5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Lipochaeta fauriei* (nehe)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 70 species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii

Name of Reviewer(s):

Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Assistant Field Supervisor for Endangered Species
Jeff Newman, Acting Deputy Field Supervisor

Methodology used to complete this 5-year 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 29, 2008. The review was based on the final critical habitat designation for *Melanthera fauriei* and other species from the island of Kauai (USFWS 2003), as well as a review of current, available information. The National Tropical Botanical Garden 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 the Plant Recovery Coordinator. The document was then reviewed by the Assistant Field Supervisor for Endangered Species and Acting Deputy Field Supervisor before submission to the Field Supervisor for approval.

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).

Application of the 1996 Distinct Population Segment (DPS) Policy:

This Policy does not apply to plants.

Review Analysis:

Please refer to the final critical habitat designation for *Melanthera fauriei* published in the Federal Register on February 27, 2003 (USFWS 2003) for a complete review of the specie's status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of *M. fauriei*.

In 2001, Wagner and Robinson transferred 14 Hawaiian *Lipochaeta* to the genus *Melanthera*, including *Lipochaeta fauriei*. This species is now recognized as *Melanthera fauriei* (Wagner and Robinson 2001; Wood 2008). This report includes plants on Kauai that were previously determined to be *Melanthera subcordata*, but have now been placed under *M. fauriei*. *Melanthera subcordata* is now considered to be a single-island endemic species (Wood 2008) restricted to Hawaii Island (Wagner and Robinson 2001).

At the time of listing in 1994 there were 5 populations, totaling fewer than 70 individuals (USFWS 1994). When critical habitat was designated in 2003, there were a total of 5 populations with 82 individuals of *Melanthera fauriei* known (USFWS 2003). *Melanthera fauriei* is restricted to the island of Kauai and was historically found in Olokele Canyon, but has not been seen in that valley since 1910. Several other populations of *M. fauriei* have never been relocated, including Hikimoe Valley observed in 1969, the lower drainage of Kawaiiki Valley observed both in 1987 and 1990, and Poopooiki Valley observed in 1987 (Wood 2008).

Melanthera fauriei is now known from 10 populations with an estimated total of 185 to 240 individuals. An increase in population numbers and individuals since listing is attributable to increased surveys. The overall numbers of individuals remain low, where in some locations there are less than 10 individuals. Locations of *M. fauriei*, with elevation and year of last reported visit included, are: Haeleele Valley, 640 meters (2,100 feet), 40 to 50 individuals, last visited in 2000; Kalalau Valley, 670 meters (2,200 feet), 15 to 20 individuals in 1991; Kawaiiki, 1,149 meters (3,770 feet), 1 individual in 1998; Koaie Canyon, 701 meters (2,300 feet), 2 individuals in 1998; Kuia Valley, 670 to 701 meters (2,200 to 2,300 feet), approximately 50 to 70 plants in 1999; Mahanaloa, 533 meters (1,750 feet), 12 individuals in 2005; Pohakuao, 396 meters (1,300 feet), 40 to 50 individuals on cliffs in 2002; Poomau Canyon, 549 meters (1,800 feet), 5 individuals in 2006; and Waialae, 949 meters (3,100 feet), 20 to 30 individuals in 2001 (Wood 2008). Perlman also reports an occurrence on Waimea Canyon Rim at 670 meters (2,200 feet) elevation in 2001 (Perlman 2008).

Melanthera fauriei has been found in several different types of habitat. *Metrosideros polymorpha* (ohia) - *Diospyros sandwicensis* (lama) forest is the habitat in Haeleele Valley; diverse mesic forest and cliff habitat in Kalalau, Kuia, Mahanaloa, and Pohakuao Valleys; *Acacia koa* (koa) - *Metrosideros polymorpha* mixed mesic forest in Kawaiiki and Waialae Valleys; transitional mixed mesic to wet *Metrosideros polymorpha* forest in Koaie Canyon; and dry to mesic relic *Diospyros sandwicensis* forest in Poomau Canyon (Wood 2008).

In Haeleele Valley, this species occurs in north facing forested slopes near a gulch bottom with *Diospyros sandwicensis* mixed mesic forest with *Acacia koa* (koa), *Diospyros sandwicensis*, *Dodonaea viscosa* (aalii), *Isodendrion laurifolium* (aupaka), *Metrosideros polymorpha* var. *glaberrima* (ohia), *Myrsine lanaiensis* (kolea), *Neraudia kauaiensis* (no common name [NCN]), *Nesoluma polynesicum* (keahi), *Nototrichium sandwicense* (kului), *Leptecophylla tameiameiae* (pukiawe), *Pisonia sandwicensis* (papala kepau), *Pleomele aurea* (hala pepe), *Pouteria sandwicensis* (alaa), *Psydrax*

odorata (alahee), *Pteralyxia kauaiensis* (kaulu), and *Sida fallax* (ilima) (Perlman 2008; Wood 2008).

