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. 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 87(90):28031–28034, May 10, 2022.

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, Recovery Program 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 2023. The review was based on a review of current, available information since the last 5-year review for *Lipochaeta lobata* subsp. *leptophylla* (USFWS 2019). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Megan Laut, Recovery Program 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/ecp/species/2670*).

Review Analysis:

Please refer to the previous 5-year reviews for *Lipochaeta lobata* subsp. *leptophylla* published in the Federal Register on August 2, 2011, and September 26, 2019 (available at *https://ecos.fws.gov/docs/tess/species_nonpublish/1742.pdf*, and *https://ecos.fws.gov/docs/tess/species_nonpublish/2876.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. lobata* subsp. *leptophylla*.

This short-lived perennial woody herb in the Asteraceae (sunflower) family is endangered and is known from the island of O‘ahu. The status and trends for *Lipochaeta lobata* subsp. *leptophylla* are provided in the tables below.

New Status Information:

- In 2011, there were between 100 and 200 individuals in two populations in the Waiʻanae mountains of Oʻahu (USFWS 2019). Currently, only six wild plants have been observed in Mākaha and Waiʻanae Kai. There may be another 103 individuals in Mikilua and Kamaileʻunu, however, the Mākaha population that has been monitored recently has declined from 100 individuals to 6 individuals in the last 8 years, and of those 103 individuals, none have been monitored in the last 20 years (Army Natural Resources Program of Oʻahu [ANRPO] 2021 appendices, p. 102; ANRPO 2023; Plant Extinction Prevention Program [PEPP] 2019–2023). The population at Waiʻeli was extirpated in 2005.
- Thirteen founders from the wild population at Mākaha are represented by 2,800 seeds in storage (Lyon Arboretum 2022; Oʻahu Native Ecosystems Protection and Management [NEPM] 2022).

New Threats:

- Drought and landslides are reported as new threats to *Lipochaeta lobata* subsp. *leptophylla* (Keir 2020). This species occurs in dry cliff habitat. Over the last 100 years, the Hawaiian Islands have experienced an annual decline in precipitation of over 9 percent, increasing to as much as 15 percent within the last 20 years (US-NSTC 2008, p. 61; Chu and Chen 2005, pp. 4812–4813; Diaz et al. 2005, 4 pp.). Drought affects plants directly by desiccation. The increase in drought frequency and intensity leads to a self-perpetuating cycle of increase in cover of nonnative plants, increase in the number of fires, and an increase of erosion (US-GCRP 2009, pp. 18, 24; Warren 2011). Feral ungulates contribute to erosion by creating trails that destabilize substrate, alter hydrology, and by dislodging stones that can cause rockfalls and landslides (Cuddihy and Stone 1990, pp. 25–26, 63–64).

New Management Actions:

- Surveys and monitoring—
  - The Plant Extinction Prevention Program (PEPP) monitors the reintroduced population at Pahole (PEPP 2020, p. 39).
  - Two subpopulations of *Lipochaeta lobata* subsp. *leptophylla* occur at Mikilua in the Lualualei Naval Reservation. This area is managed by the Naval Facilities Engineering Systems Command (NAVFAC) that works with the Waiʻanae Mountains Watershed Partnership (WMWP) to implement management goals of the Integrated Natural Resource Management Plant (INRMP) for Lualualei. This plan describes management goals that provide a conservation benefit to listed species, provides assurances that management strategies will be implemented if funded at proposed levels, and that conservation strategies will be effective. Although this species is not covered specifically in the INRMP, any occurrences within the recently fenced area at Mikilua and may benefit from this conservation action.
- Feral ungulate monitoring and control—
  - The Navy has provided funding for aerial surveys for feral goats by WMWP while the State's Division of Forestry and Wildlife (DOFAW) has contributed helicopter time, staff, and training to execute the control side of the project for

