

*Acaena exigua*  
(Liliwai)

**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: *Acaena exigua* (Liliwai)

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**5-YEAR REVIEW**  
***Acaena exigua*/ Liliwai**

**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:**

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**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 April 11, 2006. The National Tropical Botanical Garden provided most of the updated information on the current status of *Acaena exigua*. They also provided recommendations for conservation actions that may be needed prior to the next five-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 Federal Register (FR) Notice citation announcing initiation of this review:**

USFWS. 2006. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 70 species in Idaho, Oregon, Washington, Hawaii, and Guam; final rule. Federal Register 71(69):18345-18348.

### 1.3.2 Listing history

#### Original Listing

**FR notice:** USFWS. 1992. Determination of endangered of threatened status for 15 plants from the island of Maui, Hawaii; final rule. Federal Register 57(95):20772-20788

**Date listed:** May 15, 1992

**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. 2003a. Endangered and threatened wildlife and plants; designation of critical habitat for 60 plant species from the islands of Maui and Kahoolawe, HI; final rule. Federal Register 68(93):25934-26165.

USFWS. 2003b. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, HI; final rule. Federal Register 68(39):9116-9479.

Critical habitat was not designated for *Acaena exigua* in the designation for species from Maui and Kahoolawe (USFWS 2003a) or Kauai and Niihau (USFWS 2003b). *Acaena exigua* is historically known from Maui as well as Kauai, but because it had not been seen recently in the wild and no genetic material of this species was known to exist, designating critical habitat was not determined to be prudent for this species (USFWS 2003a and b).

### 1.3.4 Review History:

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

Declining

#### **Recovery achieved:**

1 (0-25%) (FY 2008 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:** Recovery plan for the Maui plant cluster (Hawaii). 1997. U.S. Fish and Wildlife Service, Portland, Oregon. 130 pages + appendices.

**Date issued:** July 29, 1997

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 criteria?**

*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 (Factors 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 Maui plant cluster (USFWS 1997), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Acaena exigua* is a short-lived perennial, and to be considered stable, this species must be managed to control threats (*e.g.*, fenced and weeds controlled) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on the islands of Maui and Kauai where the species now occurs or occurred historically. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Acaena exigua* should be documented on the islands of Maui and Kauai where it now occurs or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 300 mature individuals per population. 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.

For delisting, a total of eight to ten populations of *Acaena exigua* should be documented on the islands of Maui and Kauai where it now occurs or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 mature individuals per population for short-lived perennials. Each population should persist at this level for a minimum of five consecutive years before delisting is considered.

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 is summarized in section 2.4 ("Synthesis") below, which also includes any new information about the status and threats of the species.

**Table 1. Status of *Acaena exigua* (Liliwai) from listing through 5-year review.**

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1992 (listing)	0	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1997 (recovery plan)	0	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	0	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2009 (5-year review)	0	0	All threats managed	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No

### 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:

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**

The historical range of *Acaena exigua* was Puu Kukui on West Maui and Waialeale on Kauai (Wagner *et al.* 1999; Hawaii Biodiversity and Mapping Program 2005). No individuals of this species were known to exist at the time listing package (1991) or recovery plan (1997) were published, but suitable habitat within historical range still exists. *Acaena exigua* is a small sized perennial plant and is very difficult to survey because of its diminutive stature and the large area of intact habitat with dense growth (Oppenheimer *et al.* 2002). Since the species was found in 1997 at Puu Kukui Summit at West Maui and was seen again in 1998 and 1999 (Oppenheimer *et al.* 2002), and suitable habitat on the summits of Kauai and West Maui exist, the species most likely still exists in the wild (Wood 2005). *Acaena exigua* was rediscovered in 1997 at Puu Kukui, when one individual was found growing in *Metrosideros* (ohia lehua)-*Oreobulus* (NCN) wet montane bog, but this individual died in 2000 (Oppenheimer *et al.* 2002). The area of suitable habitat and historical range is larger than the area where it was last seen (H. Oppenheimer, Plant Extinction Prevention Program, pers. comm. 2006).

