

Lipochaeta venosa
(No common name)

**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 venosa* (No common name)

TABLE OF CONTENTS

1.0	GENERAL INFORMATION	3
1.1	Reviewers.....	3
1.2	Methodology used to complete the review:.....	3
1.3	Background:.....	3
2.0	REVIEW ANALYSIS	4
2.1	Application of the 1996 Distinct Population Segment (DPS) policy.....	4
2.2	Recovery Criteria.....	5
2.3	Updated Information and Current Species Status	6
2.4	Synthesis.....	11
3.0	RESULTS	13
3.1	Recommended Classification:.....	13
3.2	New Recovery Priority Number:.....	13
3.3	Listing and Reclassification Priority Number:	13
4.0	RECOMMENDATIONS FOR FUTURE ACTIONS	13
5.0	REFERENCES	14
	Signature Page.....	17

5-YEAR REVIEW
***Lipochaeta venosa* (No common name)**

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 the Recovery Plan for *Lipochaeta venosa* and *Isodendrion hosakae* (USFWS 1994), 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. 1979. Endangered and threatened wildlife and plants; determination that three Hawaiian plants are endangered; final rule. Federal Register 44(221):62468-62470.

Date listed: November 29, 1979

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:

No critical habitat rules have been published for *Lipochaeta venosa* (USFWS 2003).

1.3.4 Review History:

Species status review [FY 2011 Recovery Data Call (August 2011)]:

Declining

Recovery achieved:

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

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

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: USFWS. 1994. Recovery plan for *Lipochaeta venosa* and *Isodendrion hosakae*. U.S. Fish and Wildlife Service, Portland, Oregon. 45 pages + appendices. Available online at

<<http://www.fws.gov/pacificislands/recoveryplans.html>>.

Date issued: May 23, 1994

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, B, C, D, and E) affecting this species is presented in Section 2.3.2 and Table 2.

Downlisting and delisting objectives are provided in the recovery plan for *Lipochaeta venosa* and *Isodendron hosakae* (USFWS 1994). For downlisting, identified threats must be controlled and *Lipochaeta venosa* must be present at all six Parker Ranch sites and on the Department of Hawaiian Home Lands where the species occurred (as identified in the recovery plan). Each site must contain naturally reproducing populations that include seedlings, juveniles, and adults, with an age distribution allowing for a stationary or growing population size. These populations should be maintained for at 10 years. Activities that must be completed include: construction and maintenance of ungulate-proof fences around each population; establishment of firebreaks and development of a fire response and suppression plan for Parker Ranch; establishment of a germ plasm reserve; control of fountain grass and restoration of native habitat; and successful expansion of the species to all six Parker Ranch sites where the species occurred and on the Department of Hawaiian Home Lands.

This recovery objective has not been met.

Delisting objectives for *Lipochaeta venosa* was not developed because it was not foreseen at the time the recovery plan was written (USFWS 1994). Largely due to the continuation of ranching, cinder mining, and the nearly complete destruction of the native vegetation, only small remnants of habitat for *L. venosa* are left.

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 venosa is a semi-woody and semi-deciduous shrub that often grows somewhat prostrate (USFWS 1994). Details of the life history of *L. venosa* are limited, although it is known that members of the genus are usually both self-fertile and outcrossing (USFWS 1994), and it is believed that vegetative reproduction in the field is likely (USFWS 1994). It is unknown how long individuals of *L. venosa* survive (USFWS 1994), but the species is treated as a short-lived perennial (Center for the Environmental Management of Military Lands [CEMML] 2003a).

As with most other members of the aster family (Asteraceae), the flowers are believed to be pollinated by non-specific insects (USFWS 1994). Based on herbarium specimens housed at the Bishop Museum (2011) and National Tropical Botanical Garden (2011), flowering and fruiting of the species occurs from January through June.

The remaining populations of *Lipochaeta venosa* on Parker Ranch land occur on steep slopes. This may be an artifact of being relatively free of grazing pressure, rather than being their preferred habitat (USFWS 1994; Arnett 2002). One line of reasoning for that interpretation was its occurrence on much more gradually sloped habitat at the Hawaiian Home Lands site (USFWS 1994).

