

*Schiedea apokremnos*  
(maolioli)

**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 apokremnos* (maolioli)

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**5-YEAR REVIEW**  
***Schiedea apokremnos* (maolioli)**

**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) 794-9400

**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 April 29, 2008. The review was based on the final critical habitat designation for *Schiedea apokremnos* and other species from the island of Kauai, as well as a review of current, available information (USFWS 2003). 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 Samuel Aruch, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Assistant Field Supervisor for Endangered Species and Acting 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. 2008. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 70 species in Idaho, Montana, Oregon, Washington, and the Pacific Islands. Federal Register 73(83):23264-23266.

### 1.3.2 Listing history

#### Original Listing

**FR notice:** USFWS. 1991. Endangered and threatened wildlife and plants; determination of endangered status for two Na Pali Coast plants: *Hedyotis st.-johnii* (Na Pali Beach hedyotis) and *Schiedea apokremnos* (ma'oli'oli). Federal Register 56:49640-49644.

**Date listed:** September 30, 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 rule makings :

USFWS. 2003. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 95 plant species from the islands of Kauai and Niihau, Hawaii; final rule. Federal Register 68(39):9116-9479.

Critical habitat was designated for *Schiedea apokremnos* in 3 units totaling 652 hectares (1,614 acres) on the island of Kauai. These designations includes habitat on State lands (USFWS 2003).

### 1.3.4 Review History:

Species status review [FY 2009 Recovery Data Call (September 2009)]: Improving

#### **Recovery achieved:**

1 (0-25%) (FY 2007 Recovery Data Call – this is the last year this was reported)

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

8

### 1.3.6 Current Recovery Plan or Outline

**Name of plan or outline:** USFWS. 1995. Recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 270 pages.

**Date issued:** September 20, 1995.

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 (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 the Kauai plant cluster (USFWS 1995), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Schiedea apokremnos* 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* (at other than the plant's natural location, such as a nursery or arboretum) 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.

One population has as many as 350 more individuals, bringing the total number of current locations to 9 and the estimated number of individuals between 750 and 850. While this represents a net increase in the number of known individuals, it should be noted that the species appears to be extirpated at three of five previously known locations, and appears more numerous because additional surveys revealed additional population groups within the same larger area of the Na Pali Coast. There are greater than three populations with 50 or more mature individuals. All threats are not being managed. This recovery objective has been partially met.

For downlisting, a total of five to seven populations of *Schiedea apokremnos* 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 *Schiedea apokremnos* 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**

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 includes any new information about the status and threats of the species.

**Table 1. Status of *Schiedea apokremnos* from listing through 5-year review.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Downlisting Criteria identified in Recovery Plan</b>	<b>Downlisting Criteria Completed?</b>
1991(listing)	100	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	No
			3 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
1995 (recovery plan)	600	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			3 populations with 300 mature individuals each	Yes
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
2003 (critical habitat)	201	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			3 populations with 300 mature individuals each	Yes
			Naturally reproducing, stable, and increasing in number	Unknown



			Stable for five consecutive years	Unknown
2008 (5-year review)	750-850	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			3 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown

### **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:**

**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**

In 2005, a new treatment of *Schiedea* was published, which discusses the genetic, cladistic, and phylogeographic relationships of *Schiedea* species at length, including *S. apokremnos*. Two findings mentioned there in relation to *S. apokremnos* are: 1) it has a condensation of the inflorescence which is typically found in species with dimorphic breeding systems, and appears to represent an adaptation for wind pollination; and 2) seed size in *S. apokremnos* does not correlate with habitat as it does in other *Schiedea* species, in that *S. apokremnos* has much smaller seeds than expected on the basis of habitat distribution. In most *Schiedea* species selection favors large seed size in either shaded, moist environments, or in dry habitats. In these habitats, large seed size is adaptive because it permits establishment under conditions of rigorous competition or dry conditions (Wagner 2005).

