

*Lobelia gaudichaudii* ssp. *koolauensis*  
(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: *Lobelia gaudichaudii* ssp. *koolauensis* (No common name)

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**5-YEAR REVIEW**  
***Lobelia gaudichaudii* ssp. *koolauensis*/ 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, Gina Shultz, Deputy 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 (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) beginning on March 8, 2007. The Bernice P. Bishop Museum provided most of the updated information on the current status of *Lobelia gaudichaudii* ssp. *koolauensis* and provided recommendations for conservation actions needed prior to the next 5-year review. The evaluation of the status of the species was prepared by the lead PIFWO biologist and reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species, and Deputy Field Supervisor, 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. 2007. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 71 species in Oregon, Hawaii, Commonwealth of the Northern Mariana Islands, and territory of Guam. Federal Register 72(45):10547-10550.

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

### 1.3.4 Review History:

Species status review [FY 2008 Recovery Data Call (September 2008)]:  
Declining

#### **Recovery Achieved:**

1 (0-25%) (FY 2008 Recovery Data Call)

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

6

### 1.3.6 Current Recovery Plan or Outline

**Name of plan or outline:** Recovery Plan for the 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*

  X   *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?**

*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 (Factor A, C, D, and E) affecting this species is presented in section 2.4. 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 the Oahu plants (USFWS1998), based on whether the species is an annual, or short-lived perennial (fewer than 10 years), or a long-lived perennial. *Lobelia gaudichaudii* spp. *koolauensis* is a short-lived perennial, and to be considered stable, 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 Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

This recovery action has been partially met.

For downlisting, a total of five to seven populations of each taxon should be documented on Oahu and at least one other island 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 for short-lived perennials. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery action has not been met.

A total of eight to ten populations of each taxon should be documented on Oahu and at least one other island 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 for short-lived perennials. Each population should persist at this level for a minimum of five consecutive years.

This recovery action has not been met.

**2.3 Updated Information and Current Species Status**

In addition to the status summary table below, information on the species' status and threats was included in the final critical habitat rule referenced above in section 1.3.3 ("Associated rulemakings") and in section 2.4 ("Synthesis") below, which also included any new information about the status and threats of the species.

**Table 1. Status of *Lobelia gaudichaudii* spp. *koolauensis* from listing through 5-year review.**

<b>Date</b>	<b>No. of wild individuals</b>	<b>No. outplanted</b>	<b>Stability criteria identified in Recovery Plan</b>	<b>Downlisting criteria completed?</b>
1996 (listing)	< 250	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	No
1998 (recovery plan)	< 280	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	No
2003 (critical habitat)	< 270	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	No
2008 (5-year review)	462	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No

**2.3.1 Biology and Habitat** [see note in section 2.3]

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

**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:

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

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

**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.):**

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

**2.3.1.7 Other:**

**2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms) [see note in section 2.3]**

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

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

**2.3.2.3 Disease or predation:**

**2.3.2.4 Inadequacy of existing regulatory mechanisms:**

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

## **2.4 Synthesis**

The monocarpic taxon *Lobelia gaudichaudii* ssp. *koolauensis* was only known from a single population on the Manana Ridge system on the Koolau Mountain range at the time of federal listing as endangered in 1996 (USFWS 1996). By 2003, the number of known individuals had expanded to two populations, consisting of 263, with 237 individuals in a Waiawa-Waimano population, and 26 individuals at Kaukonahua (USFWS 2003a). In 2006, 5 populations consisting of 252 individuals had been documented. The population structures are as follows: Kauhonahua 3 mature and 45 immature individuals with 2 seedlings; Kipapa 100 immature individuals with 20 seedlings; Waiawa 80 immature individuals; Waiawa to Waimano 80 immature individuals; Kawai Iki (bog habitat) 2 mature

individuals. The Kipapa and Kawai Iki populations are mixed with *L. gaudichaudii* ssp. *gaudichaudii* individuals, and need further study. Overall, the number of mature individuals is small, and population numbers are tending to decline with time due to the monocarpic nature of the species. The two subspecies of *Lobelia gaudichaudii* co-occur in the same areas of the Koolau mountains, suggesting that the two taxa may be reproductively isolated from one another, yet there may be potential for hybridization ( U.S. Army Garrison Environmental Division (U.S. Army) 2007).

