

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Lipochaeta micrantha* (nehe)

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 *Lipochaeta micrantha* (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/1280>).

Review Analysis:

Please refer to the previous 5-year reviews for *Lipochaeta micrantha* published in the Federal Register on August 28, 2012, and September 16, 2017 (available at https://ecos.fws.gov/docs/tess/species_nonpublish/1981.pdf and https://ecos.fws.gov/docs/tess/species_nonpublish/2470.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. micrantha*.

This short-lived perennial herb in the Asteraceae (sunflower) family is listed as endangered and is known from the island of Kaua‘i. The status and trends for the two subspecies of *Lipochaeta micrantha* are provided in the tables below.

New Status Information:

- In 2016, there were only seven individuals of *Lipochaeta micrantha* var. *micrantha* on Kaua‘i (Clark 2016). Two sites were visited in 2018 where the plants were observed (Plant Extinction Prevention Program [PEPP] 2018; Kaua‘i Plant Extinction Prevention Program [PEPP] 2021). The occurrence of *L. micrantha* ssp. *exigua* has not been observed since 1990. In 2020, a survey conducted in the area of the last known occurrence did not locate any individuals (Wood 2020, p. 1).
- In 2012 and 2016, the Service recognized the change in the genus for two species of *Lipochaeta* (*Lipochaeta tenuifolia* and *L. kamolensis*) to *Melanthera* (77 FR 57648, September 18, 2012; 81 FR 17790, March 30, 2016). The Service recommended making this taxonomic change for *Lipochaeta micrantha* in the 2017 5-year review. A study by Orchard (2013, pp. 338, 388) transferred *Lipochaeta micrantha* to *Wollastonia micrantha* based on geographical range and morphological characteristics, thereby changing these two subspecies to *Wollastonia micrantha* ssp. *exigua* and *W. micrantha* ssp. *micrantha*. However, later research suggested that this species should retain the genus *Lipochaeta* (Edwards et al. 2018). The change from *Lipochaeta* to *Wollastonia* was recently accepted on the Smithsonian’s Hawaiian Flora Checklist (2022, <https://naturalhistory2.si.edu/botany/hawaiianflora/>) pending publication of a new supplement to the Manual of the Flowering Plants of Hawai‘i (Wagner 2021, in litt.). The Service will await publication before recommending a technical revision to 50 CFR 17.12.

New Threats:

- None reported.

New Management Actions:

- Surveys and inventories—In 2020, a survey of an area where *Lipochaeta micrantha* var. *exigua* was known to occur was conducted; however, no plants were found (Wood 2020, p. 1).
- Collection and propagation—
 - In 2019, the National Tropical Botanical Garden (NTBG) reported collection and storage of 31 seeds representing at least one founder of *L. micrantha* var. *micrantha* from Koai‘e; propagation of seven plants, and addition of two plants to Limahuli garden (NTBG 2019). In 2020, a first-generation plant (Koai‘e sourced) from an enclosure produced two plants now stored in the nursery, with 12 first-generation individuals planted in a living collection at Limahuli garden (NTBG 2020, 2021).
 - In 2018, the Waimea Arboretum reported propagation and storage of eight individuals representing one founder of *L. micrantha* var. *micrantha* from Koai‘e (Waimea Arboretum 2018).
 - *Lipochaeta micrantha* var. *exigua* was last observed in 1990 and is possibly extinct (Wood 2020, p. 1). There are no genetic materials in storage or in propagation.

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

Date	No. wild individuals	No. outplanted	Stability Criteria as identified by HPPRCC	Stability Criteria Completed?
1994 (listing)	var. <i>exigua</i> 100–500 var. <i>micrantha</i> 150–570	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1995 (recovery plan)	var. <i>exigua</i> 100–500 var. <i>micrantha</i> 150–570	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	var. <i>exigua</i> 110 var. <i>micrantha</i> 121	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2012 (5-year review)	var. <i>exigua</i> 100–500 var. <i>micrantha</i> 150–570	0	All threats managed in all 3 populations	No

			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2017 (5-year review)	var. <i>exigua</i> 0 var. <i>micrantha</i> 7	1	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 100 mature individuals each	No
2022 (5-year review)	var. <i>exigua</i> 0 var. <i>micrantha</i> 7	0	All threats managed in all 3 populations	Partially, 1 reintroduced population fenced
			Complete genetic storage	Partially, seed collections and propagation
			Natural reproduction at all 3 populations	No
			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 *Lipochaeta micrantha* 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, 2 populations in exclosures at Piwa and Lapa
Established ecosystem altering invasive plant species degradation of habitat and competition	A, E	Ongoing	Partial, 2 populations in exclosures at Piwa and Lapa
Destruction and degradation by landslides	A	Ongoing	None
Destruction and degradation by fire	A	Ongoing	None
Climate change degradation and destruction of habitat, including hurricanes	A	Ongoing	None
Reduced viability due to low numbers	E	Ongoing	Partial, seed collection and propagation

Synthesis:

Currently, there are seven wild individuals of *Lipochaeta micrantha* var. *micrantha* on Kaua‘i. No individuals of *L. micrantha* var. *exigua* were found on a survey of the area of the last known occurrence in 2020. More than 30 seeds are in storage and 17 plants representing founders from Koai‘e are in storage in two plant nurseries. Fourteen plants are in a living collection. Two areas have small exclosures to protect wild plants from feral ungulates.

