5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Lysimachia filifolia* (no common name)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 58 species in Washington, Oregon, California, and Hawaii. Federal Register 75(226):71726-71729.

Lead Region/Field Office:

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

Name of Reviewer(s):

Michelle Clark, Partners Biologist, PIFWO

Daniel Clark, Oahu, Kauai, Northwest Hawaiian and American Samoa Islands Team Manager, PIFWO

Marie Bruegmann, Plant Recovery Coordinator, PIFWO

Recovery Program Lead, PIFWO

Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

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 January 31, 2012. The review was based on a review of current, available information since the last 5-year review for *Lysimachia filifolia* (USFWS 2009). The National Tropical Botanical Garden provided an initial draft of portions of the five-year review and recommendations for conservation actions needed prior to the next five-year review. The document was reviewed by the Plant Biologist, Islands Team Manager, and Plant Recovery Coordinator, followed by the Recovery Program Lead. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

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).

Review Analysis:

Please refer to the previous 5-year review for *Lysimachia filifolia* published on July 21, 2009 (available at http://ecos.fws.gov/docs/five_year_review/doc2451.pdf) for a complete review of the species' status, threats, and management efforts. No new significant information regarding the species biological status has come to light since listing to warrant a change in the Federal listing status of *Lysimachia filifolia.*

This short-lived shrub is endangered and occurs on the islands of Oahu and Kauai. The current status and trends for *L. filifolia* are provided in the tables below.

New status information:

- On Kauai, about 30 individuals of *Lysimachia filifolia* were rediscoverd in 2008 at Kamanu Ridge at the headwaters of Waikoko Stream. The last time it was observed on Kauai was in 1912 by Lydgate in upper Olokele below the Kawaikini summit. The plants of *L. filifolia* on Kauai can be erect up to 1.5 meters (5 feet) tall, as compared to the Oahu plants which are smaller, more delicate, and only known to be pendulous (Wood 2012).
- On Oahu, the Waiahole population has declined from approximately 100 individuals in the last five-year review to 50 individuals. A new population of ten individuals was observed in Uwao (Uau) Gulch (Susan Ching, Plant Extinction Prevention Program, pers. comms. 2012a, b, c). The status of the Waianu population was not reported.

Overall, the species has been rediscovered on Kauai but has declined on Oahu from greater than 155 individuals reported in the last five-year review to a maximum of 85 individuals in 2012, if the Waianu population has remained stable.

New threats:
Climate change – Climate change may pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) funded climate modeling that will help resolve these spatial limitations. High spatial resolution climate outputs are expected in 2013.

New management actions:

- Genetic research - Samples of plants from both Oahu and Kauai populations of *Lysimachia filifolia* have been sent to the University of Hawaii, Department of Botany for comparative genetic analysis, as the growth habit of individuals from the two islands differs markedly (W. Kishida, pers. comm. 2012; C. Morden pers. comm. 2012).
- Surveys / inventories - Surveying on Oahu resulted in the discovery of a new population of *Lysimachia filifolia* in Uwao (S. Ching, pers. comm. 2012a, b, c).
- Captive propagation and genetic storage
    - Lyon Arboretum Micropropagation Laboratory has a total 115 plants of *Lysimachia filifolia* from the Waiahole populations in micropropagation storage (Harold L. Lyon Arboretum 2012).
    - Pahole Rare Plant Facility (2011) has eight *Lysimachia filifolia* plants from Oahu in the nursery.
    - The National Tropical Botanical Garden (NTBG) has 32 *Lysimachia filifolia* plants from the Oahu Waiahole population (NTBG 2012). They also have 200 *L. filifolia* seeds in storage, which were collected from the Waiahole populations in 1990 (M. Clark, NTBG, pers. comm. 2012). NTBG is cultivating the Kauai population from Kamanu Ridge and genetic work is being conducted by Cliff Morden of the University of Hawaii to determine if

the Oahu and Kauai populations are genetically distinct (Wendy Kishida, Plant Extinction Prevention Program, pers. comm., 2013).

Synthesis:
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 ten 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.