A total of about 600 individuals of *Schiedea apokremnos* were known in 1995, from four areas along a 10.5 kilometer (6.5 mile) long section of the Na Pali Coast. There were a total of 5 populations containing 201 individuals known in 2003, all on State-owned lands. These populations were Nakeikianaiwi, Pohakuao, Nualolo Valley, Haeleele Valley, and Kawaiiki Valley within the Na Pali Coast State Park and Puu Ka Pele Forest Reserve. Only the Kaaalahina-Manono and Haeleele ridge populations were estimated to contain more than five individuals (USFWS 2003). *Schiedea apokremnos* had also been seen at two other locations: Alealau, near Puu Ki, along a ridge into Kalalau Valley at 790 meters (2,592 feet) elevation in 1993 (Wood 2009), and many individuals at Polihale Ridge on cliffs over Polihale State Park at 73 meters (240 feet) elevation in 1995 (Perlman 2009).

In Nakeikianaiwi Valley at 146 to 223 meters (480 to 730 feet) elevation, scattered individuals were seen in June 1996 (Perlman 2009; Wood 2009). Ken Wood observed several hundred individuals on these walls during a visit in 1999 (Wood 2009).

On Pohakuao Valley's basalt cliffs, *Schiedea apokremnos* was seen above the trail at 180 meters (590 feet) elevation in November 2006. In October 2008, several hundred individuals were seen on the cliffs of Pohakuao at 183 meters (600 feet) elevation (Wood 2009).

At Nualolo Kai, on the back wall of the valley toward the southwest before and above the falls, 200 to 300 individuals were seen in 2008 at about 37 meters (120 feet) elevation (Tangalin 2009).

At Haeleele Ridge a population with 100 to 500 individuals was discovered in 1992. In 1995, between 12 to 500 individuals were reported from 128 to 320 meters (420 to 1,050 feet) elevation (Hawaii Biodiversity and Mapping Program 2009; Perlman 2009). Observations of *Schiedea apokremnos* at this location have not been reported since that time. There is however a strong likelihood that some individuals are still there on the steeper slopes at this site (Wood 2009).

At Kaaweiki Ridge, 5 to 50 individuals were reported in 1995 at 335 to 377 meters (1,100 to 1,237 feet) elevation (Hawaii Biodiversity and Mapping Program 2009), and 10 to 15 plants on cliffs at 344 meters (1,130 feet) elevation (Perlman 2009), but also not reported since. With fewer individuals originally reported from this site, there is probably less of a chance for survivorship at Kaaweiki, although this needs to be confirmed (Wood 2009).

It is estimated that 400 to 500 individuals are still extant in previously known populations. However, more individuals could exist in similar, inaccessible habitats (USFWS 1995). In fact new populations were subsequently found in at least seven new locations on the Na Pali Coast, including Milolii Valley, Kalalau Valley, Honopu Valley, Awaawapuhi Valley, Hanakoa Valley, Makaha Point, and Makuai Point (see discussion of each population in paragraphs below).

In Milolii Valley, in January 2000, five *Schiedea apokremnos* individuals were observed on cliffs at 12 meters (40 feet) elevation; another 15 to 20 individuals were also reported that year (Wood 2009), as were 8 individuals at 61 to 122 meters (200 to 400 feet) elevation (Hawaii Biodiversity and Mapping Program 2009).

In Kalalau Valley, *Schiedea apokremnos* was considered common on basalt cliffs between 457 and 610 meters (1,500 to 2,000 feet) elevation in 1999

(Wood 2009). On Kalalau Beach, between Kaaalahina and Manono Ridges less than five individuals were reported in 2003 (USFWS 2003). In the lower Honopu Valley, approximately 100 individuals of *S. apokremnos* were seen in May 2004 at 183 meters (600 feet) elevation (Hawaii Biodiversity and Mapping Program 2009; Wood 2009). In lower Awaawapuhi, about 100 individuals of *S. apokremnos* were seen in August 2004 at 137 meters (450 feet) elevation (Hawaii Biodiversity and Mapping Program 2009; Wood 2004, 2009).

