

*Lipochaeta micrantha*  
(Nehe)

**5-Year Review  
Summary and Evaluation**

**U.S. Fish and Wildlife Service  
Pacific Islands Fish and Wildlife Office  
Honolulu, Hawaii**

**5-YEAR REVIEW**  
Species reviewed: *Lipochaeta micrantha* (Nehe)

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**5-YEAR REVIEW**  
***Lipochaeta micrantha* (Nehe)**

**1.0 GENERAL INFORMATION**

**1.1 Reviewers**

**Lead Regional Office:**

Region 1, Endangered Species Program, Division of Recovery, Jesse D'Elia,  
(503) 231-2071

**Lead Field Office:**

Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (808)  
792-9400

**Cooperating Field Office(s):**

N/A

**Cooperating Regional Office(s):**

N/A

**1.2 Methodology used to complete the review:**

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on April 8, 2010. The review was based on final critical habitat designation for *Lipochaeta micrantha* and other species from the island of Kauai (USFWS 2003), as well as a review of current, available information. The Bernice Pauahi Bishop Museum provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Samuel Aruch, biological consultant, was reviewed by a recovery biologist and the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

**1.3 Background:**

**1.3.1 Federal Register (FR) Notice citation announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; 5-year review status of 69 species in Idaho, Washington, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 75(67):17947-17950.

### 1.3.2 Listing history

#### Original Listing

**FR notice:** USFWS. 1994. Endangered and threatened wildlife and plants; determination of endangered or threatened status for 24 plants from the island of Kauai, Hawaii; final rule. Federal Register 59(38):9304-9329.

**Date listed:** February 25, 1994

**Entity listed:** Species

**Classification:** Endangered

#### Revised Listing, if applicable

**FR notice:** N/A

**Date listed:** N/A

**Entity listed:** N/A

**Classification:** N/A

### 1.3.3 Associated rulemakings:

USFWS. 2003. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, Hawaii; final rule. Federal Register 68(39):9116-9479.

In 2003, critical habitat was designated for *Lipochaeta micrantha* in two units totaling 554 hectares (1,365 acres) on the island of Kauai on State and private land (USFWS 2003).

### 1.3.4 Review History:

Species status review [FY 2010 Recovery Data Call (August 2010)]:  
Undetermined

#### **Recovery achieved:**

1 (0-25%) (FY 2007 Recovery Data Call)

### 1.3.5 Species' Recovery Priority Number at start of this 5-year review:

The Recovery Priority number for *Lipochaeta micrantha* var. *exigua* is 6 and for *L. micrantha* var. *micrantha* is 9.

### 1.3.6 Current Recovery Plan or Outline

**Name of plan or outline:** USFWS. 1995. Recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 270 pages. Available online at <<http://www.fws.gov/pacificislands/recoveryplans.html>>.

**Date issued:** September 20, 1995

**Dates of previous revisions, if applicable:** N/A

**2.0 REVIEW ANALYSIS**

**2.1 Application of the 1996 Distinct Population Segment (DPS) policy**

**2.1.1 Is the species under review a vertebrate?**

*Yes*  
 *No*

**2.1.2 Is the species under review listed as a DPS?**

*Yes*  
 *No*

**2.1.3 Was the DPS listed prior to 1996?**

*Yes*  
 *No*

**2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?**

*Yes*  
 *No*

**2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?**

*Yes*  
 *No*

**2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?**

*Yes*  
 *No*

**2.2 Recovery Criteria**

**2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?**

*Yes*  
 *No*

**2.2.2 Adequacy of recovery criteria.**

**2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?**

*Yes*  
 *No*

**2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?**

*Yes*

*No*

**2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:**

A synthesis of the threats (Listing Factors A, C, D, and E) affecting this species is presented in Section 2.3.2 and Table 2. Factor B is not a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the Kauai plant cluster recovery plan (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Lipochaeta micrantha* is a short-lived perennial, and to be considered stabilized in the interim, which is the first step in recovering the species, the taxon must be managed to control threats (e.g., fenced, weeding, etc.) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on the island of Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Lipochaeta micrantha* should be documented on the island of Kauai. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 300 mature individuals per population. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery objective has not been met.

For delisting, a total of eight to ten populations of *Lipochaeta micrantha* should be documented on the island of Kauai. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 mature individuals per population for long-lived perennials. Each population should persist at this level for a minimum of five consecutive years before delisting is considered.

This recovery objective has not been met.

**2.3 Updated Information and Current Species Status**

## 2.3.1 Biology and Habitat

### 2.3.1.1 New information on the species' biology and life history:

*Lipochaeta micrantha* has been observed in flower during the month of December (National Tropical Botanical Garden 2010). Little else is known about the life history for *L. micrantha* at this time. Its pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (USFWS 1994, 1995, 2003).

