

Eragrostis fosbergii
(Fosberg's love grass)

**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: *Eragrostis fosbergii* / Fosberg's love grass

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5-YEAR REVIEW
***Eragrostis fosbergii* (Fosberg's love grass)**

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 March 16, 2009. The review was based on final critical habitat designations for *Eragrostis fosbergii* and other species from the island of Oahu (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 Tamara Sherrill, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before submittal 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. 2009. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 103 species in Hawaii. Federal Register 74(49):11130-11133.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1996. Endangered and threatened wildlife and plants; determination of endangered status for twenty-five plant species from the island of Oahu, Hawaii; final rule. Federal Register 61(198):53089-53108.

Date listed: October 10, 1996

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 designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, Hawaii; final rule. Federal Register 68(116):35949-36406.

Critical habitat was designated for *Eragrostis fosbergii* in a single unit totaling 81 hectares (199 acres). This designation includes habitat on State lands (USFWS 2003).

1.3.4 Review History:

Species status review [FY 2010 Recovery Data Call (September 2010)]:
Declining

Recovery achieved:

1 (0-25%) (FY 2007 Recovery Data Call – most recent year reported)

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

5

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: U.S. Fish and Wildlife Service. 1998. Recovery plan for Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages, plus appendices.

Date issued: August 10, 1998.

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. Listing Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for Oahu plants (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Eragrostis fosbergii* is a short-lived perennial, and to be considered stabilized, 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 islands where they now occur or occurred historically. 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 *Eragrostis fosbergii* should be documented on islands where they now occur or occurred historically. 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 *Eragrostis fosbergii* should be documented on islands where they now occur or occurred historically. Each of these populations must be naturally reproducing,

stable or increasing in number, and secure from threats, with 300 mature individuals per population for short-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:

No new information.

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:

As of 1990, observations of extant populations of *Eragrostis fosbergii* had not been recorded since 1937 (Hawaii Biodiversity and Mapping Program 2010; Wagner *et al.* 1999).

Subsequently, a few individuals were observed in 1991 by Joel Lau at four sites in Waianae Kai in the Waianae Mountains of Oahu, at 738 and 826 meters (2,420 and 2,710 feet) elevation (Hawaii Biodiversity and Mapping Program 2010; USFWS 1996). After that, the last recorded observation of *Eragrostis fosbergii* was in 1996 at the same location in Waianae Kai, when five individuals were seen, none in flower but with some old inflorescences, at 725 meters (2,379 feet) elevation (Perlman 2009). No more recent observations have been noted. The species is found in areas with large amounts of a more common species, *Eragrostis grandis*, and flowers must be examined closely to distinguish the two (USFWS 1998; Hawaii Biodiversity and Mapping Program 2010).

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:

No new information.

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.):

See above section 2.3.1.2.

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

The habitat in which *Eragrostis fosbergii* occurs is *Acacia koa* (koa) —*Metrosideros polymorpha* (ohia) mesic forest with associated native species including *Antidesma pulvinatum* (hame), *Coprosma foliosa* (pilo), *Cyanea angustifolia* (haha), *Diospyros sandwicensis* (lama), *Diplazium sandwichianum* (pohole), *Hibiscus arnottianus* (kokio keokeo), *Myrsine lessertiana* (kolea lau nui), *Pipturus albidus* (mamake), *Pisonia* sp. (papala kepau), *Psychotria hathewayi* (kopiko), *Psydrax odorata* (alahee), *Rauvolfia sandwicensis* (hao), *Sophora chrysophylla* (mamane), *Viola chamissoniana* (pamakani), and *Xylosma hawaiiense* (ae) (Perlman 2009).

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 to *Eragrostis fosbergii* are feral pigs (*Sus scrofa*) and goats (*Capra hircus*), which disturb the ground and uproot young plants, thereby preventing successful recruitment (Perlman 2009; Hawaii Biodiversity and Mapping Program 2010). Invasive introduced plant species such as *Schinus terebinthifolius* (Christmasberry) and *Grevillea robusta* (silk oak) degrade the habitat and invade openings created by disturbance, thus crowding out areas which might otherwise recruit and support *Eragrostis* and other native grasses (Perlman 2009).