In the lower Hanakoa Valley, about 100 individuals of *Schiedea apokremnos* were seen at 244 meters (800 feet) elevation in May 2008 (Wood 2009). At Makaha Point in 2000, 20 individuals of *S. apokremnos* were seen at 21 meters (70 feet) elevation (Hawaii Biodiversity and Mapping Program 2009). Also in 2000, five individuals of *S. apokremnos* were seen at Makuai Point 122 to 244 meters (400 to 800 feet) elevation (Hawaii Biodiversity and Mapping Program 2009).

These locations have a total of as many as 350 more individuals, bringing the known total number of current populations to 9, and the estimated number of individuals to 750 to 850. While this represents a net increase in the number of known individuals, it should be noted that the species appears to be extirpated in 3 of 5 previously known populations, and appears more numerous because additional surveys revealed additional populations within the same larger area of the Na Pali Coast.

*Schiedea apokremnos* is a gynodioecious species, having hermaphrodite or female flowers (Sakai 1997).

*Schiedea apokremnos* grows in the crevices on nearly vertical coastal cliffs, from 60 to 330 meters (200 to 1,100 feet) elevation. These cliffs have sparse, dry coastal shrub vegetation. A study on the pattern of native versus introduced plant species was observed to correlate with the range of goats (*Capra hircus*) in the lower Awaawapuhi Valley where *S. apokremnos* grows (Wood 2004). Very few native plant species were observed on cliffs in the 3-meter high grazing zone which goats can reach. Only approximately 2 percent native cover remains within this height. Above the 3-meter zone there is a 95 percent native cliff community vegetation. The vertical nature of the cliffs makes a natural barrier preventing goats from reaching the cliff vegetation. This suggests that goat predation may have eliminated the species from more accessible locations, and opened areas in the lower zone to the spread of invasive introduced plant species. From their base up to 3 meters (10 feet), the lower cliffs of Awaawapuhi are dominated by invasive introduced plant species such as *Bryophyllum pinnatum* (airplant), *Salvia occidentalis* (West Indian sage), *Pluchea carolinensis* (sourbush), *Nephrolepis multiflora* (no common name [NCN]), *Christella dentata* (downy wood fern), *Blechnum appendiculatum* (NCN), *Adiantum hispidulum* (rough maidenhair fern),

*Adiantum raddianum* (NCN), *Setaria parviflora* (yellow foxtail), *Lantana camara* (lantana), and *Erigeron karvinskianus* (daisy fleabane). Native species predominate above the goat browsing zone (Wood 2004).

Nuololo Kai's coastal dry cliff native plant community includes *Artemisia australis* (ahinahina), *Nototrichium sandwicense* (kului), *Myoporum sandwicense* (naio), *Bidens forbesii* (kookoolau), and *Lipochaeta connata* (nehe) (Tangalin 2009).

In the lower Honopu Valley, the habitat is mixed dry to mesic cliffs with native associated species including *Artemisia australis*, *Bidens sandwicensis*, *Boehmeria grandis* (akolea), *Chamaesyce celastroides* var. *hanapepensis* (akoko), *Lipochaeta connata* var. *acris*, *Lobelia niihauensis* (NCN), *Nototrichium divaricatum* (kului), *N. sandwicense*, *Vaccinium dentatum* (ohelo), *Sida fallax* (ilima), *Wilkesia hobbdi* (dwarf iliau), *Wilkesia gymnoxiphium* (iliau), and *Kadua cordata* (kopa). Occasional small trees include *Acacia koa* (koa), *Diospyros sandwicensis* (lama), *Dodonaea viscosa* (aalii), *Hibiscus kokio* subsp. *saintjohnianus* (kokio ula), *Metrosideros polymorpha* var. *glaberrima* (ohia), *Munroidendron racemosum* (NCN), *Pipturus albidus* (mamake), *Pleomele aurea* (hala pepe), *Psydrax odorata* (alahee), *Rauvolfia sandwicensis* (hao), *Santalum freycinetianum* var. *pyrularium* (iliahi), *Leptecophylla tameiameiae* (pukiawe), and *Xylosma hawaiiense* (ae). Herbs and vines include *Alyxia stellata* (maile), *Cocculus orbiculatus* (huehue), *Dianella sandwicensis* (uki uki), *Peucedanum sandwicense* (makou), *Pilea peploides* (NCN), and *Smilax melastomifolia* (pioi). Common grasses and sedges include *Agrostis avenacea* (heupueo), *Carex meyenii* (NCN), *Carex wahuensis* (NCN), *Cyperus phleoides* (NCN), *Eragrostis variabilis* (kawelu), *Heteropogon contortus* (pili), and *Panicum lineale* (NCN). Native ferns include *Adiantum capillus-veneris* (iwa iwa), *Doodia kunthiana* (okupukupu), *Doryopteris decipiens* (kumuniu), *Microlepia strigosa* (palapalai), *Psilotum nudum* (moa), *Pteridium aquilinum* var. *decompositum* (kilau), *Selaginella arbuscula* (lepelepe a moa), *Sphenomeris chinensis* (palapalaa), and *Tectaria gaudichaudii* (iwa iwa lau nui) (Wood 2009).

