *Argyroxiphium* (Steve Perlman, National Tropical Botanical Garden, pers. comm., 1996). Today, the largest individual is less than 30 centimeters (12 inches) in diameter and none have reached reproductive age (M. Bruegmann, pers. obs., 2000).

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. Pigs are the major threat to *Astelia waialealae* (Perlman and Wood 1995). 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 Kauai. 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 pig (*Sus scrofa*) is originally native to Europe, northern Africa, Asia Minor, and Asia. European pigs, introduced to Hawaii by Captain James Cook in 1778, became feral and invaded forested areas, especially wet and mesic forests and dry areas at high elevations. They are currently present on Kauai and four other islands, and inhabit rain forests and grasslands. Pig hunting is allowed on all islands either year-round or during certain months, depending on the area (DLNR n.d.-a, n.d.-b, n.d.-c, 1990). While rooting in the ground in search of the invertebrates and plant material they eat, feral pigs disturb and destroy vegetative cover, trample plants and seedlings, and threaten forest regeneration by damaging seeds and seedlings. They disturb soil and cause erosion, especially on slopes. Alien plant seeds are dispersed on their hooves and coats as well as through their digestive tracts, and the disturbed soil is fertilized by their feces, helping these plants to establish. Pigs are a major vector in the spread of many introduced plant species (Cuddihy and Stone 1990; Medeiros *et al.* 1986; Scott *et al.* 1986; Smith 1985; Stone 1985; Tomich 1986; Wagner *et al.* 1990).

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

Not applicable.

C. Disease or predation.

No mature individuals of *Astelia waialealae* remain due to predation by feral pigs. The basal rosette of the plant is starchy, and provides a food source for the feral pigs (Perlman and Wood 1995). Pigs eat the leaves and base of the plant as well as digging up the roots.

D. The inadequacy of existing regulatory mechanisms.

There is no current protection for this species.

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

While introduced plant species are not as large a threat to the *Astelia waialealae* as feral pigs, there are a few species that are invading the bog habitat of the species. Introduced plant species are minimal in the bog habitat, but will continue to increase if the feral pigs are not removed (Perlman and Wood 1995).

*Juncus planifolius* (no common name) is a perennial rush which has naturalized in moist, open, disturbed depressions on margins of forests and in bogs on Kauai, Oahu, Molokai, Maui, and Hawaii (Coffey 1990). *Juncus planifolius* is only found in disturbed areas, so the removal of feral pigs will most likely stem the spread of this species (Perlman and Wood 1995; S. Perlman, pers. comm., 1997).

*Andropogon virginicus* (broomsedge) is a perennial, tufted grass which is naturalized on Kauai, Oahu, and Hawaii along roadsides and in disturbed dry to mesic forest and shrubland (O'Connor 1990; Clyde Imada, Bernice Pauahi Bishop Museum, pers. comm., 1997). While the bogs are not dry to mesic habitat, the saturation of soil in the bogs creates a lack of oxygen which inhibits the uptake of water by plant roots, resulting in drought conditions (Joan Canfield, Service, pers. comm., 1996). Broomsedge is beginning to establish in the bogs of the Alakai that are most easily accessible to humans and may become a threat to *Astelia waialealae* if disturbance to the bogs continues (Perlman and Wood 1995).

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): All three populations are on State-owned land.

PRELISTING (Describe status of conservation agreements or other conservation activities):  
The Service is working in cooperation with the State of Hawaii, Division of Forestry and Wildlife, to fence the three bogs in which *Astelia waialealae* currently occurs. Funding was made available from the Regional Office in Fiscal Year 1995 to do this work. Additional funding will be required for annual fence maintenance and weed control.

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

Coffey, J.C. 1990. Juncaceae: in Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. University of Hawaii Press and Bishop Museum Press, Honolulu. Bishop Mus. Spec. Publ. 83:1451-1455.

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.

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.

Perlman, S. and K. Wood. 1995. Kauai Bog Survey Report. Prepared for the U.S. Fish and Wildlife Service, Honolulu, HI.

Medeiros, A.C., Jr., L.L. Loope, and R.A. Holt. 1986. Status of native flowering plant species on the south slope of Haleakala, East Maui, Hawaii. Coop. Natl. Park Resources Stud. Unit, Hawaii, Techn. Rept. 59:1-230.

O'Connor, P.J. 1990. Poaceae: in Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. University of Hawaii Press and Bishop Museum Press, Honolulu. Bishop Mus. Spec. Publ. 83:1481-1604.

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.

- Stone, C.P. 1985. Alien animals in Hawai'i's native ecosystems: toward controlling the adverse effects of introduced vertebrates: 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. 251-197.
- Tomich, P.Q. 1986. Mammals in Hawai'i; a synopsis and notational bibliography. Bishop Museum Press, Honolulu. 375 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.

LISTING PRIORITY (\* after number)

THREAT
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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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