# 5-YEAR REVIEW

Short Form Summary

**Species Reviewed**: *Lipochaeta kamolensis* (nehe)

**Current Classification**: Endangered

**Federal Register Notice announcing initiation of this review**:

[USFWS] U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; 5-year status reviews of 46 species in Idaho, Oregon, Washington, Nevada, Montana, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 77(44):13248-13251.

**Lead Region/Field Office**:

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

**Name of Reviewer(s)**:

Chelsie Javar-Salas, Plant Biologist, PIFWO
Maui nui and Hawaii Island Team Manager, PIFWO
Marie Bruegmann, Plant Recovery Coordinator, PIFWO
Recovery Program Lead, PIFWO
Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

**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 March 6, 2012. The review was based on a review of current, available information since the last 5-year review for *Lipochaeta kamolensis* (USFWS 2008). The evaluation by Chelsie Javar-Salas, Plant Biologist, was reviewed by the Island Team Manager, and Plant Recovery Coordinator, followed by the Recovery Program Lead. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

**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 *Lipochaeta kamolensis* published on July 23, 2009 (available at https://ecos.fws.gov/docs/five_year_review/doc2453.pdf) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of *L. kamolensis*.

This short-lived perennial herb is endangered and endemic to the island of Maui (USFWS 1997). The current status and trends for *Lipochaeta kamolensis* are provided in the tables below.

New status information:
In 2012, there were approximately 30 to 40 individuals of *Lipochaeta kamolensis* on East Maui (USFWS 2012; A. Medeiros, U.S. Geological Survey, pers. comm. 2010). A second population containing approximately 100 individuals appears to be of a hybrid swarm between *L. kamolensis* and *Melanthera rockii* (USFWS 2012). This potential hybrid population was mentioned in the previous 5-year review (USFWS 2009). No reports confirming this population as a hybrid swarm have been submitted to USFWS.

Overall, *Lipochaeta kamolensis* has increased from approximately 25 wild individuals reported in the last 5-year review to approximately 30 to 40 wild individuals (USFWS 2012; A. Medeiros, pers. comm. 2010).

New taxonomic information:
The 2012 supplement to the *Manual of the Flowering Plants of Hawaii* (Wagner *et al*. 2012) accepts the change from the genus *Lipochaeta* to the currently accepted *Melanthera*, and recognizes *Lipochaeta kamolensis* as *Melanthera kamolensis*. In 2012, USFWS proposed to revise the taxonomic status for this species when it proposed to revise critical habitat designations on Maui, Lanai, Kahoolawe, and Molokai (USFWS 2012). The proposed change will recognize *Lipochaeta kamolensis* with the new name of *Melanthera kamolensis*. The range of the species has not changed with this taxonomic revision. The recognition and official taxonomic change by USFWS of *M. kamolensis* will be finalized in the final rule for critical habitat designations on Maui, Lanai, Kahoolawe, and Molokai. The species will be recognized as *Melanthera kamolensis* for the remainder of this review.

New threats:
- Climate change destruction 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 Hawaii 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 kamolensis* is highly vulnerable to the impacts of climate change. Therefore, additional management actions are needed to conserve this taxon into the future.
- Stochastic events – Drought mortality and reduced viability – Drought may exacerbate the effects of ungulates and has direct adverse impacts on *M. kamolensis* (PEPP 2013).
- Landslides and flooding destruction or degradation of habitat – This species is threatened by landslides and erosion (PEPP 2012).

New management actions:
- Captive propagation for genetic storage and reintroduction
    - The Harold L. Lyon Arboretum Micropropagation Lab (2013) has six propagules of *M. kamolensis* in captive propagation.
    - There are approximately 400 seeds in storage at the Harold L. Lyon Arboretum Seed Conservation Laboratory (2013).

- The National Tropical Botanical Garden (2013) has an unspecified amount of seed in storage for *M. kamolensis*.
- The Olinda Rare Plant Facility (2013) has 57 propagules in their nursery.
- The Plant Extinction Prevention Program (2013) collected cuttings from three wild individuals of *M. kamolensis* and one possible hybrid individual. The cuttings were transported to Olinda Rare Plant Facility for captive propagation.

- Surveys / inventories
  - A survey of the East Maui population was conducted by the Plant Extinction Prevention Program (2012) to determine the status of the species. Approximately 19 mature individuals and 4 seedlings were observed.
  - In 2012, a survey for *M. kamolensis* was conducted at the Alena population (PEPP 2013).
  - In 2013, two new mature individuals were discovered while monitoring the wild population of *M. kamolensis* (PEPP 2013).
- Population viability monitoring and analysis – The Plant Extinction Prevention Program (2013) monitored the wild populations of *M. kamolensis*.
- Listing and critical habitat designation – Four units of unoccupied and occupied areas of critical habitat for *M. kamolensis* were proposed in the lowland dry ecosystem on Maui (USFWS 2012). The final rule for critical habitat designations has not been published at the time of this review.

**Synthesis**:
Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for Maui plant cluster (USFWS 1997), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Melanthera kamolensis* is a short-lived perennial, and to be considered stable, this species 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 three populations total should be documented on Maui. 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, as currently no population of 50 mature individuals exists (Table 1) and all threats are not sufficiently managed throughout its range (Table 2). Therefore, *Melanthera kamolensis* meets the definition of endangered as it remains in danger of extinction throughout its range.