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:

In the 1980s, approximately 4,150 individuals of *Lipochaeta venosa* were found on four cinder cones examined by Cuddihy *et al.* (1982). The number of individuals on Nohonaohae was said to be so dense in some parts that only an estimate was possible (Cuddihy *et al.* 1982).

At the time of the recovery plan, *Lipochaeta venosa* was known from six populations. Five populations, each on a separate cinder cone, occurred on Parker Ranch land, with sizes at the time having been estimated at 24 to 2,000 individuals. A sixth population that was only discovered in 1993 occurs on Hawaiian Home Lands, where it was known from over 100 individuals. These six populations represented all historically known populations (USFWS 1994).

Arnett (2002) reported 3,345 estimated individuals of *Lipochaeta venosa* at Keamuku. This included an estimated 1,250 individuals from Puu Nohonaohae. In 2003, the estimated number of populations for *L. venosa* was four (CEMML 2003a). The number of individuals for *L. venosa* at the “off-road maneuver area” site was 1,171 individuals (CEMML 2003a), out of a total estimated population for the species at that time of approximately 6,750 individuals (CEMML 2003a). One population consisted of 4,063 individuals (CEMML 2003a).

A wildfire occurred in December 2007 about 1.6 kilometers (1.0 mile) north of the northern tip of the U.S. Army’s Keamuku Parcel, which was carried primarily by thick stands of *Pennisetum setaceum* (fountain grass) (U.S. Army Garrison 2007). Approximately 207 individuals of *Lipochaeta venosa* were destroyed by this fire, based on surveys at the site the following June, when no individuals were seen (U.S. Army Garrison 2007). Also in 2007, the Plant Extinction Prevention Program (2007) reported the habitat condition as being “very degraded” where approximately 3,300 individuals of *L. venosa* had been observed by CEMML (2003) and it was uncertain if that population still persisted.

The most recent population estimate for *Lipochaeta venosa* by the Plant Extinction Prevention Program identifies two populations totaling 3,559 individuals (Plant Extinction Prevention Program 2010).

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

The chromosome number of *Lipochaeta venosa* is $n = 15$ based on Rabakonandrianina (1980). Prior to Rabakonandrianina (1980), Gardner (1979) had placed the species in the haploid section *Aphanopappus*. Studies by Gardner (1976) and Rabakonandrianina and Carr (1981) suggested that the genetic background of the genus *Lipochaeta*, which is a Hawaiian endemic, may include the genus *Wedelia*. Gardner and LaDuke (1978) carried out an early form of cladistic analysis of *Lipochaeta*, termed a character compatibility analysis (later called “clique analysis”), but it did not shed any light on the origin of *L. venosa*.

2.3.1.4 Taxonomic classification or changes in nomenclature:

Lipochaeta venosa was originally described by Sherff based on a type specimen collected in 1910 by Joseph Rock from Nohonaohae Crater. The species was treated in *Lipochaeta* by Gardner (1979) and Wagner *et al.* (1999). Wagner *et al.* (1999) discussed its similarity to the widespread and polymorphic species *L. subcordata* A. Gray and included in its synonymy the name *L. pinnatifida* H. St. John.

Wagner and Robinson (2001) transferred the species to *Melanthera* as *M. venosa* (Sherff) W. L. Wagner and H. Rob. In that publication, the authors also included the following names in synonymy under *M. venosa*: *Lipochaeta pinnatifida* H. St. John, *L. setosa* H. St. John, and *L. warshaueri* H. St. John. The herbaria at Bishop Museum (2011) and National Tropical Botanical Garden (2011) both file the species under the genus *Melanthera*. Some literature sources also are using *Melanthera* (U.S. Army Garrison 2007). Therefore, the species will be referred to as *Melanthera venosa* for the remainder of this review. Although some specimens were annotated using the name *Wollastonia venosa*, and the binomial has been cited in publications (Arnett 2002; CEMML 2003a), the generic name and the combination were never formally published (International Plant Names Index 2011), so there is no reason to use *Wollastonia* as a synonym in future reports.