### 2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Historically, *Lipochaeta micrantha* was known from diverse mesic forest on Kauai from Olokele Canyon, Hanapepe Valley, Koloa, and Haupu Range, from 300 to 400 meters (985 to 1,320 feet) elevation. Two varieties have been recognized (see Section 2.3.1.4 below) and occupy separate ranges: variety *exigua* is historically found only in the Haupu Range, and variety *micrantha* is historically found only in Olokele, Hanapepe, and Koloa (Wagner *et al.* 1999; USFWS 1994, 1995a, 2003). In the mid-1990s, only two populations of *L. micrantha* var. *exigua* were known from the vicinity of Haupu Range, distributed over a distance of 2.4 kilometers (1.5 miles) on privately-owned lands and totaling 100 to 500 individuals; *L. micrantha* var. *micrantha* was known only from two to four populations on State lands in Koaie Canyon, encompassing an area of 2.3 square kilometers (1.4 square miles) approximately 2.3 kilometers (1.4 miles) apart, and totaling 150 to 570 individuals (USFWS 1994, 1995). In 2003, there were five populations of *L. micrantha* var. *exigua* totaling 110 individuals from the Haupu area, and five populations of var. *micrantha* totaling 121 individuals within the State-owned Na Pali-Kona Forest Reserve in Koaie Canyon and Kawaiiki Valley (USFWS 2003).

In 2010, the census numbers stood at two populations totaling 100 to 150 individuals for *Lipochaeta micrantha* var. *exigua*, and two to four populations totaling 150 to 570 individuals for *L. micrantha* var. *micrantha* (USFWS 2010). Among the most recent recorded collections is a 2005 voucher of *L. micrantha* var. *micrantha* from Koaie Stream in Waimea Canyon, made by Steve Perlman in *Acacia-Diospyros sandwicensis* (lama) – *Metrosideros polymorpha* (ohia) mesic forest (Perlman 2005; National Tropical Botanical Garden 2010). Ken Wood (National Tropical Botanical Garden, pers. comm. 2010) believes that both the Haupu populations of *L. micrantha* var. *exigua* and the Koaie colonies of *L. micrantha* var. *micrantha* are in the range of 50 or fewer remaining

wild individuals. The National Tropical Botanical Garden has a herbarium collection of *L. micrantha* var. *micrantha* from Haupu collected by T. Flynn around 1991, which has not since been revisited.

In summary, there are currently four to six populations of *Lipochaeta micrantha* containing about 250 to 720 individuals, with populations at the Haupu Range (*L. micrantha* var. *exigua*, two populations, 100 to 150 individuals), and Koaie Canyon and Kawaiiki Valley (*L. micrantha* var. *micrantha*, two to four populations, 150 to 570 individuals).

### **2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):**

No new information.

### **2.3.1.4 Taxonomic classification or changes in nomenclature:**

*Lipochaeta micrantha* was originally described in 1841 as *Schizophyllum micranthum* by Thomas Nuttall (1841, as cited in USFWS 1994), and the species was transferred to the genus *Lipochaeta* by Asa Gray (1861, as cited in USFWS 1994). In 1941 Otto Degener and E. E. Sherff described *L. exigua* (Sherff 1941), a Kauai endemic differing from *L. micrantha* in characters of leaf length and width, degree of leaf dissection, and ray floret length (Wagner *et al.* 1999; USFWS 1994, 1995, 2003). In 1979, Robert Gardner chose to recognize the similar *L. exigua* as a variety of *L. micrantha*, publishing the new combination *L. micrantha* var. *exigua* (Gardner 1979). In 1994, *Lipochaeta micrantha* became federally listed, including both varieties *micrantha* and *exigua* (USFWS 1994).

Wagner and Robinson (2001) studied Hawaiian members of the genus *Lipochaeta* in relation to closely related Pacific and Neotropical aster family genera, including *Melanthera* and *Wollastonia*, concluding that Hawaiian members were best split into two genera, the endemic *Lipochaeta* and the fairly widespread (eastern North America, Central America, West Indies, South America, Africa, Asia, many Indian and Pacific Ocean islands) *Melanthera*. The members of *Lipochaeta* are allopolyploid ( $n = 26$ ), apparently the result of an intergeneric hybridization between a species of *Melanthera* and an unknown taxon, perhaps of the genus *Wedelia* ( $n = 11$ ). On the other hand, 14 Hawaiian *Lipochaeta* species have the same haploid chromosome number as *Melanthera* ( $n = 15$ ), and their names were transferred to the latter genus as a result. *Lipochaeta micrantha* was among the latter, and is now recognized as *Melanthera micrantha*. The infraspecific taxa were both recognized and transferred, but the authors preferred to recognize them at the subspecific level, rather than the varietal level. Therefore, the taxa



will be referred to as *Melanthera micrantha* subsp. *micrantha* and *M. micrantha* subsp. *exigua* for the remainder of this review.

