

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Melanthera tenuifolia* (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 *Melanthera tenuifolia* (as *Lipochaeta tenuifolia*) (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 *Melanthera tenuifolia* (as *Lipochaeta tenuifolia*) published in the Federal Register on August 2, 2011 (available at https://ecos.fws.gov/docs/five_year_review/doc3796.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 *M. tenuifolia*.

This short-lived perennial woody herb in the Asteraceae (sunflower) family is endangered and endemic to O'ahu. The current status and trends for *Melanthera tenuifolia* are provided in the tables below.

New Status Information:

- Currently, there are approximately 2,100 individuals of *Melanthera tenuifolia* in five populations (Keawa‘ula, Kaluakauila, Ka‘ala, ‘Ōhikilolo, and Kamaile‘unu to Wai‘anae Kai) in the Wai‘anae mountains of O‘ahu (Army Natural Resources Program-O‘ahu (ANRP) 2018; Keir *et al.* 2016). In addition, there is one individual in Kahanahāiki. The largest population, which has 50 percent of all known plants, has not been monitored since 2010 (ANRP 2018).
- As discussed in the previous 5-year review, Wagner and Robinson (2001) recognized and published new combinations for Hawaiian species of *Lipochaeta*, including *L. tenuifolia*, to *Melanthera tenuifolia*. In 2012, we revised the List of Endangered and Threatened Plants at 50 CFR 17.12 for this taxon (77 FR 57648, September 18, 2012). This change does not affect the range or status of this species. We are aware of a publication by Edwards *et al.* (2018) recombining species of *Melanthera* back to *Lipochaeta*; however, this change has not been widely accepted at this time.
- In 2012, 17 critical habitat units in three ecosystems (lowland dry, lowland mesic, and dry cliff) were designated for *Melanthera tenuifolia* in the Wai‘anae mountains of O‘ahu (7,788 ac, 3,152 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 Hawai‘i 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 *Melanthera tenuifolia* is highly vulnerable to the impacts of climate change, with a vulnerability score of 0.816 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions may be 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:

- Fencing for ungulates—The Army’s Kaluakauila fence, Manuwai Management Unit perimeter fence, is completed; however, quarterly fence checks must be conducted to address any ingress by feral pigs (ANRP 2018). Mākaha subunit I fence is completed. A small fence at Pu‘u Kawiwi protects some individuals of the Waianae Kai-Mākaha population in the Kamaile‘unu II management unit. The ‘Ōhikilolo and ‘Ōhikilolo Lower management units are also ungulate-free.
- Nonnative plant control—Nonnative plant control is conducted at Manuwai management unit every five years or more often if nonnative plant cover is greater than 50 percent (currently at more than 60 percent controlled). ‘Ōhikilolo and Kamaile‘unu-Waianae Kai have attained almost 10 percent nonnative plant control (ANRP 2018).

- Fire destruction and degradation of habitat—Fire is noted to be a threat to occurrences at Mākua and Kahanahāiki. For ANRP management areas (such as Manuwai), fire threat control includes removing fuel from the areas with pesticides, marking sites for water drops, and installing fuel-breaks in fallow agricultural areas along roads. In August, 2018, a large wildfire in Wai‘anae, Kea‘au, and Mākaha valleys burned 5,000 ac (2,023 ha) destroying two exclosures in the Kea‘au Forest Reserve, and impacting two endangered plant taxa, *Hibiscus brackenridgei* subsp. *mokuleianus* and *Gouania vitifolia*, which was a major setback for the ANRP’s restoration work (ANRP 2018; U.S. Army 2018, in litt.). The Army managed the fire response in the northernmost portion of the wildfire area. This fire came within 1,398 and 2,625 ft (426 and 800 m) of two populations of *Melanthera tenuifolia* (U.S. Army 2018, in litt.).
- Rodent control—ANRP has attained 10 percent control of rats at the Kamaile‘unu-Waianae Kai management unit (ANRP 2018).
- Captive propagation for genetic storage and reintroduction—
 - The ANRP goals are to stabilize three populations of *Melanthera tenuifolia* and manage additional populations for genetic resources (ANRP 2018). Currently, nine plants from occurrences at Kaluakauila are represented in genetic storage collections, as well as 11 plants from Kahanahāiki and 16 plants from ‘Ōhikilolo (ANRP 2018).
 - Lyon Arboretum Micropropagation Laboratory reports 67 explants from three subpopulations (representing nine individuals) (Lyon Arboretum 2018).
 - Waimea Arboretum reports one individual of *Melanthera tenuifolia* is represented by five plants in storage in 2013, three plants in storage in 2014, 29 plants in storage in 2015, and seven plants in storage in 2017 (Waimea Arboretum 2013, 2014, 2015, 2017).