Awaawapuhi has lowland diverse dry to mesic cliffs with *Artemisia australis*, *Bidens sandwicensis* subsp. *sandwicensis*, *Chamaesyce celastroides* var. *hanapepensis*, *Lipochaeta connata* var. *acris*, and *Nototrichium sandwicense*, (Wood 2009). Trees and shrubs occasionally seen along the cliffs include *Dodonaea viscosa*, *Metrosideros polymorpha* var. *glaberrima*, *Myoporum sandwicense*, *Psydrax odorata*, and *Wilkesia gymnoxiphium*. Common ferns on the cliffs include *Doryopteris decipiens* and *Psilotum nudum* (Wood 2004).

In Hanakoa Valley, on north east facing slopes and cliffs of Manono Ridge, the habitat is mesic *Diospyros sandwicensis* relic forest with *Aleurites moluccana*

(kukui) and cliffs harboring *Bidens sandwicensis*, and *Chamaesyce celastroides* var. *hanapepensis* with *Lobelia niihauensis* (Wood 2009).

Kalalau Valley has diverse mesic forest slopes below Kahuamaa Flat, with *Antidesma platyphyllum* (hame), *Diospyros* sp., *Doodia kunthiana*, *Pouteria sandwicensis* (alaa), *Psychotria mariniana* (kopiko), *Pteralyxia kauaiensis* (kaulu), *Rauvolfia sandwicensis*, and *Tetraplasandra kavaiensis* (ohe ohe) (Wood 2009).

In Alealau, near Puu Ki, along the ridge into Kalalau valley *Schiedea apokremnos* grows with *Chamaesyce atrococca* (akoko), *C. eleanoriae* (akoko), *Eragrostis variabilis*, *Lepidium serra* (anaunau), *Lobelia niihauensis*, *Lysimachia scopulensis* (NCN), *Metrosideros polymorpha*, *Plantago princeps* var. *anomala* (laukahi kuahiwi), and *Wilkesia gymnoxiphium* (Wood 2009).

Nakeikianaiwi Valley has diverse mesic cliffs with *Artemisia australis*, *Eragrostis variabilis*, *Lobelia niihauensis*, *Munroidendron racemosum*, *Nototrichium sandwicense*, *Peucedanum sandwicensis*, *Wilkesia gymnoxiphium*, and *Wilkesia hobdyi* (Wood 2009).

Makuaiki Point has associated native species including *Chenopodium oahuensis* (aheahea), *Heteropogon contortus*, *Lipochaeta connata* var. *acris*, and *Lobelia niihauensis* (Hawaii Biodiversity and Mapping Program 2009).