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):

Melanthera venosa occurs in dry mixed shrublands from 725 to 1,136 meters (2,360 to 3,728 feet) elevation and is historically known only from the South Kohala District (Wagner *et al.* 1999; Wagner and Robinson 2001; Arnett 2002); particularly on cinder cones (USFWS 1994). More specifically, the historically known sites are all on the western slope of Mauna Kea in soils derived from volcanic cinder or ash (USFWS 1994; CEMML 2003a). It was also collected in 1980 and said to be “fairly common” in a small ravine on the northwestern slope of Nohonaohae Crater (*Gustafson 1705* at National Tropical Botanical Garden [2011]), so it may also grow in somewhat more mesic conditions.

Native plant species associated with *Melanthera venosa* include *Bidens menziesii* (kookoolau), *Chenopodium oahuense* (aheahea), *Dodonaea viscosa* (aalii), *Dubautia ciliolata* ssp. *ciliolata* (kupaoa), *Euphorbia olowaluana* (akoko), *Lipochaeta lavarum* (nehe), *Osteomeles anthyllidifolia* (ulei), *Sida fallax* (ilima), and *Wikstroemia pulcherrima* (akia) (USFWS 1994; Arnett 2002; Bishop Museum 2011; National Tropical Botanical Garden 2011).

Soils over which *Melanthera venosa* is said to grow include fine sandy loams, or loamy fine sands (USFWS 1994), but the actual sites may be more coarsely cindery, thus exacerbating the effects of seasonal dryness. The soils are derived from pahoehoe rubble (Arnett 2002). Population records (Hawaii Biodiversity and Mapping Program 2010) indicate that ustollic eutrandedpts is the only soil group associated with *M. venosa*.

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 – Cattle (*Bos taurus*) (Arnett 2002; CEMML 2003a)
- Established ecosystem-altering invasive plant species degradation

of habitat (USFWS 1994; Bishop Museum 2011; National Tropical Botanical Garden 2011)

- *Lantana camara* (lantana)
- *Pennisetum setaceum* (fountain grass)

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

None reported.

2.3.2.3 Disease or predation:

Threats:

- Ungulate predation or herbivory – Grazing by cattle (Arnett 2002; CEMML 2003a)

2.3.2.4 Inadequacy of existing regulatory mechanisms:

Threat:

- 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 *Melanthera venosa* occurs continue to threaten this species.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

Threats:

- Ungulate trampling – By cattle (Arnett 2002; CEMML 2003a)
- Established invasive plant species competition (Arnett 2002; CEMML 2003a)
- Human disturbance – Cinder mining (Arnett 2002; CEMML 2003a).
- Military activities – Dust due to military training maneuvers (Arnett 2002; CEMML 2003a)
- Fire – High heat-content fires (USFWS 1994; CEMML 2003a). Low intensity fires evidently do not necessarily eradicate the species, given that a site burned in 1983 recovered from a fire (USFWS 1994). In contrast, the high intensity fire in December 2007 in the U.S. Army's Keamuku Parcel appeared to kill 207 individuals (CEMML 2003a).
- 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:
 - Cuttings of *Melanthera venosa* are said to root readily in the greenhouse, where they easily form adventitious roots at the nodes (USFWS 1994).
 - Cuttings have been grown at the Hawaii State Division of Fish and Wildlife Hilo Base yard nursery and at the Botany Department at the University of Hawaii at Manoa (USFWS 1994).
 - Attempts to propagate *M. venosa* by seed have been less successful. Seeds planted at the National Tropical Botanical Garden failed to grow, and at the time of the recovery plan it was unconfirmed whether the species had ever been grown from seed (USFWS 1994).
 - The Volcano Rare Plant Facility (2011) reported 25 individuals from Nohonaohae in controlled propagation.
- Fire protection – In 2003, the Pohakuloa Training Area completed an Integrated Wildland Fire Management Plan to reduce the threat of wildfires (CEMML 2003b). In June 2012, Pohakuloa Training Area drafted a revision of their 2003 Integrated Wildland Fire Management Plan (CEMML 2012).

