

Brighamia rockii
(Pua`ala)

**5-Year Review:
Summary and Evaluation**

**U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii**

5-YEAR REVIEW
***Brighamia rockii* (Pua `ala)**

I. GENERAL INFORMATION

A. 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) between June 2006 and June 2007. The National Tropical Botanical Garden provided most of the updated information on the current status of *Brighamia rockii*. They also provided recommendations for conservation actions that may be needed prior to the next five-year review. The evaluation of the lead PIFWO biologist was reviewed by the Plant Recovery Coordinator. These comments were incorporated into the draft five-year review. The document was then reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before final approval.

B. Reviewers

Lead Region --Contact name(s) and phone numbers:

Region 1, Jesse D'Elia, Chief, Division of Recovery, (503) 231-2071

Lead Field Office -- Contact name(s) and phone numbers:

Pacific Islands Fish and Wildlife Office, Gina Shultz, Assistant Field Supervisor for Endangered Species, (808) 792-9400

Cooperating Field Office(s) -- Contact name(s) and phone numbers:

N/A

Cooperating Region(s) -- Contact name(s) and phone numbers:

N/A

C. Background

1. FR Notice citation announcing initiation of this review:

USFWS. 2006. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 70 species in Idaho, Oregon, Washington, Hawaii, and Guam. Federal Register 71(69):18345-18348.

2. Species status:

Stable (FY 2006 Recovery Data Call)

3. Recovery achieved:

1 (0-25%) (FY 2006 Recovery Data Call)

4. Listing history

Original Listing

FR notice: USFWS. 1992. Endangered of threatened wildlife and plants; determination of endangered of threatened status for 16 plants from the island of Molokai, Hawaii; final rule. Federal Register 57(196):46325-46340.

Date listed: October 8, 1992

Entity: Species

Classification Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

5. Associated actions:

USFWS. 2003a. Endangered and threatened wildlife and plants; final designations and nondesignations of critical habitat for 42 plant species from the island of Molokai, HI; final rule. Federal Register 68(52):12982-13141.

USFWS. 2003b. Endangered and threatened wildlife and plants; final designations and nondesignations of critical habitat for 60 plant species from the island of Maui and Kahoolawe, HI; final rule. Federal Register 68(93):25934-25165.

Critical habitat was designated for *Brighamia rockii* in five units totaling of 289 hectares (717 acre) on island of Molokai and total of two units totaling of four hectares (11 acres) on the island of Maui. This designation includes private and state land (USFWS 2003a and b).

6. Review:

Species status review [FY 2006 Recovery Data Call (September 2006)]:

Stable

7. Species' Recovery Priority Number at start of review:

2

8. Recovery Plan or Outline

Name of plan: Recovery plan for the Molokai plant cluster. 1996. U.S. Fish and Wildlife Service, Portland, Oregon. 143 pages.

Date issued: September 26, 1996

Dates of previous revisions: N/A

Indicate if plan is being used: Yes. Some of the actions outlined in the recovery plan have been initiated but not completed (*e.g.*, collection of genetic material for storage) within the historical range of this species. Some recovery actions will require long-term commitments (*e.g.*, maintenance of exclosure fences; weed control, hand pollination) or may only be necessary intermittently (*e.g.*, collect for genetic storage).

II. REVIEW ANALYSIS

A. Application of the 1996 Distinct Population Segment (DPS) policy

1. Is the species under review listed as a DPS?

Yes
 No

2. Was the DPS listed prior to 1996?

Yes
 No

a. Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes,
 No

b. Does the original listed entity meet the discreteness and significance elements of the 1996 DPS policy?

Yes
 No

3. Is there relevant new information that would lead you to re-consider the classification of this species with regard to designation of DPSs (*i.e.*, indicates that there was a problem with the original (post-1996) DPS listing, that there is a need for splitting out or combining DPSs, or that there is some other reason to consider a change in listing that involves DPSs)?

Yes
 No

B. Recovery Criteria

1. Does the species have a final, approved recovery plan?

Yes
 No

2. Does the recovery plan contain recovery (i.e., downlisting or delisting) criteria?

Yes
 No

3. Adequacy of recovery criteria.

a. Do the recovery criteria reflect the best available (i.e., most up-to-date) information on the biology of the species and its habitat?