Invasive introduced plant species, specifically *Leucaena leucocephala* (haole koa), *Hyptis pectinata* (comb hyptis), *Opuntia* sp. (NCN), and *Pluchea carolinensis* (sourbush), are threats to *Schiedea apokremnos* (Factor E). Other invasive introduced plant species include *Ageratum conyzoides* (billy goat weed), *Bryophyllum pinnatum*, *Clidemia hirta* (Koster's curse), *Conyza bonariensis* (hairy horseweed), *Elephantopus mollis* (elephant's foot), *Erigeron karvinskianus*, *Furcraea foetida* (Mauritius hemp), *Lantana camara*, *Pluchea carolinensis*, *Psidium guajava* (common guava), *Salvia occidentalis*, *Setaria parviflora*, *Syzygium cumini* (Java plum), and *Xanthium strumarium* var. *canadense* (cocklebur) (Factor E). Introduced invasive grasses include *Andropogon virginicus* (broomsedge), *Bromus rigidus* (ripgut grass), *Ehrharta stipoides* (meadow ricegrass), *Oplismenus hirtellus* (basketgrass), and *Vulpia bromoides* (brome fescue). Introduced ferns include *Adiantum hispidulum*, *Adiantum raddianum*, *Blechnum appendiculatum*, *Christella dentata*, and *Nephrolepis multiflora* (USFWS 1995; Wood 2009) (Factor E). Also noted as possible threats are fire (Factor E) (Wood 2009), drought (Factor E) (Tangalin 2009; Wood 2004), and invasive insects (Factor C) (Wood 2009).

Goats not only disturb the cliff habitats and open areas for the incursions of introduced invasive plants, but they eat the native vegetation including *Schiedea* species (Factors A, C, and D). The natural exclusion of grazing

mammals from the steep cliffs in *Schiedea apokremnos* habitats clearly show the effects that introduced goats have on natural ecosystems (Wood 2004).

The small size of most populations and a restricted distribution pose potential threats to this species (Factor E). A limited gene pool may depress reproductive vigor, or a single environmental disturbance could destroy a significant percentage of the extant individuals. Landslides also pose additional potential threats (Factor E). Some *S. apokremnos* individuals are functionally female and must be cross-pollinated to set seed. This reproductive strategy may threaten populations with few individuals dispersed over wide areas (USFWS 1995). Climate change may also pose a threat to *S. apokremnos* (Factors A and E). However, current climate change models do not allow us to predict specifically what those effects, and their extent, would be for this species.

Four hundred and sixty seeds from 6 accessions along with 18 cuttings from the Nualolo population are at the National Tropical Botanical Garden. (2009).

The known total number of current locations has increased from five to nine, and the estimated number of individuals from 201 to as many as 850. While this represents a net increase in the number of known individuals, this species appears to be extirpated at three of five previously known locations. Increasing damage from feral goats no doubt contributed to this. The apparent gain in population numbers is not due to any changes in the severity of threats to the species, but to increased surveying which revealed additional population groups. The species continues to be impacted by severe pressures from goat activity and invasive introduced plant competition.

The downlisting goals for this species have not been met (see Table 1), as no population has more than 300 mature individuals and all threats are not being managed. Therefore, *Schiedea apokremnos* 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*

**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**

- Determine methods to protect populations from goats in the steep areas where the species occurs.
- Collect seeds for adequate genetic storage.
- Propagate for reintroduction within protected suitable habitat.
- Establish additional populations within protected suitable habitat.
- Survey suitable habitat in historical range to determine current status of species.
- Work with Hawaii Division of Forestry and Wildlife and Hawaii State Parks to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

**5.0 REFERENCES**

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**Signature Page**  
**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Schiedea apokremnos***

**Current Classification:** \_\_\_\_\_ E \_\_\_\_\_

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

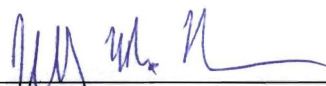
- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

**Appropriate Listing/Reclassification Priority Number, if applicable:** \_\_\_\_\_

**Review Conducted By:**

Marie Bruegmann, Plant Recovery Coordinator  
Marilet A. Zablan, Assistant Field Supervisor for Endangered Species  
Jeff Newman, Acting Deputy Field Supervisor

Approved

  
\_\_\_\_\_  
Field Supervisor, Pacific Islands Fish and Wildlife Office

Date **AUG 27 2010**

*FOR*