The major threats to the species continue to be the habitat degradation by pigs (*Sus scrofa*), invasive introduced plant species, and the predation of fruit and fleshy plant parts by several species of slugs and rats (*Rattus* spp). Ungulate control is being undertaken near the Kaukonahua population, and the Kawai iki bog population is located within a one-acre fence. No weed control has been undertaken, although eradication of *Psidium cattleianum* has been undertaken along the Koolau Summit Trail which runs near the Kawai iki population (U.S. Army 2007).

*Lobelia gaudichaudii* ssp. *koolauensis* is monocarpic, flowering and fruiting only once then dying. It has been seen flowering primarily from May through October, and fruiting from July through November. Seeds do not survive storage at 24 degrees Celsius or -18 degrees Celsius but remained viable at 4 degrees Celsius. Germination rates at 4 degrees Celsius are highly variable and it is uncertain if there is any decrease in viability with storage. Cuttings and air layers are not considered to be viable options for propagation since most plants are single stemmed (U.S. Army 2006).

There are 1,593 seeds in storage from six plants from two populations, Kawai iki bog fence and Kaukonahua (U.S. Army 2006). The National Tropical Botanical Garden has 7900 seed in storage (National Tropical Botanical Garden 2007), and Lyon Arboretum has 1593 seed in 7 accessions (Lyon Arboretum Micropropagation Laboratory 2007).

The stabilization and recovery goals for this species have not been met, as no population contains 50 mature individuals, only two populations are being managed for ungulates, and none of the other threats are being managed. Therefore, *Lobelia gaudichaudii* ssp. *koolauensis* meets the definition of endangered as it remains in danger of extinction throughout its range.

### 3.0 RESULTS

#### 3.3 Recommended Classification:

\_\_\_ **Downlist to Threatened**

\_\_\_ **Uplist to Endangered**

\_\_\_ **Delist**

\_\_\_ *Extinction*

\_\_\_\_ *Recovery*  
\_\_\_\_ *Original data for classification in error*  
X **No change is needed**

**3.2 New Recovery Priority Number: N/A**

**Brief Rationale:**

**3.3 Listing and Reclassification Priority Number: N/A**

**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**

- Establish new populations within protected habitats and enhance extant populations by outplanting suitable genetic material.
- Conduct botanical survey in current population habitats to assess the distribution of the two subspecies, and in historical areas to search for new populations.
- Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Conduct genetic analyses to determine population and subspecies variability.
- Research into the life history characteristics of the species.

**5.0 REFERENCES**

Lyon Arboretum Micropropagation Facility 2007. Micropropagation database. Lyon Arboretum, University of Hawaii at Manoa, Honolulu, HI.

National Tropical Botanical Garden 2007. 2007 report on controlled propagation of listed and candidate species, as designated under the U.S. endangered species act. National Tropical Botanical Garden, Lawai, HI.

[U.S. Army] U.S. Army Garrison Environmental Division. 2006. 2006 status reports for the Makua implementation plan and the draft Oahu implementation plan. Unpublished.

- [U.S. Army] U.S. Army Garrison. 2007. 2007 Status reports for the Makua Implementation Plan and the draft Oahu Implementation Plan. U.S. Army Garrison, Directorate of Public Works, Environmental Division, Schofield Barracks, Hawaii. 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. Federal Register 61(198):53089-53108.
- [USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for the Oahu plants. U.S. Fish and Wildlife Service, Portland, Oregon. 207 pages; plus appendices.
- [USFWS] U.S. Fish and Wildlife Service. 2003a. Biological opinion of the U.S. Fish and Wildlife Service for routine military training and transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army installations, island of Oahu.
- [USFWS] U.S. Fish and Wildlife Service. 2003b. Endangered and threatened wildlife and plants; final designations or nondesignations of critical habitat for 101 plant species from the island of Oahu, HI; final rule. Federal Register 68(116) 35949-36406.

**Signature Page**  
**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Lobelia gaudichaudii* ssp. *koolauensis* (No common name)**

**Current Classification:** Endangered

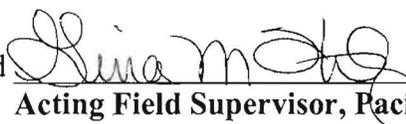
**Recommendation resulting from the 5-Year Review:**

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

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

**Review Conducted By:**

Joy Hiromasa, Fish and Wildlife Biologist  
Marie Bruegmann, Plant Recovery Coordinator  
Marilet Zablan, Recovery Program Leader and acting Assistant Field Supervisor for Endangered Species  
Gina Shultz, Deputy Field Supervisor

Approved  Date 21 July 2009  
**Acting Field Supervisor, Pacific Islands Fish and Wildlife Office**