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

Not a threat.

2.3.2.3 Disease or predation:

Slugs (species unidentified) and rats (*Rattus* spp.) are believed to threaten this species by eating the leaves and seeds of *Eragrostis fosbergii* (Perlman 2009). Browsing by feral goats may also be a threat to this species (Hawaii Biodiversity and Mapping Program 2010).

2.3.2.4 Inadequacy of existing regulatory mechanisms:

No new information.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

In at least one location, *Eragrostis fosbergii* grew near a trail and was at risk of being trampled by hikers (Hawaii Biodiversity and Mapping Program 2010).

The invasive introduced plant species previously described in Section 2.3.2.1, in addition to degrading habitat, directly compete with *Eragrostis fosbergii* for light, nutrients, and water.

Climate change may also 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.

In addition to all of the other threats, species like *Eragrostis fosbergii* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes, landslides, flooding, and disease outbreaks. The extent of these natural processes on this single island endemic are exacerbated by anthropogenic threats, such as habitat loss for human development or predation by introduced species (USFWS 2010).

No specific conservation measures, such as propagation or seed storage, have been undertaken for *Eragrostis fosbergii*.

2.4 Synthesis

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for Oahu plants (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Eragrostis fosbergii* is a short-lived perennial, and to be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (off-site) collection. In addition, a minimum of three populations should be documented on islands where they now occur or occurred historically. For the species to be considered stable, 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. It has been more than 13 years since the species was last observed, and there were only five plants known at that time (Table 1). In addition, all threats are not being managed (Table 2), and there is no off-site representation of the species. Therefore, *Eragrostis fosbergii* meets the definition of endangered as it remains in danger of extinction throughout its range.

Table 1. Status of *Eragrostis fosbergii* from listing through 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	6	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	6	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	4	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2010 (5-year review)	5	0	All threats managed in all 3 populations	No (Table 2)
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No: not seen since 1996; only five individuals

Table 2. Threats to *Eragrostis fosbergii*.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification and herbivory	A, C, D	Ongoing	No
Rats – herbivory	C	Ongoing	No
Slugs – herbivory	C	Ongoing	No
Invasive introduced plants	A, E	Ongoing	No
Climate change	A, E	Increasing	No
Small population size	E	Ongoing	No
Trampling by hikers	E	Ongoing	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

- Survey historical locations and potentially suitable habitat to determine the current status of the species.
- If plants are found, collect material for genetic storage and propagation for reintroduction.
- Eradicate invasive introduced plants from known populations.
- Control rats in the vicinity of these populations.
- Develop and implement methods to control slugs.
- Develop and implement methods to prevent trampling of this species by hikers.
- Work with Hawaii Division of Forestry and Wildlife, Hawaii State Parks and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

5.0 REFERENCES

Hawaii Biodiversity and Mapping Program. 2010. Records for *Eragrostis fosbergii* from program database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

Perlman, S. 2009. *Eragrostis fosbergii*. National Tropical Botanical Garden, Kalaheo, Hawaii. 1 page. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered status for twenty-five plant species from the island of Oahu, Hawaii; final rule. Federal Register 61(198):53089-53108.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages, plus appendices.

[USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; final designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, Hawaii; final rule. Federal Register 68(116):35949-36406.

[USFWS] U.S. Fish and Wildlife Service. 2010. Recovery program, rare plant tracking database, species list report. Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii. Unpublished.

Wagner, W.L., D.R. Herbst and S.H. Sohmer. 1999. Manual of the flowering plants of Hawaii. University of Hawaii Press, Honolulu, Hawaii. 1,918 pages.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Eragrostis fosbergii* (Fosberg's love grass)

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
- No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

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Date 1/2/11