Kalalau lowland diverse mesic forest is surrounded by precipitous cliffs with *Dryopteris unidentata* (akole), *Dubautia microcephala* (naenae), *Gouania meyenii* (NCN), *Kadua flynnii* (NCN), *Lobelia niihauensis* (NCN), *Lysimachia glutinosa* (NCN), *Melicope pallida* (alani), *Metrosideros polymorpha*, *Nototrichium divaricatum* (kului), *Peucedanum sandwicense* (makou), *Poa mannii* (NCN), *Schiedea attenuata* (NCN), and *Wilkesia gymnoxiphium* (iliau) (Wood 2008).

Melanthera fauriei occurs in Upper Kawaiiki, on Kaluahaulu Ridge (Mohihi-Waialae Trail) at 1,158 meters (3,800 feet) elevation, west of the trail along a windswept rim, then dropping into the drainage. The habitat is *Acacia koa - Metrosideros polymorpha* mixed mesic forest with *Dubautia laevigata* (naenae), *Dianella sandwicensis* (uki uki), *Poa sandwicensis* (NCN), *Peperomia* (ala ala wai nui), and *Schiedea stellarioides* (laulihilihi) (Wood 2008).

In Kuia Valley's north facing slopes, the habitat is mixed mesic forest with associated species including *Acacia koa*, *Aleurites moluccana* (kukui), *Antidesma platyphylla* (hame), *Coprosma waimeae* (olena), *Diospyros sandwicensis*, *Dodonaea viscosa*, *Dryopteris unidentata* (akole), *Diospyros sandwicensis*, *D. hillebrandii* (lama), *Elaeocarpus bifidus* (kalia), *Euphorbia haeleeleana* (NCN), *Kadua affinis* (manono), *K. knudsenii* (NCN), *Kokia kauaiensis* (kokio), *Metrosideros polymorpha*, *Nesoluma polynesicum*, *Nestegis sandwicensis* (olopua), *Pipturus albidus*, *P. kauaiensis* (mamake), *Pouteria sandwicensis* (alaa), *Psychotria mariniana*, *P. greenwelliae* (kopiko), and *Tetraplasandra waimeae* (ohe kikoola) (Perlman 2008; Wood 2008).

Mahanaloa Valley, down valley from the *Pteralyxia* exclosure, has relic diverse mesic forest with *Diospyros sandwicensis*, *Dodonaea viscosa*, *Euphorbia haeleeleana*, *Metrosideros polymorpha* var. *glaberrima*, *Nototrichium sandwicensis*, *Pleomele aurea*, *Psydrax odorata*, *Pteralyxia kauaiensis*, and *Xylosma hawaiiense* (maua) (Wood 2008).

In Pohakuao the habitat of relictual diverse mesic cliffs has a secondary succession of invasive introduced plant species. Associated native species include *Chamaesyce celastroides* var. *hanapepensis* (akoko), *Diospyros sandwicensis*, *Metrosideros polymorpha* var. *glaberrima*, *Myrsine lanaiensis*, *Pleomele aurea*, *Pouteria sandwicensis*, *Psychotria mariniana*, *Rauvolfia sandwicensis* (hao), *Santalum freycinetianum* var. *pyrularium* (iliahi), and *Wilkesia gymnoxiphium* (iliau) (National Tropical Botanical Garden 2008; USFWS 2003; Wood 2008).

In Poomau Canyon, habitat for this species is dry to mesic relic *Diospyros sandwicensis* forest along a stream, mostly dominated by invasive introduced plant species, including *Aleurites moluccana*, *Lantana camara*, *Melia azedarach* (pride-of-India), *Melinis minutiflora* (molasses grass), *M. repens* (natal redtop grass), *Salvia coccinea* (scarlet sage), and *Triumfetta semitriloba* (Sacramento burr) with occasional native dry forest trees of *Bobea timonioides* (ahakea), *Erythrina sandwicensis* (wiliwili), *Flueggea neowawraea* (mehamehame), *Metrosideros*

polymorpha, *Nesoluma polynesicum*, *Nototrichium sandwicensis*, and *Rauvolfia sandwicensis* (Wood 2008).

