5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Lipochaeta lobata* subsp. *leptophylla* (nehe)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2017. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 138 species in Hawaii, Oregon, Washington, and California. Federal Register 82(75): 18665–18668, April 20, 2017.

Lead Region/Field Office:

Region 1/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) beginning in October 2018. The review was based on a review of current, available information since the last 5-year review for *Lipochaeta lobata* subsp. *leptophylla* (USFWS 2011). The evaluation completed 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 (*http://ecos.fws.gov/tess_public*).

Review Analysis:

Please refer to the previous 5-year review for *Lipochaeta lobata* subsp. *leptophylla* published in the Federal Register on August 2, 2011 (available at *https://ecos.fws.gov/docs/five_year_review/doc3797.pdf*) for a complete review of the species' status, threats, and management efforts. 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. lobata* subsp. *leptophylla*.

This short-lived perennial shrub in the Asteraceae (sunflower) family is endangered and endemic to O‘ahu. The current status and trends for *Lipochaeta lobata* subsp. *leptophylla* are provided in the tables below.

New Status Information:

- Currently there are between 100 and 200 individuals of *Lipochaeta lobata* subsp. *leptophylla* in two populations in the Waiʻanae mountains of Oʻahu (U.S. Army 2018). In 2019, one subpopulation at Mākaha (Kamāʻili) was observed to have 34 mature and three immature individuals (Heintzman 2019, in litt.). Three the other subpopulations have not been observed or monitored for more than 10 years.
- In 2001, Wagner and Robinson provided new combinations for species of *Lipochaeta* and *Melanthera* world-wide. They gave subspecies status to infraspecific Hawaiian taxa, including *Lipochaeta lobata* var. *leptophylla*, based on geographic and ecological distributions, along with morphological diagnostic characters that distinguish them. This change was also recognized in the most recent treatment of Hawaiian flora by Wagner *et al.* (2012). Therefore, this taxon is now *Lipochaeta lobata* subsp. *leptophylla*. This change does not affect the range or endangered status of this taxon.
- In 2012, eight critical habitat units in the dry cliff ecosystem were designated for *Lipochaeta lobata* subsp. *leptophylla* in the Waiʻanae mountains of Oʻahu (7,312 ac, 2,960 ha) (77 FR 57648, September 18, 2012).

New Threats:

- Climate change loss or degradation of habitat—Climate change may pose a threat to this species. Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawaiʻi using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under climate change. The assessment by Fortini *et al.* (2013) concluded that *Lipochaeta lobata* is highly vulnerable to the impacts of climate change, with a vulnerability score of 0.653 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions are needed to conserve this taxon into the future, such as locating key microsites that overlap with current and future climate envelopes for outplanting efforts.

New Management Actions:

- Monitoring—New monitoring in Mākaha estimates 37 individuals.
- Captive propagation for genetic storage and reintroduction—Ten founders from two subpopulations in Mākaha are represented in the Lyon Arboretum Seed Conservation Laboratory (Lyon Arboretum 2019).

Synthesis:

Currently there between 100 and 200 individuals of *Lipochaeta lobata* subsp. *leptophylla* in two populations. A landscape-based assessment of climate change vulnerability for native plants of Hawaiʻi using high resolution climate change projections was made by Fortini *et al.* (2013) and their analysis showed that *L. lobata* is highly vulnerable to the effects of climate change. The first known seed collections were made in 2019.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Recovery Plan for the O‘ahu Plants (USFWS 1998), 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 lobata subsp. *leptophylla* 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. In addition, a minimum of three populations should be documented on O‘ahu where they now occur or occurred historically and each of these populations must be naturally reproducing (*i.e.,* viable seeds, seedlings, saplings) and increasing in number, with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met. There are only two populations that total more than 50 mature individuals each, genetic representation is incomplete and not all threats are managed (Table 1, Table 2). Therefore, *Lipochaeta lobata* subsp. *leptophylla* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:
Other than the new data on this taxon’s vulnerability to climate change, we are not aware of any new threats or significant new information regarding the species’ biological status since the last 5-year review in 2011. Thus, the following recommendations for future actions are reiterated for the 5-year review for 2019.