**2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):**

No new information.

**2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):**

Both subspecies of *Melanthera micrantha* are often found on exposed rocky slopes in diverse lowland *Metrosideros polymorpha* (ohia) mesic forests between 300 and 720 meters (1,000 and 2,360 feet) elevation. Associated native species include *Diospyros* spp. (lama), *Acacia koa* (koa), *Dodonaea viscosa* (aalii), *Artemisia australis* (ahinihina), *Euphorbia celastroides* var. *hanapepensis* (akoko), *Pipturus* spp. (mamaki), and *Neraudia kauaiensis* (Wagner *et al.* 1999; Perlman 1990, 2005; USFWS 1994, 1995, 2003; Wood 2005; Hawaii Biodiversity and Mapping Program 2010a, b; National Tropical Botanical Garden 2010).

*Melanthera micrantha* subsp. *micrantha* from Haupu is found on the north-northwest side of the Hoary Head Range near Omoe and is quite separate from locations of subsp. *exigua* on Haupu. The species was described as a locally common as a sterile sprawling herb growing in full sun with secondary vegetation of species of *Psidium guajava* (guava), *Aleurites moluccana* (kukui), *Rhodomyrtus tomentosa* (downy or rose myrtle), *Lantana camara* (lantana), *Stachytarpheta jamaicensis* (Jamaican vervain), *Cordyline fruticosa* (ti), *Cyrtandra* sp. (haiwale), *Freycinetia arborea* (ieie), *Kadua* sp. (No common name [NCN]), *Diplazium* sp. (hoio), and *Blechnum appendiculatum* (NCN) (K. Wood, pers. comm. 2010).

**2.3.1.7 Other:**

No new information.

**2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)**

**2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:**

**Threats:**

- Ungulate degradation of habitat – Feral pigs (*Sus scrofa*) and goats (*Capra hircus*) impact both subspecies (K. Wood, pers. comm. 2010)
- Established ecosystem-altering invasive plant species degradation of habitat (Hawaii Biodiversity and Mapping Program 2010a, b; K. Wood, National Tropical Botanical Garden, pers. comm. 2010; Hawaii Biodiversity and Mapping Program 2010; National Tropical Botanical Garden 2010)
  - *Erigeron karvinskianus* (daisy fleabane)
  - *Lantana camara* (lantana)
  - *Melia azedarach* (Chinaberry)
  - *Melinis minutiflora* (molasses grass)
  - *Psidium cattleianum* (strawberry guava)
  - *Psidium guajava* (guava)
  - *Rhodomyrtus tomentosa* (downy or rose myrtle)
  - *Rubus argutus* (prickly Florida blackberry)
  - *Schinus terebinthifolius* (Christmasberry)
- Landslides and flooding (USFWS 1994, 1995, 2003; Hawaii Biodiversity and Mapping Program 2010a, b; K. Wood, pers. comm. 2010)

**2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:**

This is not a threat.

**2.3.2.3 Disease or predation:**

**Threats:**

- Ungulate predation or herbivory –Noted as a potential threat to the taxa (K. Wood, pers. comm. 2010).

**2.3.2.4 Inadequacy of existing regulatory mechanisms:**

**Threats:**

- Lack of adequate hunting regulation in areas with ungulates – The lack of adequate ungulate control and the existence of established hunting programs in areas where both subspecies occur continue to threaten this species.

### 2.3.2.5 Other natural or manmade factors affecting its continued existence:

#### Threats:

- Established invasive plant species competition (Hawaii Biodiversity and Mapping Program 2010; K. Wood, pers. comm. 2010)
  - *Blechnum appendiculatum* (NCN)
  - *Bryophyllum pinnatum* (airplant)
  - *Caesalpinia decapetala* (mysore thorn)
  - *Heliocarpus popayanensis* (white moho)
  - *Melastoma septemnerium* (Asian melastome)
  - *Pluchea carolinensis* (sourbush)
  - *Stachytarpheta jamaicensis* (Jamaica vervain)
  - *Triumfetta semitriloba* (Sacramento bur)
- Climate change may pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

#### Current conservation efforts:

- Captive propagation for genetic storage and reintroduction:
  - Waimea Valley Arboretum (2011) reported two individuals of *Melanthera micrantha* subsp. *micrantha* in refugia, representing a single wild individual.
  - The Center for Conservation Research and Training (2010) reported no current seeds in storage for the taxa.
  - The Harold L. Lyon Micropropagation Laboratory (2010) reported no micropropagation efforts for the taxa.
  - The National Botanical Garden (2011) reported no current controlled propagation efforts.