Stabilizing (interim), downlisting, and delisting objectives are provided in the Kaua‘i Islandwide Recovery Plan (USFWS 2021) and have been updated according to the draft revised recovery objective guidelines developed by the Hawai‘i 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.

Lipochaeta micrantha is a short-lived perennial herb. 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 Kaua‘i 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 *Lipochaeta micrantha* have not been met. Populations are rapidly declining and there are only seven wild individuals remaining in widely separated areas of var. *micrantha*; while there are currently no known individuals of var. *exigua* (Table 1). Seed collection and propagation are ongoing with plants in a living collection (Table 1, Table 2). Two small areas with wild individuals are fenced and managed. However, other threats, including landslides and the effects of hurricanes, are not managed. Therefore, *L. micrantha* 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 both subspecies of *Lipochaeta micrantha* 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 to protect all occurrences from habitat disturbance and herbivory by feral ungulates.
- Nonnative invasive plant monitoring and control—Continue to control established ecosystem-altering nonnative invasive plant species and those that compete with *L. micrantha* 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.
- Captive propagation for genetic storage and reintroduction—Continue collection of seeds and propagative materials for storage, propagation, and for maintenance of genetic stock.
- Reintroduction and augmentation—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 hurricanes and landslides.
- Population biology and genetic research—Study *L. micrantha* populations to determine viable population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal mechanisms, longevity, specific environmental requirements, limiting factors, and threats.

- 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:

- Edwards, R.D., J.T. Cantley, M.M. Chau, S.C. Keeley, and V.A. Funk. 2018. Biogeography and relationships within the *Melanthera* alliance: a pan-tropical lineage (Compositae: Heliantheae: Ecliptinae). *Taxon* 67(3): 552-564.
- [HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.
- [NTBG] National Tropical Botanical Garden. 2019. 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.
- [NTBG] 2020. 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.
- [NTBG] 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.
- Orchard, A.E. 2013. The *Wollastonia/Melanthera/Wedelia* generic complex (Asteraceae: Ecliptinae), with particular reference to Australia and Malesia. *Nuytsia*, The Journal of the Western Australian Herbarium. published online 25 JUL 2013 23:337–466.
- [PEPP] Plant Extinction Prevention Program . 2018. Plant Extinction Prevention Program, fiscal year 2018 interim performance report (October 1, 2017-September 30, 2018) cooperative agreement F18AC00502, US Fish and Wildlife Service CFDA Program #15.657, Endangered species conservation—recovery implementation funds, University of Hawaii at Manoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 49 pp.
- [PEPP] Plant Extinction Prevention Program. 2021. Fiscal year 2021 interim performance report (October 1, 2020-September 30, 2021) cooperative agreements F18AC00502 and F19AC00532, US Fish and Wildlife Service CFDA Program #15.657, Endangered species conservation—recovery implementation funds, University of Hawaii at Manoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program.

- Smithsonian Institution. 2022. *Wollastonia micrantha* (Nutt.) Orchard subsp. *exigua* (O. Deg. & Sherff) and *Wollastonia micrantha* (Nutt.) Orchard subsp. *micrantha*. Hawaiian Flora Checklist. <http://naturalhistory2.si.edu/botany/hawaiianflora>.
- [USFWS] U.S. Fish and Wildlife Service. 2012. *Lipochaeta micrantha* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. https://ecos.fws.gov/docs/tess/species_nonpublish/1981.pdf.
- [USFWS] 2017. *Melanthera micrantha* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. https://ecos.fws.gov/docs/tess/species_nonpublish/2470.pdf.
- [USFWS] 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.
- [USFWS] 2021. Kaua‘i Islandwide Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 65 pp. + appendices.
- Wagner, W.L. and H. Robinson. 2001. *Lipochaeta* and *Melanthera* (Asteraceae: Helianthea Subtribe Ecliptinae): establishing their natural limits and synopsis. *Brittonia* 53(4): 539–561.
- Wagner, W. 2021, in litt. Email regarding possible taxonomic changes to the genus *Lipochaeta* in the new supplement to the Manual of Flowering Plants of Hawai‘i. 19 JUL 2021.
- Waimea Arboretum. 2018. 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.
- Wood, K. 2020. Appendix 1, Hā‘upu survey. In USFWS Partners Program, Mt. Hā‘upu Conservation Project, Service Award #F18AC00511, Interim Performance and Financial Report, October 1, 2019-September 30, 2020, M. DeMotta. 17 pp. + appendices.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Lipochaeta micrantha* (nehe)

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

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