**Recommendations for Future Actions:**
- Captive propagation for genetic storage and reintroduction
  - Continue collection of genetic resources for storage, propagation, and reintroduction into protected suitable habitat within historical range.
  - Evaluate genetic resources currently in storage to determine the need to place additional genetic resources in long-term storage due to this species' vulnerability to climate change.
- Surveys / inventories – Survey geographical and historical range for a current assessment of the species' status.

- Ungulate monitoring and control – Fence remaining populations to protect them from the impacts of feral ungulates.
- Reintroduction / translocation – Augment current natural populations to increase numbers of individuals.
- Fire monitoring and control – Develop and implement a fire management plan for all populations.
- Invasive plant monitoring and control – Control invasive introduced plant species within enclosures.
- Population viability monitoring and analysis – Continue monitoring wild populations.
- Taxonomy research – Conduct research on the taxonomy of the species to confirm if the population at Alena is a hybrid swarm between *M. kamolensis* and *M. rockii*.
- Climate change adaptation strategy – Research the suitability of habitat for reintroducing this species in the future due to the impacts of climate change.
- Alliance and partnership development – Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this taxon.

**Table 1. Status and trends of *Melanthera kamolensis* from listing through current 5-year review**.

| Date | No. wild indivs | No. outplanted | Stabilization Criteria identified in Recovery Plan | Stabilization Criteria Completed? |
|---|---|---|---|---|
| 1992 (listing) | <500 | 0 | All threats managed in all 3 populations | No |
| | | | Complete genetic storage | No |
| | | | 3 populations with 50 mature individuals each | Partially |
| 1997 (recovery plan) | <200 | 0 | All threats managed in all 3 populations | No |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | No |
| 2003 (critical habitat) | <500 | 0 | All threats managed in all 3 populations | Unknown |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | Partially |
| 2009 (5-year review) | 25 | 0 | All threats managed in all 3 populations | No |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | Partially |
| 2012 (critical habitat – proposed) | 30-40 | 0 | All threats managed in all 3 populations | Partially |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | No |
| 2014 (5-yr review) | 30-40 | 0 | All threats managed in all 3 populations | Partially |
| | | | Complete genetic storage | Partially |
| | | | 3 populations with 50 mature individuals each | No |

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

| Threat | Listing factor | Current Status | Conservation/ Management Efforts |
|---|---|---|---|
| Ungulates – degradation of habitat and herbivory | A, C, D, E | Ongoing | Partially, hybrid population fenced |
| Invasive introduced plants | A, E | Ongoing | None |
| Fire | E | Ongoing | None |
| Landslides and erosion | E | Ongoing | None |
| Drought | E | Ongoing | None |
| Low numbers | E | Ongoing | Partially, captive propagation for genetic storage and reintroduction |
| Climate change | A, E | Increasing | None |

**References:**

See previous 5-year review for a full list of references (USFWS 2009). Only references for new information are provided below.


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. 141 pages.

Harold L. Lyon Arboretum Micropropagation Laboratory. 2013. Micropropagation database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Harold L. Lyon Arboretum Seed Conservation Laboratory. 2013. Seed storage database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

National Tropical Botanical Garden. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 30 pages. Unpublished.

Olinda Rare Plant Facility. 2013. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. 5 pages. Unpublished.

[PEPP] Plant Extinction Prevention Program. 2012. Plant Extinction Prevention Program annual report, fiscal year 2012 (July 1, 2011-June 30, 2012). 169 pages. Unpublished.

[PEPP] Plant Extinction Prevention Program. 2013. Plant Extinction Prevention Program annual report, fiscal year 2013 (July 1, 2012-June 30, 2013). 207 pages. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1997. Recovery plan for the Maui plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 130+ pages.

[USFWS] U.S. Fish and Wildlife Service. 2009. *Lipochaeta kamolensis* 5-year review short form summary. U.S. Fish and Wildlife Service, Honolulu, Hawaii. 7 pages.

[USFWS] U.S. Fish and Wildlife Service. 2012. Endangered and threatened wildlife and plants; listing 38 species on Molokai, Lanai, and Maui as endangered and designating critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species; proposed rule. Federal Register 77(112):34464-34775.

Wagner, W.L., D.H. Herbst, N. Khan, and T. Flynn. 2012. Hawaiian vascular plant updates: a supplement to the manual of the flowering plants of Hawaii and Hawaii's ferns and fern allies, version 1.3. Available online at <http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/Hawaiian_vascular_plant_updates_1.3.pdf>. Accessed on February 14, 2014.

**Personal communication:**

Medeiros, Arthur. 2010. Research biologist, U.S. Geological Survey. E-mail to Sam Aruch, private consultant, dated September 28, 2010. Subject: USFWS updates for *Melanthera kamolensis* and *Neraudia sericea*.

**U.S. FISH AND WILDLIFE SERVICE**
**SIGNATURE PAGE for 5-YEAR REVIEW of *Lipochaeta kamolensis* (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**:_____

for **Programmatic Deputy Field Supervisor, Pacific Islands Fish and Wildlife Office**

Maile M Bluegmann Date 2014-03-27