

*Lysimachia filifolia*  
(No common name)

**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: *Lysimachia filifolia* (No common name)

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**5-YEAR REVIEW**  
***Lysimachia filifolia*/ No common name**

**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:**

Pacific Islands Fish and Wildlife Office, Gina Shultz, Deputy Field Supervisor,  
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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 March 8, 2007. The Bernice P. Bishop Museum provided most of the updated information on the current status of *Lysimachia filifolia*. 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. 2007. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 71 species in Oregon, Hawaii, Commonwealth of the Northern Mariana Islands, and Territory of Guam. Federal Register 72(45):10547-10550.

### 1.3.2 Listing history

#### Original Listing

**FR notice:** USFWS. 1994. Endangered and threatened wildlife and plants; determination of endangered or threatened status for 24 plants from the island of Kauai, HI; final rule. Federal Register 59(38):9304-9329.

**Date listed:** February 24, 1994

**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; 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.

USFWS. 2003b. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 101 plant species from the island of Oahu, HI; final rule. Federal Register 68(116):35949-35998.

Critical habitat was designated for *Lysimachia filifolia* in one unit totaling 995 hectares (2,458 acres) on Oahu and one unit totaling 1,512 hectares (3,734 acres) on Kauai. This designation includes habitat on State, Federal and private lands (USFWS 2003a, b).

### 1.3.4 Review History:

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

#### **Recovery achieved:**

1 (0-25%) (FY 2008 Recovery Data Call)

### 1.3.5 Species' Recovery Priority Number at start of this 5-year review:

2

### 1.3.6 Current Recovery Plan or Outline

**Name of plan or outline:** Recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 270 pages.

**Date issued:** September 20, 1995.

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, D, and E) affecting this species is presented in section 2.4. Factor B (overutilization for commercial, recreational, scientific, or educational purposes) and Factor C (disease or predation) are not known to be a threat to this species.

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. *Lysimachia filifolia* is a short-lived perennial, and to be considered stable, the taxon must be managed to control threats (*e.g.*, fenced, weeding, etc.) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on islands where they now occur 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 been partially met.

For downlisting, a total of five to seven populations of *Lysimachia filifolia* should be documented on islands where they now occur 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 *Lysimachia filifolia* should be documented on islands where they now occur 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 was included in the final critical habitat rule referenced above in section 1.3.3 (“Associated Rulemakings”) and in section 2.4 (“Synthesis”) below, which also includes any new information about the status and threats of the species.

**Table 1. Status of *Lysimachia filifolia* from listing through 5-year review.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Downlisting Criteria identified in Recovery Plan</b>	<b>Downlisting Criteria Completed?</b>
1994 (listing)	226-276	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Partially
1995 (recovery plan)	170-275	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2003 (critical habitat)	180-230	unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2008 (5-year review)	> 155	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

**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**

*Lysimachia filifolia* was first collected from upper Olokele Valley on Kauai in 1912 and was not seen again on the island until a population was discovered in 1987 in the Blue Hole area of Waialeale, at the head of the north fork of Wailua River. On Oahu, the species was first known from Waiahole Valley in the windward Koolau Mountains. At the time *Lysimachia filifolia* was federally listed, it was known from



two isolated populations; one in the Blue Hole on Kauai and the other in Waiahole Valley on Oahu. The population in the Blue Hole consisted of approximately 76 individuals and the population in Waiahole Valley consisted of approximately 150 to 200 individuals, both occurring on State-owned land (USFWS 1994, 1995). Marr and Bohm (1997) published a taxonomic revision that described the population from Blue Hole as a new species, *L. pendens* (see discussion on taxonomy below). The critical habitat designation reports approximately 160 individuals in Waiahole Valley on Oahu (USFWS 2003b) and 20 to 70 individuals in the Blue Hole in the Lihue-Koloa Forest Reserve on Kauai (USFWS 2003a).

Most recently, the Oahu Plant Extinction Prevention Program reports two extant populations on Oahu, on vertical waterfall faces in Waianu and Waiahole Valleys. The Waianu population consists of more than 25 plants on a single waterfall face. The Waiahole population includes approximately 100 individuals on five separate waterfall faces (Plant Extinction Prevention Program 2008; USFWS 2008). In January 2008, botanist Ken Wood rediscovered *L. filifolia* on Kauai. The locality is in Wailua, below Kamanu Ridge in the headwaters of Waikoko, in *Metrosideros* (ohia) wet forest associated with wet cliff communities. The population of about 30 plants was located at the margin of a recent landslide (K. Wood, National Tropical Botanical Garden, pers. comm. 2008). The extant range of the species, reduced to Oahu when the Blue Hole, Kauai population was described as *L. pendens* (Marr and Bohm 1997), has now been restored to Kauai and Oahu with the recent rediscovery of *L. filifolia* on Kauai.

