5-YEAR REVIEW

Short Form Summary

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

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2020. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 129 Species in Oregon, Washington, Idaho, Hawaii, Montana, California, and Nevada. Federal Register 85(48): 14240–14243, March 11, 2020.

Lead Region/Field Office:

Interior Region 12/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

Name of Reviewer:

Cheryl Phillipson, Biologist, PIFWO
Lauren Weisenberger, Plant Recovery Coordinator, PIFWO
Megan Laut, Conservation & Restoration Team Manager, PIFWO

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (Service or USFWS) beginning in October 2021. The review was based on a review of current, available information since the last 5-year review for *Lysimachia venosa* (USFWS 2017). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Conservation and Restoration Team Manager.

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 (*https://ecos.fws.gov/ecp/species/3190*).

Review Analysis:

Please refer to the previous 5-year review for *Lysimachia venosa* published in the Federal Register on September 16, 2017 (available at*://ecos.fws.gov/docs/tess/species_nonpublish/2468.pdf*) for a complete review of the species' status, threats, management efforts, and references cited. We are not aware of any significant new information regarding the species' biological status since listing to warrant a change in the Federal listing status of *L. venosa*.

This short-lived perennial shrub in the Primulaceae (primrose) family is listed as endangered and is known from the island of Kaua‘i. The status and trends for the two subspecies of *Lysimachia venosa* are provided in the tables below.

New Status Information:

- The single population at Kawaikini has not been surveyed since 2014 when there were 50 mature and 10 immature individuals, and seedlings observed (Perlman and Wood 2014).

New Threats:

- None reported.

New Management Actions:

- Surveys and inventories—The Plant Extinction Prevention Program (PEPP) and the National Tropical Botanical Garden (NTBG) monitor populations of *Lysimachia venosa* on Kaua‘i (Kishida and Perlman 2017; Perlman and Wood 2014).
- Captive propagation for genetic storage and reintroduction— There are 260 seeds in storage at the National Tropical Botanical Garden representing a sngle founder from Kawaikini (NTBG 2021).
- Reintroduction and augmentation—In 2017, PEPP and NTBG monitored a reintroduced population of five individuals of *L. venosa* at Kanaele Bog and found one surviving individual (Kishida and Perlman 2017).

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

Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2010 (listing and critical habitat)	Unknown	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2017 (5-year review)	122	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	Unknown
			3 populations with 50 mature individuals each	Partially

2022 (5-year review)	60	5, 1 surviving	All threats managed in all 3 populations	Partially, 1 reintroduced population in exclosure
			Complete genetic storage	Partially, one founder
			Natural reproduction at all 3 populations	Partially, seedlings observed at one location
			3 populations with 50 mature individuals each	No

* The Preventing Extinction Stage was established in 2011. Prior to 2011, the Interim Stabilization Stage was the first stage towards recovery (now it is the second stage after Preventing Extinction).

Table 2. Threats to *Lysimachia venosa* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Degradation and destruction of habitat and herbivory by feral ungulates	A, C	Ongoing	Partial, 1 reintroduced population in exclosure
Established ecosystem altering invasive plant species degradation of habitat and competition	A, E	Ongoing	Partial, small exclosure is managed
Landslide and flooding destruction or degradation of habitat	A	Ongoing	None
Climate change degradation and destruction of habitat, including hurricanes	A	Ongoing	None
Rodent predation and herbivory	C	Ongoing	None
Inadequacy of existing regulatory mechanisms—lack of adequate hunting and biosecurity legislation	D	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, propagation and reintroduction