Synthesis:

Currently there are approximately 2,100 mature and immature individuals of *Melanthera tenuifolia* in six populations in the Wai‘anae mountains. A landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections was made by Fortini *et al.* (2013) and their analysis showed that *M. tenuifolia* is highly vulnerable to the effects of climate change. Fencing and ungulate control protects most or portions of four populations. Genetic storage collections have begun but are limited. Collections include both banked seed and cuttings for propagation for *ex situ* representation.

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.

Melanthera tenuifolia is a short-lived perennial woody herb, with vegetative reproduction. To prevent extinction, which is the first step 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 six 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. While there are four to six populations with 50 mature individuals, genetic representation is limited, and not all threats are managed (Table 1, Table 2). Therefore, *Melanthera tenuifolia* 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.

- Ungulate monitoring and control—Continue to monitor fencing to provide protection from the negative impacts of feral ungulates.
- Invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species, and those that compete with *Melanthera tenuifolia* at all populations.
- Fire monitoring and control—Implement fire management plans and continue to 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 predation and herbivory—Implement effective control methods for rats at all known populations.
- Invertebrate predation and herbivory—Develop and implement methods to control slugs.
- Captive propagation for genetic storage and reintroduction—Continue to collect material for genetic storage and for propagation and reintroduction.
- Alliance and partnership development—Continue to work with the Division of Forestry and Wildlife, the U.S. Army, 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 *Melanthera tenuifolia* from listing through current 5-year review.

Date	No. wild individuals	No. outplanted	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
1991 (listing)	400–600	0	All threats managed in all 5–7 populations	No
			Naturally reproducing, stable or increasing in number	Unknown
			5–7 populations with 300 mature individuals each	Unknown
1998 (recovery plan)	2,000	0	All threats managed in all 5–7 populations	No
			Naturally reproducing, stable or increasing in number	Unknown
			5–7 populations with 300 mature individuals each	Unknown
2003 (critical habitat)	759–1,174	0	All threats managed in all 5–7 populations	Partially
			Naturally reproducing, stable or increasing in number	Unknown
			5–7 populations with 300 mature individuals each	Unknown
2011 (5-year review)	2,579	0	All threats managed in all 5–7 populations	Partially
			Naturally reproducing, stable or increasing in number	Partially
			5–7 populations with 300 mature individuals each	Partially, three populations > 300
2012 (critical habitat)	ca 4,000	0	All threats managed in all 5–7 populations	Partially

			Naturally reproducing, stable or increasing in number	Partially
			5–7 populations with 300 mature individuals each	Partially, three populations > 300
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2019 (5-year review)	2,100	0	All threats managed in all six populations	Partially
			Complete genetic storage	Partially
			Reproduction (<i>i.e.</i> viable seeds, seedlings) at all three populations	Unknown
			Six populations with 50 mature individuals each	Partially, possibly complete

* 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 *Melanthera tenuifolia* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate destruction and degradation of habitat	A	Ongoing	Partial, partial populations in fenced areas
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, some nonnative plant control in fenced areas
Fire destruction and degradation of habitat	A	Ongoing	Partial, fire management plan and coordinated control efforts
Climate change degradation or loss of habitat	A	Ongoing	None
Rodent predation and herbivory	C	Ongoing	Partial, some rat control in fenced areas
Invertebrate predation and herbivory	C	Ongoing	None
Competition with established invasive plant species	E	Ongoing	Partial, some nonnative plant control in fenced areas

References:

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

[ANRP] Army Natural Resource Program-O‘ahu. 2018. 2018 status report for the Makua and Oahu implementation plans. 217 pp.

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* online 4 JUN 2018. 13 pp.

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.

Keir, M., M. Sporck-Koehler, S.M. Gon, V.L. Caraway, M. Bruegmann, M. Chau, J. Kwon, and N. Sugii. 2016. *Melanthera tenuifolia*. The IUCN Red List of Threatened Species 2016: e.T80167726A115503789. <http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T80167726A80167735.en>.

- Lyon Arboretum. 2018. 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. 2018. Email regarding westside fire 2018. 7 AUG 2018.
- [USFWS] U.S. Fish and Wildlife Service. 2011. *Melanthera tenuifolia* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. https://ecos.fws.gov/docs/five_year_review/doc3796.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: Heliantheae subtribe Ecliptinae): establishing their natural limits and a synopsis. *Brittonia* 53(4): 539–561.
- Waimea Arboretum. 2013. 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.
- Waimea Arboretum. 2014. 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.
- Waimea Arboretum. 2015. 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.
- Waimea Arboretum. 2017. 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. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Melanthera tenuifolia* (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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