Schiedea kaalae
(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: *Schiedea kaalae* (No common name)

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1.0 GENERAL INFORMATION

1.1 Reviewers

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

Lead Field Office:
Pacific Islands Fish and Wildlife Office, Gina Shultz, Assistant Field Supervisor for Endangered Species, (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) between June 2006 and June 2007. The Hawaii Biodiversity and Mapping Program provided most of the updated information on the current status of *Schiedea kaalae*. 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.

1.3 Background:

1.3.1 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.

1.3.2 Listing history

Original Listing
FR notice: USFWS. 1991. Determination of endangered status for 26 plants from the Waianae Mountains, island of Oahu, Hawaii; final rule. Federal Register 56(209):55770-55786.
Date listed: October 29, 1991
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 designation or nondesignations of critical habitat for 101 plant species from the island of Oahu, HI: final rule. Federal Register 68(116):35950-36406.

Critical habitat was designated for *Schiedea kaalae* in five units totaling 1,105 hectares (2,726 acres) on Oahu. This designation includes habitat on state and private lands (USFWS 2003).

1.3.4 Review History:

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

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

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: Recovery plan for the Oahu plants. 1998. 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*
_X__ *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*
_X__ *No*

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

_X__ *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?

_X__ *Yes*
____ *No*

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery?

_X__ *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 (Factors 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 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. *Schiedea kaalae* is a short-lived perennial, and to be considered stable, 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 Oahu, where the species now occurs 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 *Schiedea kaalae* should be documented on Oahu where it now occurs 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 *Schiedea kaalae* should be documented on Oahu where it now occurs 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

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 *Schiedea kaalae* from listing through 5-year review.

Date	No. wild inds	No. outplanted	Stability Criteria	Stability Criteria Completed?
1991 – listing	Fewer than 100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 – recovery plan	13	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 – critical habitat	49	Unknown	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2007 – 5-yr review	40	193	All threats managed all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

2.3.1 Biology and Habitat

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)

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:

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

Currently, 40 mature *Schiedea kaalae* are known from nine populations in the Waianae and Koolau Mountains of Oahu. In addition, 193 individuals (146 mature and 47 immature) that were outplanted since 2001 continue to survive at three of these locations in the Waianae Mountains. However, while the mature outplanted individuals flower and fruit, no seedlings have been observed in those populations (U.S. Army 2004, 2005, 2006a and b; Hawaii Biodiversity and Mapping Program 2006; Makua Implementation Team 2003).

Schiedea kaalae in the Waianae Mountains is found growing in the understory of diverse mesic forests, usually in gulch bottoms or on lower to mid-gulch slopes. In the Koolau Mountains, *S. kaalae* has been found in habitats that range from mesic to fairly wet, in gulch bottoms and on lower gulch slopes. Some plants grow on gentle to moderate slopes, while others are found growing on steep rock embankments and nearly vertical cliffs. Some Koolau *S. kaalae* sites are constantly wet from seeping water (Makua Implementation Team 2003). Native plant species associated with *S. kaalae* include *Cibotium chamissoi* (hapuu), *Cyrtandra calpidicarpa* (haiwale), *Cyrtandra laxiflora* (haiwale), *Cyrtandra propinqua* (haiwale), *Diospyros hillebrandii* (lama), *Hibiscus arnottianus* (kokio keokeo), *Microlepia strigosa* (palapalai), *Pipturus albidus* (mamaki), *Pisonia umbellifera* (papala), and *Pouteria sandwicensis* (alaa) (J. Lau, Hawaii Biodiversity and Mapping Program, pers. comm. 2006).

Habitat modification by feral pigs is still considered to be a major threat (Factors A and D) (U.S. Army 2006a). Currently, all known plants in the Waianae Mountains, except one, are protected from ungulates by fencing (U.S. Army 2006a). However, only one *Schiedea kaalae* is protected from ungulates by fencing in the Koolau Mountains (U.S. Army 2004). Public hunting does not adequately control the umbers of goats and pigs to eliminate this threat. *S. kaalae* is still threatened by habitat degradation by and competition from introduced invasive plant species (J. Lau, pers. comm. 2006).

Fire still remains a potential threat to the species, especially the populations in the Waianae Mountains (Factor E) (Makua Implementation Team 2003). Slug and rat predation also continue to threaten the species (Factor C) (U.S. Army 2006a). Currently, slug and rat control measures are being used around some of mature individuals, but the efficacy of these measures is not yet known (Hawaii Department of Land and Natural Resources 2007). Therefore, the stabilization goals of this species have not been met and the number of individuals is expected to decrease unless these threats are adequately controlled.

In addition, species like *Schiedea kaalae* that are endemic to small portions of one island, and limited to a few populations and individuals, are 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 hurricanes, landslides or drought (Factor E). For example, the two individuals in the Kaipapau Valley population were smashed and destroyed by a rockslide in 2005 (U.S. Army 2005). Efforts to increase the number of individuals in the wild have been undertaken through outplantings since 2001. In addition, work is ongoing to collect genetic material from wild individuals for long-term storage and for augmentation of populations (Makua Implementation Team 2003, U.S. Army 2006a). However, additional work is still needed.

In summary, the stabilization and recovery goals for this species have not been met, as the stability numbers have not been met and not all threats are being managed. Therefore,

Schiedea kaalae meets the definition of endangered as it remains in danger of extinction throughout its range.

3.0 RESULTS

3.1 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:

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

- Complete genetic storage.
- Control invasive introduced plant species around wild and outplanted individuals.
- Search for new plants and populations of *Schiedea kaalae* in suitable habitat within historical range.
- Research the impact of slugs on *Schiedea kaalae* populations, and investigate potential methods of slug control in the field.
- Study *Schiedea kaalae* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.

5.0 REFERENCES

Hawaii Biodiversity and Mapping Program. 2006. Program Database, Unpublished.

Makua Implementation Team. 2003. Implementation Plan for the Makua Military Reservation, Island of Oahu. Prepared for U.S. Army Garrison, Hawaii, Unpublished.

[U.S. Army] U.S. Army Garrison, Hawaii. 2004. 2004 Status Update, Implementation Plan, Makua Military Reservation, Island of Oahu. Unpublished.

[U.S. Army] U.S. Army Garrison, Hawaii. 2005. 2005 Status Report, Makua Implementation Plan, Island of Oahu. Unpublished.

[U.S. Army] U.S. Army Garrison, Hawaii. 2006a. 2006 Status Reports for the Makua Implementation Plan and the Draft O`ahu Implementation Plan. Unpublished.

[U.S. Army] U.S. Army Garrison, Hawaii. 2006b. Rare plant database, 2006. Unpublished.

[U.S. Fish and Wildlife Service] U.S. Fish and Wildlife Service. 1991. Determination of endangered status for 26 plants from the Waianae Mountains, island of Oahu, Hawaii; final rule. Federal Register 56(209):55770-55786.

[U.S. Fish and Wildlife Service] 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.

[U.S. Fish and Wildlife Service] 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, HI; final rule Federal Register 68(116):35949-35998.

Personal and Written Communications:

Lau, Joel Q.C., Hawaii Biodiversity and Mapping Program, April 12, 2007.

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

Current Classification: E

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X_ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable:_____

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, June 5 and 29, 2007
Fred Amidon, Fish and Wildlife Biologist, April 30, 2007

Approve _____ Date 1/16/08
Lead Field Supervisor, Fish and Wildlife Service