

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Wilkesia hobdyi* (dwarf iliau)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 70 species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

Lead Region/Field Office:

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

Name of Reviewer(s):

Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Assistant Field Supervisor for Endangered Species
Jeff Newman, Pacific Islands Fish and Wildlife Office, Acting Deputy Field Supervisor

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 April 29, 2008. The review was based on final critical habitat designation for *Wilkesia hobdyi* and other species from the island of Kauai (USFWS 2003), as well as a review of current, available information. The National Tropical Botanical Garden provided an initial draft of portions of the 5-year 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 Assistant Field Supervisor for Endangered Species and Acting Deputy Field Supervisor 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).

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 *Wilkesia hobdyi* published in the Federal Register on February 27, 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 *W. hobdyi*.

At the time of listing in 1992, three populations of *Wilkesia hobdyi* were known totaling 400 individuals (USFWS 1992). In 1995 when the recovery plan was written, five populations of *W. hobdyi* were known totaling 420 to 510 individuals. These populations were located at Polihale Ridge (250 to 300 individuals), Kaaweiki Ridge (100 individuals), Waiahuakua Valley (10 to 50 individuals), Makaha Ridge (50 individuals), and Pohakuao (10 individuals) (USFWS 1995). In 2003, when critical habitat was designated, there were believed to be nine occurrences with a total of 406 to 471 individuals (USFWS 2003). These populations of *W. hobdyi* occurred in Milolii Valley, Haeleele Ridge, Kaaweiki Ridge, Polihale Spring, Pohakumano, Pohakuao, and Makaha Ridge. The Makaha location is on State land leased to the United States Navy Pacific Missile Range Facility (USFWS 2003).

Observations made from 1998 to 2006 only documented four populations of *Wilkesia hobdyi* with a total of 117 to 127 individuals. A total of 70 to 80 individuals were observed in Milolii Valley in 2000, from 12 to 152 meters (40 to 500 feet) elevation (Perlman 2009; Wood 2006). Seven mature individuals were seen in an area damaged by goats on Makaha Ridge, outside the Pacific Missile Range Facility zone in September 2006, at an elevation of 183 meters (600 feet) (National Tropical Botanical Garden 2008a; Tangalin 2009). Only 25 individuals were seen at Polihale Ridge in 1998 growing only inside a goat exclosure fence, and with goat pressure evident (Hawaii Biodiversity and Mapping Program 2009; Perlman 2009). Five individuals were noted at Pohakuao at 488 to 610 meters (1,600 to 2,000 feet) elevation in 2001 (Hawaii Biodiversity and Mapping Program 2009).

In 2006, a study was undertaken for the planning of the Pacific Missile Range Facility that summarized extant populations and their numbers. That study indicated that there are presently ten populations of *W. hobdyi*, with a total of 759 to 809 individuals. These populations are found at Haeleele (70 individuals); Polihale (250 to 300 individuals); Kaaweiki (100 individuals); Milolii to Mahuaiki Point (70 individuals); Makaha Ridge at the Pacific Missile Range Facility (214 individuals); Honopu (10 individuals); Kalalau (20 individuals); Pohakuao (10 individuals); Hanakoa (10 individuals); and Waiahuakua (5 individuals). Honopu is a new population not previously noted (Wood 2006).

Cross-pollination of this species yielded abundant fruits with embryos. *Wilkesia hobdyi* is probably pollinated by insects and is most likely self-incompatible (Carr 1985). Flowering has been observed in June, September, October, and December, and fruits have been collected primarily during the months of November to January. Fruits may be dispersed when they stick to the feathers of birds. Hybridization with *W. gymnoxiphium* may be occurring where the species occur together (Wood 2006).

Wilkesia hobdyi grows on coastal dry cliffs or very dry ridges at elevations ranging between 152 and 457 meters (500 and 1500 feet) (Wood 2006). Associated native species where *W. hobdyi* occurs include *Alphitonia ponderosa* (kauila), *Antidesma platyphyllum* (hame), *Artemisia australis* (hinahina), *Bidens sandwicensis* subsp. *sandwicensis* (kookoolau), *Boehmeria grandis* (akolea), *Carex* spp. (no common name

[NCN]), *Chamaesyce celastroides* var. *hanapepensis* (akoko), *Coprosma* sp. (pilo), *Dodonaea viscosa* (aalii), *Doryopteris decipiens* (kumuniu), *Eragrostis variabilis* (kawelu), *Kadua acuminata* (au), *K. st.-johnii* (NCN), *Leptecophylla tameiameia* (pukiawe), *Lipochaeta connata* var. *acris* (nehe), *Lobelia niihauensis* (NCN), *Lythrum maritimum* (pukamole), *Myoporum sandwicense* (naio), *Nototrichium sandwicense* (kului), *Panicum lineale* (NCN), *Peucedanum sandwicense* (makou), *Psydrax odorata* (alahee), *Scaevola gaudichaudii* (naupaka kuahiwi), *Schiedea apokremnos* (maolioli), *Sida fallax* (ilima), *Vaccinium dentatum* (ohelo), *Wilkesia gymnoxiphium* (iliau), and *Wikstroemia oahuensis* (akia) (Hawaii Biodiversity and Mapping Program 2009; National Tropical Botanical Garden 2008b; Perlman 2009; Tangalin 2009; Wood 2006).