The stabilization goals for this species have not been met, as only one population of 50 or more mature individuals exists (Table 1) and all threats are not being managed sufficiently throughout all of the populations (Table 2). Therefore, *Lysimachia filifolia* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Captive propagation for genetic storage and reintroduction - Continue collecting material for genetic storage and propagation for reintroduction. Investigate new propagation methods.
- Invertebrate control research - Investigate insect predation and appropriate control methods.
- Ungulate exclosures - Fence remaining populations to protect them from the impacts of feral ungulates.
- Ecosystem-altering invasive plant species control - Remove competing invasive introduced plant species within fenced areas and maintain those areas free of invasive introduced plants.
- Fire protection – Develop and implement fire prevention plans for vulnerable populations.
- Population biology research
    - Continue to implement genetic studies to assess viability of remaining populations.
    - Investigate causes of reproductive failure and techniques to improve natural recruitment.
- Surveys / inventories - Survey current and historical locations on all islands to determine current status of the rangewide.
- Alliance and partnership development - Initiate planning and contribute to implementation of ecosystem level restoration and management to benefit this taxon.

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

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1994 (listing)	226-276	0	All threats managed in 3 populations	No
			Complete genetic storage	No
			3populations with 50 mature individuals each	Partially
1995 (recovery plan)	170-275	0	All threats managed in 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 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2009 (5-yr review)	>155	0	All threats managed in 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially
2013 (5-yr review)	Oahu: 60; Kauai 30	0	All threats managed in 3 populations	No (Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

Table 2. Status of threats to *Lysimachia filifolia* from listing through current 5-year review.)

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Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – pigs degrade habitat	A, D	Ongoing	Partially
Invasive introduced plants	A, E	Ongoing	Partially
Landslides	A, E	Ongoing	None
Climate change	A, E	Increasing	None

References:

See previous 5-year review for a full list of references (USFWS 2009). Only references for new information are provided below.

Harold L. Lyon Arboretum. 2012. Micropropagation database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

National Tropical Botanical Garden. 2012. Nursery inventory control system. 1 page. Unpublished.

Pahole Rare Plant Facility. 2011. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 15 pages. Unpublished.

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

[USFWS] U.S. Fish and Wildlife Service. 2009. Lysimachia filifolia (no common name) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 13 pages. Available online at http://ecos.fws.gov/docs/five_year_review/doc2451.pdf.

Wood, K.R. 2012. Possible extinctions, rediscoveries, and new plant records within the Hawaiian Islands. Bishop Museum Occasional Papers 113:91-102.

Personal Communications:

Ching, Susan. 2012a Oahu Coordinator, Plant Extinction Prevention Program. E-mail to Margaret Clark, National Tropical Botanical Garden, dated October 15, 2012. Subject: Five year review data needed.

Ching, Susan. 2012b. Oahu Coordinator, Plant Extinction Prevention Program. E-mail to Margaret Clark, National Tropical Botanical Garden, dated November 26, 2012. Subject: Lys_fil.

Ching, Susan. 2012c. Oahu Coordinator, Plant Extinction Prevention Program. E-mail to Margaret Clark, National Tropical Botanical Garden, dated November 28, 2012.Subject: Lys_fil2.

Clark, Margaret. 2012. Seed Bank Manager, National Tropical Botanical Garden. Note to the record, dated November 28, 2012. Subject: Seed inventory, *Lysimachia filifolia*.

Kishida, Wendy. 2012. Kauai Coordinator, Plant Extinction Prevention Program. E-mail to Margaret Clark, National Tropical Botanical Garden, dated August 15, 2012. Subject: RE: *Lysimachia filifolia*.

Kishida, Wendy. 2013. Kauai Coordiantor, Plant Extinction Prevention Program. E-mail to Michelle Clark, Pacific Islands Fish and Wildlife Office, dated July 23, 2013. Subject: Blue Hole Fence.

Morden, Cliff. 2012. Department of Botany, University of Hawaii. E-mail to Margaret Clark, National Tropical Botanical Garden, dated October 30, 2012. Subject: *Lysimachia filifolia*.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Lysimachia filifolia* (no common name)

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
__X__ No Change in listing status

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