2.4 Synthesis

The downlisting goals for this species have not been met, as none of the populations have been managed to control threats (*e.g.*, fenced, firebreaks, etc.) (Table 2). In addition, not all of the populations are naturally reproducing and increasing in number (Table 1). Therefore, *Melanthera venosa* meets the definition of endangered, as it remains in danger of extinction throughout its range.

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

Date	No. wild individuals	No. outplanted	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
1979 (listing)	~4,150		All threats managed at all seven sites	No
			Complete genetic storage	No
			Naturally reproducing populations at all seven sites	No
			Maintained for 10 years	No
1994 (recovery plan)	~220-10,100		All threats managed in all 7 populations	No
			Complete genetic storage	No
			Naturally reproducing populations at all seven sites	No
			Maintained for 10 years	No
2012 (5-year review)	3,559	0	All threats managed in all 7 populations	No (See Table 2)
			Complete genetic storage	Partially
			Naturally reproducing populations at all seven sites	Unknown
			Maintained for 10 years	No

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

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – Degradation of habitat, herbivory, trampling	A, C, D, E	Ongoing	No
Established ecosystem-altering invasive plant species degradation of habitat	A	Ongoing	No
Fire	E	Ongoing	No
Established invasive plants species competition	E	Ongoing	No
Human disturbance – Cinder mining	E	Ongoing	No
Military activities	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 – Continue to collect cuttings or seed from all populations for adequate genetic storage and for reintroduction.

- Captive propagation protocol development – Augment the number of cuttings available for reintroduction, but use as many sources of cuttings as possible so as to maximize the amount of genetic variation represented in reintroductions.
- Reintroduction / translocation site identification:
 - Identify potentially new sites for reintroduction that would have minimal chances of disturbance by (in particular) human activity or fire.
 - Reintroductions should be made in the early winter to take advantage of the wetter months between December and April.
- Ecosystem-altering invasive plant species control – Revisit known populations and control invasive introduced plant species from the area, particularly *Pennisetum setaceum* (fountain grass).
- Competitive invasive plant species control – Control invasive nonnative plant species around all populations that compete with the species.
- Fire protection – Develop and implement fire management plans for all wild and reintroduced populations.
- Ungulate control – Protect all populations against browsing, trampling, and disturbances from feral ungulates.
- Ungulate exclosures – Construct and maintain fenced exclosures around all populations.
- Site / area / habitat protection – Implement control measures to prevent human disturbance from cinder mining.
- Threats research – Study *Melanthera venosa* populations with regard to threats of military activities at U.S. Army’s Pohakuloa Training Area.
- Surveys / inventories – Resurvey suitable habitat of *Melanthera venosa* from its historical range to find new populations or rediscover old populations.
- Population biology research – Carry out field studies to determine which species of insects or other arthropods are on flowers of *M. venosa* and that may be acting as pollinators.
- Population viability monitoring – Mark individuals of *M. venosa* in the field, obtain geo-coordinates to the nearest meter, and monitor the individuals at least twice a year to better understand the longevity of individuals.
- 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.
- Alliance and partnership development – Work with the Hawaii Division of Forestry and Wildlife, U.S. Army, and other land managers to continue implementation of ecosystem-level restoration and management to benefit this species.