The major threat to *Wilkesia hobdyi* is feral goats (*Capra hircus*), which promote landslides (Perlman 2009) and erosion (Factor A) (National Tropical Botanical Garden 2008a; Perlman 2009; Tangalin 2009). Goat overgrazing has been identified as a problem at Milolii where during a survey in 2000, two herds of approximately 15 animals each were noted at both ends of the beach, with extensive tracks and feces throughout the area, and vegetation in the area was clearly subjected to intense grazing (Factor C) (Coral Reef Assessment and Monitoring Program 2009).

Invasive introduced plant species that compete and crowd out native species (Factor E) also thrive in areas goats have cleared of native vegetation (Wood 2004). These include *Vachellia farnesiana* (sweet acacia), *Andropogon glomeratus* (beardgrass), *Bothriochloa pertusa* (pitted beardgrass), *Bryophyllum pinnatum* (airplant), *Erigeron karvinskianus* (daisy fleabane), *Grevillea robusta* (silk oak), *Indigofera suffruticosa* (upright indigo), *Lantana camara* (lantana), *Leucaena leucocephala* (haole koa), *Melinis minutiflora* (molasses grass), *Opuntia ficus-indica* (prickly pear cactus), *Pluchea carolinensis* (sourbush), *Psidium guajava* (common guava), *Melinis repens* (Natal redtop grass), *Rubus rosifolius* (thimbleberry), *Setaria parviflora* (yellow foxtail), *Stachytarpheta* sp. (NCN), and *Verbena litoralis* (seashore vervain) (Hawaii Biodiversity and Mapping Program 2009; National Tropical Botanical Garden 2008b; Perlman 2009; Tangalin 2009; Wood 2004; Wood 2006).

Goats eat *Wilkesia hobdyi* apparently in preference to many introduced species, as indicated by the evidence at the Polihale enclosure where no plants occur outside the fence (Factor C) (Wood 2006).

An additional threat is reduced reproductive vigor as the result of limited numbers of existing individuals (Factor E) (Wood 2006). Climate change may also pose a threat to *Wilkesia hobdyi* (Factors A and E). However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

Conservation measures that have been taken for the preservation of this species include seed collection, propagation, and outplanting. Most seed collections have been used for propagation, and approximately 100 individuals have been outplanted by the National Tropical Botanical Garden at its gardens on Kauai for genetic storage (National Tropical

Botanical Garden 2008c). In 2007, the Division of Forestry and Wildlife of the Hawaii Department of Land and Natural Resources had 100 plants of *Wilkesia hobdyi* at the Kokee Rare Plant Facility and reintroduced 89 individuals in their Kepapa Exclosure (Hawaii Department of Land and Natural Resources 2007). In 2008, 17 more individuals were outplanted at Kepapa (Hawaii Department of Land and Natural Resources 2008). Survival rates are unknown. Currently 10,000 seeds are in storage at the National Tropical Botanical Garden and it is being propagated in their nursery (National Tropical Botanical Garden 2009).

While *Wilkesia hobdyi* may appear to be increasing in the number of populations and individuals, it is unlikely that this is actually the case, and is most likely the result of increased surveys in *W. hobdyi* habitats. The pressures on the habitat quality from feral goats is considerable (Hawaii Department of Land and Natural Resources 2009) and not abating. Goats destroy vegetation causing erosion and landslides that further imperil this cliff species. The pressure from invasive introduced plants compounds the threat. Like some other cliff dwelling species from the Na Pali Coast, many of the areas in which *W. hobdyi* grows naturally are extremely difficult to access without climbing equipment. Conservation management measures such as seed collection, fencing, or control of invasive introduced plants are therefore logistically very expensive.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for the Kauai plant cluster (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Wilkesia hobdyi* is a short-lived perennial, and to be considered stable, which is the first step in recovering the species, existing populations 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 Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The interim stabilization goals for this species have been met, as 5 of 10 known populations have more than 50 mature individuals and there is an *ex situ* collection. However, all threats are not being controlled.

For the taxon to be considered for downlisting from endangered to threatened status, a total of five to seven populations should be documented on Kauai where they now occur or occurred historically. Each of these populations must be secured from threats, naturally reproducing, and increasing in number, with a minimum of 300 mature individuals per population. Each population should persist at this level for a minimum of 5 consecutive years before downlisting is considered.

The downlisting goals for this species have not been met (see Table 1), because only one of the populations has 300 mature individuals, and not all populations are secure from threats. Therefore, *Wilkesia hobdyi* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Continue collecting seed from all known populations.
- Place a portion of genetically representative seed accessions into long-term seed storage.
- Continue reintroducing individuals into protected suitable habitat within historical range.
- Fence wild populations to exclude goats, when possible, given cliff habitat.
- Control invasive introduced plants within and around exclosures, when possible.
- Resurvey known locations at regular intervals of five years or less, to obtain indications of status and trend of the populations of this species.
- Work with Hawaii Division of Forestry and Wildlife, Hawaii State Parks, and the U.S. Navy to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

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Table 1. Status of *Wilkesia hobyi* from listing through 5-year review.

Date	No. wild indivs.	No. outplanted	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
1992 (listing)	360-450	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	No
			5-7 populations with 300 mature individuals each	No
1995 (recovery plan)	420-510	20	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No
2003 (critical habitat)	406-471	Unknown	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No
2009 (5-year review)	759-809	89	All threats managed in all 5-7 populations	Partially
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No

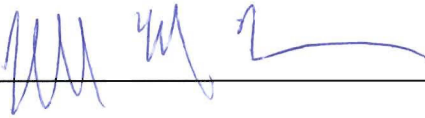
U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Wilkesia hobdyi* (dwarf iliau)

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

for **Field Supervisor, Pacific Islands Fish and Wildlife Office**



Date AUG 27 2010