Synthesis:
Currently, there are approximately 60 wild individuals of *Lysimachia venosa* at one location on Kauaʻi, though the population has not been visited since 2014. There are no

recently reported collections or propagules; however, one individual is secured in *ex situ* seed storage and five individuals were reintroduced within an exclosure with one currently surviving.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Kauaʻi Islandwide Recovery Plan (USFWS 2021) and have been updated according to the draft revised recovery objective guidelines developed by the Hawaiʻi and Pacific Plants Recovery Coordinating Committee (HPPRCC 2011). The HPPRCC identifies an additional initial objective, the Preventing Extinction Stage, in addition to the Interim Stabilization, Delisting, and Downlisting objectives. Furthermore, life history traits such as breeding system, population size fluctuation or decline, and reproduction type (sexual or vegetative), have been included in the calculation of goals for the number of populations and reproducing individuals for each stage. The goals for each stage remain grouped by life span defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

Lysimachia venosa is a short-lived perennial shrub. To prevent extinction, which is the first milestone in recovering the species, the taxon must be managed to control threats (e.g., fenced) and have 50 individuals (or the total number of individuals if fewer than 50 exist) from each of three populations represented in *ex situ* (secured off-site, such as a nursery or seed bank) collections that are well managed. In addition, a minimum of a total of three populations should be documented on Kauaʻi where this species now occurs or occurred historically and each of these populations must be naturally reproducing (i.e., viable seeds, seedlings) with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for *Lysimachia venosa* have not been met. There are 60 wild individuals in a single population (Table 1). Collections of seeds and propagules has not been reported since one founder was represented in 2014 (Table 1, Table 2). Five individuals were reintroduced into an exclosure with one individual currently surviving. The populations are susceptible to threats, including ungulate and rodent predation, nonnative plant competition, and landslides. Therefore, *L. venosa* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:
No new threats and no significant new information regarding the species' biological status have been reported since the last 5-year review in 2017. Thus, the following recommendations for future actions are reiterated or updated for the 5-year review for 2022.

- Surveys and inventories—Continue to survey for populations of *Lysimachia venosa* in areas of potentially suitable habitat and monitor known populations to determine their current status.
- Ungulate monitoring and control—Continue to construct and maintain exclosures and strategic fencing to protect all occurrences from habitat disturbance and herbivory by feral ungulates.

- Nonnative invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species and those that compete with *L. venosa* at all populations.
- Climate change adaptation strategy—Research suitability of habitat for viability of species, including where to conduct translocations in the future due to impacts of climate change.
- Rodent control—Implement effective control measures for rats at all populations.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock.
- Reintroduction and augmentation—Continue to reintroduce individuals into protected suitable habitat within historic range that is being managed for known threats to this species.
- Build resiliency and redundancy—Increase numbers of individuals and populations through historic range to reduce impacts of landslides and hurricanes and from low numbers.
- Alliance and partnership development—Continue to work with partners and other land managers in planning and implementation of ecosystem-level restoration and management to benefit this species.

References:

[HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

Kishida, W. and S. Perlman. 2017. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Lysimachia venosa*, Pacific Islands Fish and Wildlife Office.

[NTBG] National Tropical Botanical Garden. 2021. Report on controlled propagation of listed species, as designated under the U.S. Endangered Species Act. Unpublished report submitted to the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, Hawai‘i.

Perlman, S. and K. Wood. 2014. Hawai‘i Rare Plant Restoration Group (HRPRG) Field Data Form *in* PEPP 2019: Plant Extinction Prevention Program, FY 2019 Annual Report (Oct 1, 2018-Sep 30, 2019), USFWS CFDA Program #15.657, Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F18AC00502, December 26, 2019, UH Mānoa, PCSU, PEPP. 192 pp. + appendices. BioPacifica database record for *Lysimachia venosa*, Pacific Islands Fish and Wildlife Office.

[USFWS] 2017. *Lysimachia venosa* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/tess/species_nonpublish/2468.pdf*.

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[USFWS] 2021. Kaua‘i Islandwide Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 65 pp. + appendices.

Walsh, S. 2015. *Lysimachia venosa*. The IUCN Red List of Threatened Species 2015:e.T80233182A80233256. *http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T80233182A80233256.en*.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Lysimachia venosa*
(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

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

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