5.0 REFERENCES

- Arnett, M. 2002. Report of survey for rare plants on the Keamuku parcel, Island of Hawaii, Center for Environmental Management of Military Lands Colorado State University, Fort Collins, Colorado. 96 pages.
- Bishop Museum. 2011. Herbarium Pacificum database. Available online at <http://nsdb.bishopmuseum.org/>. Accessed 28 February 2011.
- [CEMML] Center for the Environmental Management of Military Lands, Colorado State University. 2003a. Programmatic biological assessment for transformation of the 2nd brigade 25th infantry division (light), Colorado State University, Fort Collins, Colorado, prepared for the U.S. Army Corps of Engineers, Honolulu District, Hawaii. xviii + 376 pages.
- [CEMML] Center for the Environmental Management of Military Lands, Colorado State University. 2003b. Integrated wildland fire management plan, Pohakuloa and Oahu Training Areas, U.S. Army, Hawaii and 25th Infantry Division (light). 22 August 2003. 436 pages.
- [CEMML] Center for the Environmental Management of Military Lands, Colorado State University. 2012. Draft integrated wildland fire management plan, U.S. Army Garrison, Hawaii. June 2012. 139 pages + appendices.
- Cuddihy, L.W., J.A. Davis, and S.J. Anderson. 1982. A botanical survey of twelve cinder cones in south Kohala, Island of Hawaii. Endangered species program, Division of Forestry and Wildlife, Department of Lands and Natural Resources, Hilo, Hawaii. 61 pages.
- Gardner, R.C. 1976. Evolution and adaptive radiation in *Lipochaeta* (Compositae) of the Hawaiian Islands. *Systematic Botany* 1(4):383-391.
- Gardner, R.C. 1979. Revision of *Lipochaeta* (Compositae: Heliantheae) of the Hawaiian Islands. *Rhodora* 81(827):291-343.
- Gardner, R.C., and J.C. LaDuke. 1978. Phyletic and cladistic relationships in *Lipochaeta* (Compositae). *Systematic Botany* 3(2):197-207.
- Hawaii Biodiversity and Mapping Program. 2010. Element occurrence records for *Lipochaeta venosa* through 31 March 2010. 30 pages. Unpublished.
- International Plant Names Index. 2011. The international plant names index database, plant name query. Available online at <http://www.ipni.org/ipni/plantnamesearchpage.do>. Accessed 28 February 2011.
- National Tropical Botanical Garden. 2011. Herbarium database. Available online at <http://ntbg.org/herbarium/>. Accessed 28 February 2011.

- Plant Extinction Prevention Program. 2007. Hawaii Island PEP report, May 2, 2007-June 30, 2007. Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife. 4 pages. Unpublished.
- Plant Extinction Prevention Program. 2010. Plant Extinction Prevention Program annual report, fiscal year 2010 (July 1, 2009-June 30, 2010). 122 pages. Unpublished.
- Rabakonandrianina, E. 1980. Infrageneric relationships and the origin of the Hawaiian endemic genus *Lipochaeta* (Compositae). *Pacific Science* 34(1):29-39.
- Rabakonandrianina, E., and G.D. Carr. 1981. Intergeneric hybridization, induced polyploidy, and the origin of the Hawaiian endemic *Lipochaeta* from *Wedelia* (Compositae). *American Journal of Botany* 68(2):206-215.
- U.S. Army Garrison. 2007. Report for the ecosystem management program, Pohakuloa Training Area, island of Hawaii. 85 pages + appendices. Unpublished.
- [USFWS] U.S. Fish and Wildlife Service. 1979. Endangered and threatened wildlife and plants; determination that three Hawaiian plants are endangered; final rule. *Federal Register* 44(221):62468-62470.
- [USFWS] U.S. Fish and Wildlife Service. 1994. Recovery plan for *Lipochaeta venosa* and *Isodendrion hosakae*. U.S. Fish and Wildlife Service, Portland, Oregon. 45 pages + appendices. Available online at <http://www.fws.gov/pacificislands/recoveryplans.html>.
- [USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; final designation and nondesignation of critical habitat for 46 plant species from the island of Hawaii, Hawaii; final rule. *Federal Register* 68(127):39623-39761.
- Volcano Rare Plant Facility. 2011. Controlled propagation report to U.S. Fish and Wildlife Service. Volcano, Hawaii. Unpublished.
- Wagner, W.L., D.R. Herbst and S.H. Sohmer. 1999. Manual of the flowering plants of Hawaii, revised edition. University of Hawaii and Bishop Museum Press, Honolulu, Hawaii. 1,918 pages.
- Wagner, W.L., and H.L. Robinson. 2001. *Lipochaeta* and *Melanthera* (Asteraceae: Heliantheae subtribe Ecliptinae): establishing their natural limits and a synopsis. *Brittonia* 53(4):539-561.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Lipochaeta venosa* (No common name)

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