Lualualei (WMWP 2024, p. 41). The most recent survey conducted in September of 2023 found no feral goats (WMWP 2024, p. 40). A total of 112 goats have been removed since 2008 (WMWP 2024, p. 40). Feral goats may still be present in the Wai‘anae mountains and this area should continue to be monitored and goats controlled if found.
    - The WMWP constructed fencing at Mikilua (upper elevation of Lualualei) to protect two subpopulations and possible recruits (and other listed species) from the activities of feral ungulates (WMWP 2023, pp. 9–10, 12).
- Invasive nonnative plant monitoring and control—PEPP controls nonnative invasive plants at the outplanting site at Pahole (PEPP 2021, p. 29).
- Fire prevention and management—NAVFAC finalized the wildfire management plan for Lualualei and held the first working group meeting (NAVFAC 2022a, p. 3; NAVFAC 2022b, p. 7). The working group set up two subcommittees, the first to plan and conduct roadside and vegetation management, the second to plan and conduct inter-departmental drills (NAVFAC 2022c, p. 6).
- Collection and propagation for genetic storage and reintroduction—
    - From 2019 to 2021, the Lyon Arboretum Seed Conservation Laboratory reported storage of 2,174 seeds representing 10 wild founders at Mākaha and 1,633 seeds representing eight founders from the reintroduced population at Pahole (Lyon Arboretum 2022).
    - In 1994, the National Tropical Botanical Garden (NTBG) collected and stored an uncounted number of seeds from unspecified founders in the Wai‘anae mountains (NTBG 2022). The viability of this collection is uncertain.
    - In 2022, the O‘ahu Native Ecosystems Protection and Management’s (NEPM) plant nursery reported collection and storage of 352 seeds representing three founders at Mākaha and 274 seeds representing three reintroduced founders at Pahole (O‘ahu NEPM 2022).
    - PEPP collects seeds from the reintroduced population at Pahole (PEPP 2020, p. 39).
- Translocation and augmentation—In 2020 to 2021, PEPP reported reintroduction of 25 individuals at Pahole (PEPP 2020, p. 11; PEPP 2021, p. 10).

Table 1. Status and trends of *Lipochaeta lobata* ssp. *leptophylla* from listing through current 5-year review. Table 1a shows progress according to Interim Stabilization Goals; Table 1b shows progress according to Preventing Extinction Goals.

Table 1a.

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 3 populations	No
			Complete genetic storage	No

			3 populations with 50 mature individuals each	No
2011 (5-year review)	350	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partial
			3 populations with 50 mature individuals each	Partial, 1 population >50 individuals

Table 1b.

Date	**No. wild individuals**	**No. outplanted**	***Preventing Extinction Targets identified by HPPRCC**	***Preventing Extinction Targets Completed?**
2019 (5-year review)	100–200	0	All threats managed in all 3 populations	Partial
			Complete genetic storage	Partial
			Reproduction (i.e., viable seeds, seedlings) at all 3 populations	Unknown
			3 populations with 50 mature individuals each	Unknown
2024 (5-year review)	≥ 6	25	All threats managed in all 3 populations	Partial, 1 reintroduced population fenced with nonnative plant control; 1 wild subpopulation partial fencing

			Complete genetic storage	Partial, 13 founders from 1 populations represented
			Natural reproduction at all 3 populations	Historically, currently unknown
			3 populations with 50 mature individuals each	Partially, possibly 1 subpopulation >50 individuals

* 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 lobata* subsp. *leptophylla* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate destruction and degradation of habitat	A	Ongoing	Partial, fencing and ungulate management for 1 population
Established ecosystem altering invasive plant species destruction and degradation of habitat and competition	A, E	Ongoing	Partial, nonnative plant control for 1 population
Drought and landslide destruction and degradation of habitat	A	Ongoing	None
Fire destruction and degradation of habitat	A	Ongoing	Partial, management plans and coordinated fire response for DoD lands
Climate change degradation or loss of habitat	A	Ongoing	None
Rodent predation and herbivory	C	Ongoing	None
Invertebrate predation and herbivory	C	Ongoing	None
Small populations	E	Ongoing	Partial, seed collection and translocation