In Waialae Valley's, headwaters south of Kaluahaulu Ridge Trail, on north facing slopes along the ridge and down to the drainage, the habitat is *Acacia koa –Metrosideros polymorpha* montane mesic forest, with *Alphitonia ponderosa* (kauila), *Alyxia stellata* (maile), *Antidesma platyphylla*, *Blechnum appendiculatum* (NCN), *Chamaesyce halemanui* (akoko), *Charpentiera elliptica* (papala), *Claoxylon sandwicensis* (laukea), *Coprosma foliosa* (pilo), *Dianella sandwicensis*, *Diospyros sandwicensis*, *Dodonaea viscosa*, *Doodia kunthiana* (okupukupu), *Doryopteris decipiens* (kumuniu), *Dryopteris fusco-atra* (ii), *Dryopteris unidentata*, *Gahnia beecheyi* (NCN), *Hibiscus waimeae* ssp. *waimeae* (kokio keokeo), *Isodendrion laurifolium*, *Kadua affinis*, *K. knudsenii*, *Leptecophylla tameiameiae* (pukiawe), *Lipochaeta fauriei* (nehe), *Lysimachia kalalauensis* (NCN), *Melicope anisata*, *M. barbigera*, *Microlepia strigosa* (palapalai), *Perrottetia sandwicensis* (olomea), *Pipturus albidus* (mamake), *Poa sandwicensis (NCN)*, *Pouteria sandwicensis*, *Pritchardia minor* (loulu), *Psychotria greenwelliae*, *P. mariniana*, *Pteralyxia kauaiensis*, *Pteris excelsa*, *Sida fallax* (ilima), *Streblus pendulinus* (aiai), *Syzygium sandwicensis* (ohia ha), *Urera glabra* (opuhe), *Wikstroemia furcata* (akia), and *Zanthoxylum dipetalum* (kawau) (Wood 2008).

Threats to *Melanthera fauriei* include deer (*Odocoileus hemionus*), goats (*Capra hircus*), pigs (*Sus scrofa*), rats (*Rattus spp.*), (Factors A, C, and D) fire, landslides, and the loss of reproductive vigor as the result of limited numbers of existing individuals (Factor E). Invasive introduced plant species which compete with *M. fauriei* and modify habitat include *Aleurites moluccana* (kukui), *Andropogon glomeratus* (*beardgrass*), *Blechnum appendiculatum* (NCN), *Bryophyllum pinnatum* (airplant), *Grevillea robusta* (silk oak), *Hyptis pectinata* (comb hyptis), *Lantana camara*, *Melia azedarach*, *Erigeron karvinskianus* (daisy fleabane), *Nephrolepis multiflora* (NCN), *Pluchea carolinensis* (sourbush), *Psidium cattleianum* (strawberry guava), *Psidium guajava* (common guava), *Rubus rosifolius* (thimbleberry), *Salvia coccinea*, *Setaria parviflora* (yellow foxtail), and *Triumfetta semitriloba* (Factor E) (National Tropical Botanical Garden 2008; Perlman 2008; Wood 2008). Coffee twig borer (*Xylosandrus compactus*) and native seed eating bugs of the genus *Nysius* were observed in the pappus bristles of *Melanthera fauriei* growing in Pohakuao Valley (Factor C) (Wood 2008). Climate change may also pose a threat to *M. fauriei* (Factors A and E). However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

Two seed collections with a total of 2,000 seeds from Kuia and Pohakuao are stored at the National Tropical Botanical Garden Seed Bank (M. Clark, National Tropical Botanical Garden, pers. comm. 2008; National Tropical Botanical Garden 2009).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Kauai (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Melanthera fauriei* is a short-lived perennial, and to be considered stable, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (at other than

the plant's natural location, such as a nursery or arboretum) collection. In addition, a minimum of 3 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.

The interim stabilization goals for this species have not been met (see Table 1). While 3 populations may have close to 50 or more individuals they have not been surveyed since 1999 and 2000 and their current status is unknown. In addition, all threats are not being managed. Therefore, *Melanthera fauriei* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Protect all occurrences against trampling, browsing, and disturbances from feral ungulates.
- Control introduced invasive plant species around wild plants.
- Survey formerly identified locations for current status of species.
- Assess the genetic variability of extant populations.
- Work with Hawaii Division of Forestry and Wildlife and Hawaii State Parks to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Investigate techniques to improve natural recruitment.
- Update the listed entity on 50 CFR 17 to match the currently recognized taxonomy.

References:

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Wood, K.R. 2008. Notes on *Melanthera fauriei* (H.Lév.) W.L. Wagner & H. Rob. (Asteraceae). National Tropical Botanical Garden, Kalaheo, Hawaii. 6 pages. Unpublished.

Personal communications:

Clark, Margaret. 2008. Seed Bank Manager, National Tropical Botanical Garden, Kalaheo, Hawaii. *Melanthera fauriei*: note to the record, dated November 28, 2008.

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

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	<70	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	<70	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	82	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2009 (5-year review)	185-240	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

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SIGNATURE PAGE for 5-YEAR REVIEW of *Lipochaeta fauriei* (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

Field Supervisor, Pacific Islands Fish and Wildlife Office

for

Date AUG 2 7 2010