Yes
 No

b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding existing or new threats)?

Yes
 No

c. If you answered *yes* to both II.B.3.a. and II.B.3.b., go to section II.D.

If you answered *no* to either II.B.3.a. or II.B.3.b, go to section II.C.

4. 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 (Factors A, C, D, and E) affecting this species is presented in section II.D. 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 Molokai Plant Cluster (USFWS 1996), based on whether the species is an annual, a short-lived perennial (fewer than ten years), or a long-lived perennial. *Brighamia rockii* is a long-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* (off-site) collection. In addition, a minimum of three populations should be documented on Molokai where it now occurs and if possible at least one other island where it

occurred historically (Lanai or Maui). Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Brighamia rockii* should be documented on Molokai where it now occurs and at least one other island where it occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 100 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 *Brighamia rockii* should be documented on Molokai where it now occurs and at least one other island where it occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 100 mature individuals per population. 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.

C. 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 I.C.5 (“Associated Rulemakings”) and in section II.D (“Synthesis”) below, which also includes any new information about the status and threats of the species.

Status of *Brighamia insignis* from listing through 5-year review.

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1994 – listing	Fewer than 200	0	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	Unknown
1995 – recovery plan	60-70	20	All threats managed in all 3 populations	No
			Complete genetic storage	Yes

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
			3 populations with 25 mature individuals each	No
2003 – critical habitat	42-62	unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Unknown
			3 populations with 25 mature individuals each	No
2007 – 5-yr review	1	3	All threats managed in all 3 populations	No
			Complete genetic storage	Yes
			3 populations with 25 mature individuals each	No

1. Improved Analyses:

 Yes
 X No.

No new analytical methods have been applied to this species.

2. Biology and Habitat:

a. 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:

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

c. Taxonomic classification or changes in nomenclature:

d. 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.):

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

f. Other:

3. Five Factor Analysis (threats, conservation measures and regulatory mechanisms):

a. Present or threatened destruction, modification or curtailment of its habitat or range:

b. Overutilization for commercial, recreational, scientific, or educational purposes:

c. Disease or predation:

d. Inadequacy of existing regulatory mechanisms:

e. Other natural or manmade factors affecting its continued existence:

D. Synthesis:

Brighamia rockii was historically known from Molokai, Maui, and Lanai, but is currently only found on Molokai. On Molokai, it has declined from six wild populations totaling 173 individuals in 1990 to two populations in 2005 (Perlman 2006; Wood 2002; Hawaii Biodiversity and Mapping Program 2005). Kaaloa (Haupu Bay) has four mature plants and ten juveniles and Huelo Islet had one mature individual remaining. The National Park Service has outplanted 117 individuals at Kukaiwaa, four individuals along the Kalaupapa trail switchbacks, and one individual at the top of Kalaupapa trail. These outplanted individuals are all immature. The three outplanting locations are all on the northeastern cliffs of Molokai (Plant Extinction Prevention Program 2006).

The natural habitat for *Brighamia rockii* includes rock crevices on steep black basalt sea cliffs which are sometimes as high as 3,280 feet (1,000 meters). The upper cliff where *B. rockii* grows is a *Pritchardia* (loulou) coastal mesic forest, and has only 30 percent vegetative cover in native plants (Perlman 2006; USFWS 2003; Wood 2002).

Goats (Factors A and D) (Wood 2002; Perlman 2006), deer (Factors A and D) (M. Bruegmann, USFWS, pers. comm. 2006), and invasive introduced plant species (Factor E) degrade the habitat of *B. rockii* (Wood 2002; Perlman 2006; USFWS 1996). Other threats that impact *B. rockii* include predation on various plant parts by goats, slugs, and rats (Factor C) (Perlman 2006). The species is also vulnerable to landslides (Factor E) (Wood and LeGrande 2002; Wood 2002; Perlman 2006). *Brighamia rockii* apparently does not produce enough pollen, and its original coevolved pollinators are likely extinct (Factor E) (Perlman 2006).