The major threats at that time of listing were habitat degradation by feral pigs (Factors A and D) (USFWS 1992). The recovery plan also noted additional threats, including: invasive introduced plants like *Juncus planifolius* (rush) (Factor E), small population size (Factor E), human impacts (just walking in its habitat can cause damage) (Factor E), and possible herbivory by rats and slugs (Factor C) (USFWS 1997). Existing enclosure fences at the Waialeale summit bogs protect some potential habitat for *A. exigua* which is also under periodic control of invasive introduced plants (Bruegmann 2006). This area is also within the Kauai Watershed Alliance. Incipient invasive plant control is ongoing in the area, and strategic fencing is planned to limit pig access to the Alakai Plateau, including Waialeale (Kauai Watershed Alliance 2005 and 2007). No permanent fencing has been constructed at Puu Kukui, although temporary short strategic fences have been used to take advantage of natural barriers to exclude ungulates (H. Oppenheimer, pers. comm. 2006). Maui Pineapple Company, Ltd. has worked to reduce the habitat degradation by ungulates and competition with and habitat degradation by invasive introduced plants (Maui Pineapple Company, Ltd. 1999; West Maui Mountains Watershed Partnership 2005). The West Maui location where *Acaena exigua* was last seen is now protected from trampling by hikers by a two mile boardwalk completed in 2005. Access is limited by the landowner, which also limits the transmission of additional invasive plants (H. Oppenheimer, pers. comm. 2006).

The specific causes of the extirpation of the two known populations are unknown but are likely due to one or more of the aforementioned threats. *Acaena exigua* is currently endangered by feral pigs (Factors A and D) at both historical locations and by goats (Factors A and D) at Waialeale that may trample individual plants as well as degrade habitat; habitat degradation by and competition with introduced invasive plants such as *Juncus planifolius* (rush), *J. effusus* (Japanese mat rush), *Tibouchina herbacea* (glorybush), *Hypochaeris radicata* (hairy cat's-ear), *Ageratina adenophora* (Maui mapakani), *Ageratina riparia* (Hamakua pamakani) and *Axonopus fissifolius* (narrow-leaved carpetgrass) that invade bare ground dug up by goats and pigs (Factor E); and slugs and rats that feed on seedlings (Factor C) (Wood 2006; Perlman 2006; H. Oppenheimer, pers. comm. 2006). The presence of black rat, European slug, leopard snail, and another unspecified species of slug may have some effect on regeneration (Oppenheimer *et al.* 2002; Wood 2006; Perlman 2006). Other possible causes for the extirpation of this species, alone or in conjunction, are loss of pollinators, dispersal agents, disease, inbreeding depression, droughts, rare frost episodes (Factor E) (Oppenheimer *et al.* 2002; R. Bartlett, Maui Pineapple Company, pers. comm. 2006).

An attempt to collect seed from this individual in 1998 was unsuccessful (R. Bartlett, pers. comm. 2006).

This species has been rediscovered more than once in the last 135 years, after intervals of many decades, and suitable habitat still exists within historical range, indicating that *Acaena exigua* still exists. The stabilization and recovery goals for this species have not been met (see Table 1); therefore, *A. exigua* meets the definition of endangered as it remains in danger of extinction throughout its range.

### 3.0 RESULTS

#### 3.3 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

- Conduct further surveys in the Puu Kukui Watershed and the Alakai Swamp area around Waialeale.
- When additional plants are found, research which threats, such as lack of pollinators, introduced slugs, rodents or disease, are limiting factors to the survival of this species.
- When new seed or cuttings are obtained, propagate *Acaena exigua* reintroduction and genetic storage.
- Research potential control methods for slugs.

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**Personal and Written Communications:**

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Oppenheimer, Hank. 2006. Maui Nui Coordinator, Plant Extinction Prevention Program, June 13, 2006.

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**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Acaena exigua* (Liliwai)**

**Current Classification:** \_\_\_\_\_ E \_\_\_\_\_

**Recommendation resulting from the 5-Year Review:**

- \_\_\_\_\_ Downlist to Threatened
- \_\_\_\_\_ Uplist to Endangered
- \_\_\_\_\_ Delist
- X   No change needed

**Appropriate Listing/Reclassification Priority Number, if applicable:** \_\_\_\_\_

**Review Conducted By:**

Christian Torres-Santana, Student Trainee Biologist  
Marie Bruegmann, Plant Recovery Coordinator  
Marilet A. Zablan, Recovery Program Leader and acting Assistant Field  
Supervisor for Endangered Species  
Gina Shultz, Deputy Field Supervisor

Approved:  \_\_\_\_\_ Date 29 July 2009

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