Synthesis:
Currently, there are at least six and as many as approximately 100 wild individuals of *Lipochaeta lobata* subsp. *leptophylla* in three populations. Only one wild and one reintroduced population are protected from the negative effects of feral ungulates by fencing. Nonnative plant control is ongoing directly for only one population. Thirteen founders from one wild and one reintroduced population are represented in seed collections. There is one reintroduced population of 25 individuals.

Stabilizing (interim), and downlisting and delisting criteria are provided in the Recovery Plan for the O‘ahu Plants (USFWS 1998) and preventing extinction targets have been added and criteria 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 woody 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 O‘ahu where they now occur 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 lobata* subsp. *leptophylla* have not been met. The number of wild individuals continues to decline. Fencing provides protection from feral ungulates for two populations (Table 1, Table 2). Nonnative invasive plant control is conducted for one population (Table 1, Table 2). Thirteen founders from one population are represented in a seed collections (Table 1). There is only reintroduced population of 25 individuals; however, no recruitment is reported. Wildfire is an increasing threat to this species and habitat (Table 2). The effects of climate change, including drought and landslides, and rodent and invertebrate predation are not addressed (Table 2). Therefore, *L. lobata* subsp. *leptophylla* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:
Drought and landslides are reported as new threats; however, no significant new information regarding the species’ biological status has been reported since the last 5-year review in 2019. Thus, the following recommendations for future actions are updated or reiterated for the 5-year review for 2024.

- Surveys and monitoring—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—Continue to construct exclosures and strategic fencing for all populations to provide protection against the negative impacts of feral ungulates.
- Nonnative invasive plant monitoring and control—Continue to control established ecosystem-altering nonnative invasive plant species, and those that compete with *L. lobata* subsp. *leptophylla*, at all populations.
- Fire monitoring and control—Continue to 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 its recovery.
- Rodent monitoring and control—Implement effective rodent control for all populations where possible.
- Invertebrate monitoring and control—Implement effective slug control for all populations where possible.
- Captive propagation for genetic storage and reintroduction—Continue collection and propagation efforts for maintenance of genetic stock and for reintroduction.
- Reintroduction and augmentation—Continue translocation efforts to augment and establish new populations, using adaptive management, within suitable and historical habitat that is being managed for known threats to this species.
- Population biology research—
    - Study *L. 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.
    - Study the two subspecies (subsp. *leptophylla*, subsp. *lobata*) with regard to morphological and genetic differences.
- Build resiliency, redundancy, and representation—Increase species' viability through habitat restoration, threat control, and reintroduction and translocation to reduce impacts of rodent and invertebrate predation, drought, landslides, climate change, and wildfires.
- Update the listed entity on 50 CFR 17 to match the currently recognized taxonomy as a subspecies.
- Alliance and partnership development—Continue to work with WMWP, the U.S. Navy, ANRPO, PEPP, and other land managers and partners to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

References:

[ANRPO] Army Natural Resources Program, Oahu. 2021. 2021 Status report for the Mākua and Oahu Implementation Plans. Office of the Vice President for Innovation and Research, University of Hawai‘i. 207 pp.

[ANRPO] 2023. 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.

Chu, P-S. and H. Chen. 2005. Interannual and interdecadal rainfall variations in the Hawaiian Islands. Journal of Climate 18: 4796–4813.

Cuddihy, L.W. and C.P. Stone. 1990. Alteration of native Hawaiian vegetation: effects of humans, their activities and introductions. Cooperative National Park Resources Studies Unit, University of Hawaii. 138 pp.

Diaz, H.F., P-S. Chu, and J.K. Eischeid. 2005. Rainfall changes in Hawaii during the last century. 16th Conference on Climate Variability and Change, abstract.