- Surveys and inventories—Survey the historical range of *Lipochaeta lobata* subsp. *leptophylla* for additional populations and for a thorough current assessment of the status of known populations.
- Ungulate monitoring and control—Construct large-scale fences around all naturally occurring and future reintroduced individuals to protect these occurrences from feral ungulates.
- Invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species, and those that compete with *Lipochaeta lobata* subsp. *leptophylla*.
- Fire monitoring and control—Develop and implement fire management plans and coordinate fire response efforts.

- Climate change adaptation strategy—Assess the modeled effects of climate change on this species and use to determine future landscape needed for the recovery of the species.
- Rodent control—Control rats in the vicinity of all populations.
- Slug control—Control slugs in the vicinity of all populations.
- Population biology research—Study *Lipochaeta lobata* subsp. *leptophylla* 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.
- Captive propagation for genetic storage and reintroduction—
  - Begin seed collection and storage and propagation efforts.
  - Assess genetic variability within extant populations.
- Reintroduction and translocation—Begin reintroduction efforts and establish new populations and augment existing populations with genetically appropriate individuals within suitable habitat to increase numbers.
- Update the listed entity on at 50 CFR 17 to match the currently recognized taxonomy.
- Alliance and partnership development—Continue to work with the U.S. Navy and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

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

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1991 (listing)	25–50	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
1998 (recovery plan)	142	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2003 (critical habitat)	147	0	All threats managed in all three populations	No

			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2011 (5-year review)	350	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	Partially, one population > 50 individuals
2012 (critical habitat)	350	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	Partially, one population > 50 individuals
Date	**No. wild individuals**	**No. outplanted**	***Preventing Extinction Criteria identified by HPPRCC**	***Preventing Extinction Criteria Completed?**
2019 (5-year review)	100–200	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Reproduction (*i.e.* viable seeds, seedlings) at all three populations	Unknown
			Three populations with 50 mature individuals each	Unknown

* 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 after Preventing Extinction).

Table 2. Threats to *Lipochaeta lobata* subsp. *leptophylla* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation and destruction of habitat	A	Ongoing	Partial, ungulate removal at one managed area
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control at one managed area
Fire destruction and degradation of habitat	A	Ongoing	Partial, management plan and coordinated fire response efforts
Climate change degradation or loss of habitat	A	Ongoing	None
Rodent predation and herbivory	C	Ongoing	None
Invertebrate predation and herbivory	C	Ongoing	None
Competition with established invasive plant species	E	Ongoing	Partial, nonnative plant control at one managed area
Stochastic events and small populations	E	Ongoing	None

References:

See previous 5-year review for a full list of references (USFWS 2011). Only references for new information are provided below.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change vulnerability for all native Hawaiian plants. Technical report HCSU-044. Hawaii Cooperative Studies Unit, University of Hawaii at Hilo, Hawaii. 134 pp.

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

Lyon Arboretum. 2019. Lyon Arboretum Hawaiian Rare Plant Program. Report on controlled propagation of listed and candidate 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, Hawaii.

[U.S. Army] U.S. Army, Environmental Division. 2018. Report to the U.S. Fish and Wildlife Service for Oahu Army Natural Resource Program, Permit: TES-043638, Reporting period January 1, 2018-December 31, 2018. 16 pp.

[USFWS] U.S. Fish and Wildlife Service. 2011. *Lipochaeta lobata* var. *leptophylla* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc3797.pdf.*

[USFWS] 2012. Endangered and threatened wildlife and plants; Endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Department of the Interior, Federal Register 77 (181): 57648–57862, September 18, 2012.

[USFWS] 2017. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 138 species in Hawaii, Oregon, Washington, and California. Federal Register 82(75): 18665–18668, April 20, 2017.

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.L., D.R. Herbst, N. Khan, and T. Flynn. 2012. Hawaiian vascular plant updates: a supplement to the Manual of the Flowering Plants of Hawaii and Hawaii's Ferns and Fern Allies Version 1.1 19 MAR 2012. 126 pp.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Lipochaeta lobata* subsp. *leptophylla* (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
_X____ No Change in listing status

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

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