Harold St. John (1987) described a new *Lysimachia* species from Oahu, *L. funkiae*, but Wagner *et al.* (1999) and Marr and Bohm (1997) reduced it to synonymy with *L. filifolia*. St. John (1987) also described a much older *Lysimachia* specimen, collected in Waiahole in 1926, naming it *L. waiaholeensis* (Marr and Bohm 1997; Hawaii Mapping and Biodiversity Program 2007). This name was also reduced to synonymy under *L. filifolia* in Marr and Bohm's taxonomic revision (1997).

The taxonomic revision of the endemic Hawaiian *Lysimachia* species also describes a new species from Kauai, *L. pendens*. This narrow-leaved species is restricted to the headwaters of the north fork of Wailua River known as the Blue Hole and is the same population that at the time of its discovery in 1987 was called the rediscovery of *L. filifolia* on Kauai. *Lysimachia pendens* is distinguished from *L. filifolia* by its broader leaves (2 to 4 millimeters versus 0.5 to 1.2 millimeters) and tomentose (hairy) leaves, stems, and pedicels (flower stalks) (Marr and Bohm 1997). An allozyme variation study of Hawaiian *Lysimachia* by Marr and Bohm (1999) found that results confirmed a genetic distinction between *L. pendens* and *L. filifolia*, validating the decision (Marr and Bohm 1997) to separate out the Blue Hole population (*L. pendens*) as a similar but distinct species from *L. filifolia*.

Specimen vouchers at Bernice P. Bishop Museum noted *L. filifolia* flowering and fruiting in January and June, based on the limited vouchers available (C. Imada, Bernice P. Bishop Museum, pers. comm. 2008).

The primary threats to *Lysimachia filifolia* on Kauai are habitat degradation by feral pigs (*Sus scrofa*) (Factors A and D), and competition with introduced invasive plant species such as *Buddleia asiatica* (dog tail) and *Erigeron karvinskianus* (daisy fleabane) (Factor E). The primary threats for this species on Oahu are habitat degradation by feral pigs (Factors A and D), and competition with introduced invasive plant species such as *Ageratina riparia* (Hamakua pamakani), *Blechnum appendiculatum* (hammock fern), *Cordyline fruticosa* (ti), *Pluchea* sp. (sourbush), and *Schefflera actinophylla* (octopus tree) (Factor E) (USFWS 1994, 1995, 2003b, 2008; K. Wood, pers. comm. 2008). The species is also threatened by landslides (K. Wood, National Tropical Botanical Garden, pers. comm. 2008).

To safeguard existing genetic material, propagation for genetic storage and reintroduction is occurring at various institutions. The National Tropical Botanical Garden (2008) houses seeds of *Lysimachia filifolia*, Lyon Arboretum Micropropagation Laboratory has 33 cuttings of this species from Kauai, and Pahole Rare Plant Facility has 10 mature plants from an unknown population (Plant Extinction Prevention Program 2008). The Center for Conservation Research and Training Seed Storage Laboratory (2008) houses 66 seeds in storage from plants in the Pahole Rare Plant Facility.

The stabilization goals for this species have not been met as only one population has more than 50 mature individuals and none of the threats are being managed (see Table 1). Therefore, *Lysimachia filifolia* 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**

- Continue collection of fruit and plant material for genetic storage.
- Construct enclosure fences to protect individuals from the adverse impacts of feral ungulates and eradicate invasive introduced plant species within the enclosures.
- Establish *ex situ* populations within protected habitat.
- Augment current natural populations with appropriate genetic individuals.
- Survey geographical and historical range and other potentially suitable habitat for a thorough current assessment of *Lysimachia filifolia* and *L. repens*.
- Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Assess genetic variability within extant populations, especially differences between *Lysimachia filifolia* and *L. repens* and whether they are both valid species.
- Study *Lysimachia filifolia* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.
- Update the listed entity to match the currently recognized taxonomy.

#### **5.0 REFERENCES**

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[USFWS] U.S. Fish and Wildlife Service. 1995. Recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, OR. 270 pages.

[USFWS] U.S. Fish and Wildlife Service. 2003a. 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.

[USFWS] U.S. Fish and Wildlife Service. 2003b. Endangered and threatened wildlife and plants; final designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, HI; final rule. *Federal Register* 68(116): 35950-36406.

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Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1999. Manual of the flowering plants of Hawaii, Revised Edition. University of Hawaii Press, Bishop Museum Press, Special Publication. 97:1-1918.

**Personal communication:**

Imada, Clyde. Research Specialist, Bernice P. Bishop Museum. Email communication to Christian Torres-Santana (USFWS) on June 30, 2008.

Wood, Ken. Research Botanist, National Tropical Botanical Garden. Personal communication, June 2008.

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**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Lysimachia filifolia* (No common name)**

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

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

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

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

**Review Conducted By:**

Christian Torres-Santana, Student Trainee Biologist  
Marie Brueggemann, Plant Recovery Coordinator  
Marilet A. Zablan, Recovery Program Leader and acting Assistant Field  
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Approved  Date 21 July 2009  
**Acting Field Supervisor, Pacific Islands Fish and Wildlife Office**