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

Keir, M. 2020. *Lipochaeta lobata* subsp. *leptophylla*. The IUCN Red List of Threatened Species 2020: e.T80166320A80166460. *https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T80166320A80166460.en*.

Lyon Arboretum. 2022. 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] National Tropical Botanical Garden. 2022. 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.

[NEPM] O‘ahu Native Ecosystems Protection and Management. 2022. 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.

[NAVFAC] Naval Facilities Engineering Systems Command Hawai‘i. 2022a. NAVFAC progress report, Lualualei management goals, October 2021-March 2022. 4 pp.

[NAVFAC] 2022b. NAVFAC progress report, Lualualei management goals, July 2022-September 2022. 7 pp.

[NAVFAC] 2022c. NAVFAC Progress report, Lualualei management goals, reporting period April 2022-June 2022. 7 pp.

[PEPP] Plant Extinction Prevention Program 2020. Plant Extinction Prevention Program fiscal year 2020 interim performance report (October 1, 2019-September 30, 2020), Cooperative Agreement F18AC00502 (Interim report), F19AC00532 (Interim report), U.S. Fish and Wildlife Service CFDA Program #15.657 Endangered Species Conservation—Recovery Implementation Funds, University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 70 pp.

[PEPP] 2021. Plant Extinction Prevention Program fiscal year 2021 interim performance report (October 1, 2020-September 30, 2021), Cooperative Agreement F19AC00532 (Interim report), U.S. Fish and Wildlife Service CFDA Program #15.657 Endangered Species Conservation—Recovery Implementation Funds, University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit, Plant Extinction Prevention Program. 46 pp.

[PEPP] Plant Extinction Prevention Program. 2019–2023. Plant Extinction Prevention Program fiscal years 2019 to 2023 interim performance report (October 1, 2018-September 30, 2023). U.S. Fish and Wildlife Service CFDA Program $15.657 Endangered Species Conservation—Recovery Implementation Funds, Cooperative Agreement: F18AC00502 (Final performance report), University of Hawai‘i at Mānoa, Pacific Cooperative Studies Unit. 105 pp.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery Plan for the O‘ahu Plants. Portland. 207 pp. + appendices.

[USFWS] 2011. *Lipochaeta lobata* subsp. *leptophylla*. 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc/1742.pdf.*

[USFWS] 2019. *Lipochaeta lobata* subsp. *leptophylla*. 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. *https://ecos.fws.gov/docs/five_year_review/doc/2876.pdf.*

[USFWS] 2022. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status reviews for 167 Species in Oregon, Washington, Idaho, Montana, California, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 87(90): 28031–28034, May 10, 2022.

[US-GCRP] US GCRP Advisory Committee. 2009. Global climate change impacts in the United States. Karl, T.R., J.M. Melilo, and T.C. Peterson (eds.), Cambridge University Press. 189 pp.

[US-NSTC] US National Science and Technology Council. 2008. Scientific assessment of the effects of global change on the United States. Committee on Environment and Natural Resources. 261 pp.

[WMWP] Wai‘anae Mountains Watershed Partnership. 2023. Performance Progress Report, SF-PPR, W9126G-21-0024, University of Hawai‘i, Pacific Cooperative Studies Unit, Honolulu. 10 pp.

[WMWP] 2024. Wai‘anae Mountains Watershed Partnership, Lualualei Plant Support, Joint Base Pearl Harbor-Hickam, JBPHH field botany summary report, FY24, Q2. 62 pp.

Warren, R. 2011. The role of interactions in a world implementing adaptation and mitigation solutions to climate change. Philosophical Transactions of the Royal Society A 369: 217–241.

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Lipochaeta lobata* ssp. *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**

MEGAN LAUT Digitally signed by MEGAN LAUT
Date: 2024.08.23 16:16:17 -10'00'

_____ Date_____