The Lyon Arboretum, National Tropical Botanical Garden, and the National Park Service have material from all wild individuals, including some no longer extant, in storage for genetic storage and restoration purposes (Harold H. Lyon Arboretum Micropropagation Laboratory 2006; Plant Extinction Prevention Program Database 2006).

Because there are only a small number of individuals remaining in two populations, this species is inherently more vulnerable to extinction than widespread species because of the higher risks posed by genetic bottlenecks, random demographic fluctuations and localized catastrophes such as landslides or predation.

The stabilization and recovery goals for this species have not been met, as the species is only known from 5 mature individuals. Therefore, *B. rockii* meets the definition of endangered as it remains in danger of extinction throughout its range.

III. RESULTS

A. Recommended Classification:

- Yes, downlist to Threatened
- Yes, uplist to Endangered
- Yes, delist
- No, no change is needed

B. New Recovery Priority Number N/A

C. If applicable, indicate the Listing and Reclassification Priority Number (USFWS only): N/A

Reclassification (from Threatened to Endangered) Priority Number: _____

Reclassification (from Endangered to Threatened) Priority Number: _____

Delisting (Removal from list regardless of current classification) Priority Number: _____

IV. RECOMMENDATIONS FOR FUTURE ACTIONS:

- Continue hand pollination, seed collection, seed storage, and propagation to maintain the existing genetic complement of the species.
- Manage ungulates and invasive plant species around remaining individuals.
- Increase the number of individuals in cultivation and genetic storage through controlled breeding.

- Augment populations as plants become available in nurseries and habitat is protected.
- Conduct rodent control around remaining individuals.
- Survey for populations in known historical sites and suitable habitat.

V. REFERENCES:

Hawaii Biodiversity and Mapping Program. 2005. Program Database. Unpublished.

Harold L. Lyon Arboretum Micropropagation Laboratory. 2006. Report on controlled propagation of species, as designated under the U.S. Endangered Species Act. Unpublished.

Perlman, S. 2006. National Tropical Botanical Garden, field log summaries from 1980-1994 for *Brighamia rockii*. Unpublished.

Plant Extinction Prevention Database. 2006. Compiled data from meetings of species experts. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 2003a. Endangered and threatened wildlife and plants; Final designations and nondesignations of critical habitat for 42 plant species from the island of Molokai, HI; final rule. Federal Register 68(52):12982-13141.

[USFWS] U.S. Fish and Wildlife Service. 2003b. Endangered and threatened wildlife and plants; final designations and nondesignations of critical habitat for 60 plant species from the island of Maui and Kahoolawe, HI; final rule. Federal Register 68(93):25934-25165.

[USFWS] U.S. Fish and Wildlife Service. 1996. Recovery plan for the Molokai plant cluster. U.S. Fish and Wildlife Service, Portland, OR. 143 pages.

[USFWS] U.S. Fish and Wildlife Service. 1992. Endangered and threatened wildlife and plants; determination of threatened or endangered status for 16 plants from the island of Molokai, Hawaii; final rule. Federal Register 57(196):46325-46340.

Wood, K.R. 2002. The distribution and abundance of *Brighamia rockii* & *Brighamia insignis* (Campanulaceae) with an ecological description of *B. rockii* on the cliffs of Haupu Bay, Molokai, Hawaii. Unpublished.

Wood, K.R. and M.K. LeGrande. 2002. Biological notes of two survey trips to Huelo Islet. Unpublished.

Personal and Written Communications:

Marie Bruegmann, Plant Recovery Coordinator, USFWS, December 11, 2006.

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Current Classification E

Recommendation resulting from the 5-Year Review

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

Appropriate Listing/Reclassification Priority Number _____

Review Conducted By

Marilet A. Zablan, Recovery Program Leader and Acting Assistant Field Supervisor for Endangered Species, June 24, 2007

Marie Bruegmann, Plant Recovery Coordinator, December 11, 2006, January 27, February 6, 15 and 16, and June 28, 2007

Christian Torres-Santana, Fish and Wildlife Biologist, December 2, 2006, January 22, February 2 and 15, and June 27, 2007

Approve  Date 1/18/08
Lead Field Supervisor, Fish and Wildlife Service