## 2.4 Synthesis

The interim stabilization goals for this species have only been partially met, as there are at least three populations containing 50 or more mature individuals (Table 1). There are currently four to six populations of *Lipochaeta micrantha* containing about 250 to 720

individuals, with populations at the Haupu Range (*L. micrantha* var. *exigua*, two populations, 100 to 150 individuals), and Koaie Canyon and Kawaiiki Valley (*L. micrantha* var. *micrantha*, two to four populations, 150 to 570 individuals). However, although there are approximately 250 to 720 individuals, not all threats are being managed at all known populations (Table 2). Therefore, *Melanthera micrantha* subsp. *micrantha* and *M. micrantha* subsp. *exigua* meets the definition of endangered, as it remains in danger of extinction throughout its range.

**Table 1. Status of *Melanthera micrantha* from listing through 5-year review.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Stabilization Criteria identified in Recovery Plan</b>	<b>Stabilization Criteria Completed?</b>
1994 (listing)	250-1,070	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	Unknown
1995 (recovery plan)	250-1,070	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Unknown
2003 (critical habitat)	231	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Unknown
2012 (5-year review)	250-720	0	All threats managed in all 3 populations	No (See Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Yes

**Table 2. Threats to *Melanthera micrantha* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Ungulates – Degradation of habitat and herbivory	A, C, D	Ongoing	No
Established ecosystem-altering invasive plant species degradation of habitat	A	Ongoing	No
Landslides and flooding	A	Ongoing	No
Established invasive plant species competition	E	Ongoing	No
Climate change	A, E	Increasing	No

### 3.0 RESULTS

#### 3.1 Recommended Classification:

- Downlist to Threatened**  
 **Uplist to Endangered**  
 **Delist**  
 *Extinction*  
 *Recovery*  
 *Original data for classification in error*  
 **No change is needed**

#### 3.2 New Recovery Priority Number:

**Brief Rationale:**

#### 3.3 Listing and Reclassification Priority Number:

**Reclassification (from Threatened to Endangered) Priority Number:** \_\_\_\_  
**Reclassification (from Endangered to Threatened) Priority Number:** \_\_\_\_  
**Delisting (regardless of current classification) Priority Number:** \_\_\_\_

**Brief Rationale:**

#### 4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Captive propagation for genetic storage and reintroduction:
  - Collect cuttings or seed from tagged individuals, keeping close track of the maternal source for use in *ex situ* propagation.
  - Continue to collect seeds from all existing populations and send to at least two or three different venues for propagation and storage.
- Reintroduction / translocation implementation – Reintroduce individuals into suitable habitat within historic range that is being managed for known threats to this species.
- Reintroduction / translocation protocol development – Maximize the genetic variation among individuals at each reintroduction site, based on microsatellite data and detailed information from crossing records.
- Surveys / inventories:
  - Conduct surveys in the historic habitat of the species to achieve a clearer understanding of population numbers that will drive future management decisions.
  - Relocate the disjunct population of *Melanthera micrantha* subsp. *micrantha* from Haupu, which has not been visited since 1991.
- Ungulate control – Protect all populations against browsing and disturbances from feral ungulates.
- Ungulate exclosures – Construct and maintain fenced exclosures around all populations.
- Established ecosystem-altering invasive plant species control – Control established ecosystem-altering invasive plant species around all populations.
- Competitive invasive plant species control – Control invasive nonnative plant species around all populations that compete with the species.
- Site / area / habitat protection – Implement erosion control measures to prevent landslides and flooding.
- Federal Register updates – Update the Federal Register to reflect changes in taxonomy to the taxa.
- Population biology research – Study *Melanthera micrantha* populations with regard to population size and structure, geographical distribution, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.
- Alliance and partnership development – Work with Hawaii Department of Forestry and Wildlife, and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Threats research – Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

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**Personal communications:**

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**Signature Page**  
**U.S. FISH AND WILDLIFE SERVICE**  
**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  
  X   No Change in listing status

**Appropriate Listing/Reclassification Priority Number, if applicable:**           

**Review Conducted By:**

Chelsie Javar, Fish and Wildlife Biologist  
Marie Bruegmann, Plant Recovery Coordinator  
Jess Newton, Endangered Species Recovery Program Leader  
Assistant Field Supervisor for Endangered Species

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

*for*

          *Jess Newton*          

Date   8/28/2012