

## **5-YEAR REVIEW**

Short Form Summary

**Species Reviewed:** *Schiedea kealiae* (ma oli oli)

**Current Classification:** Endangered

### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 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.

### **Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii

### **Name of Reviewer(s):**

Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator  
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Assistant Field Supervisor for Endangered Species  
Jeff Newman, Pacific Islands Fish and Wildlife Office, Acting Deputy Field Supervisor

### **Methodology used to complete this 5-year 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 kealiae* 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 Samuel Aruch, 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 submission to the Field Supervisor for approval.

### **Background:**

For information regarding the species listing history and other facts, please refer to the Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database for threatened and endangered species ([http://ecos.fws.gov/tess\\_public](http://ecos.fws.gov/tess_public)).

### **Application of the 1996 Distinct Population Segment (DPS) Policy:**

This Policy does not apply to plants.

### **Review Analysis:**

Please refer to the final critical habitat designation for *Schiedea kealiae* published in the Federal Register on June 17, 2003 (USFWS 2003) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species' biological status have come to light since listing to warrant a change in the Federal listing status of *S. kealiae*.

Historically, *Schiedea kealiae* was known only from the island of Oahu at the northern Waianae Mountains including Mokuleia (Hatheway 1952), and, collected once from the Palikea area, near the southern end of the same mountain range (USFWS 1996). At the time the recovery plan was written, four populations totaling 300 and 500 individuals were located on the cliffs above Dillingham Airfield and Camp Erdman, and at Kaena Point at the northern end of the Waianae Mountains (USFWS 1998). At Kealia, on the Dillingham Military Reservation, *S. kealiae* was common on cliffs, at 122 to 183 meters (400 to 600 feet) elevation in 1986. It was seen there as late as 1996 at 207 meters (680 feet) elevation. Hundreds of individuals of *S. kealiae* were seen at Kaena, in Uluhulu Gulch behind Camp Erdman on cliffs at 198 meters (650 feet) elevation in 1987, but not reported since. In 1987, about 500 individuals were reported growing along the cliffs of Alei Pali above the end of the road at Kaena (Perlman 2008). Current numbers are unknown, as no recent surveys have been conducted, but the highly degraded habitat from which it has been reported would indicate that the species has most likely declined since last seen in the 1980s.

*Schiedea kealiae* is usually found on steep slopes and cliff faces at elevations from 60 to 305 meters (200 to 1,000 feet), in dry remnant *Erythrina sandwicensis* (wiliwili) or *Pisonia sandwicensis* (aulu, papala kepau, alaa) forest. Associated native plants include *Psydrax odorata* (alahee), *Bidens amplexans* (kookoolau), *Hibiscus arnottianus* (kokio keokeo), *Lepidium bidentatum* (anaunau), *Melanthera remyi* (nehe), *Plumbago zeylanica* (iliee), *Sicyos microcarpa* (anunu), *Myoporum sandwicense* (naio), *Sida fallax* (ilima), *Sapindus oahuensis* (lonomea), *Rauvolfia sandwicensis* (hao), *Reynoldsia sandwicensis* (ohe ohe), *Dodonaea viscosa* (aalii), *Hibiscus brackenridgei* ssp. *mokuleianus* (mao hau hele), *Nototrichium humile* (kului), *Hibiscus kokio* (kokio), and *Peperomia* sp. (ala ala wai nui) (Perlman 2008; USFWS 1998, 2003).

The major threat to *Schiedea kealiae* is competition with invasive introduced plant species including *Leucaena leucocephala* (haole koa), *Panicum maximum* (guinea grass), *Syzygium cumini* (Java plum), *Melinis minutiflora* (molasses grass), *Digitaria insularis* (sourgrass), *Aleurites moluccana* (candlenut), and *Schinus terebinthifolius* (Christmas berry) (Factor E) (Perlman 2008; USFWS 2003).

Other threats include feral ungulates, especially goats (*Capra hircus*) and pigs (*Sus scrofa*), (Factors A, and C) as well as fires and landslides (Factor E) (Perlman 2008). The Kaena Point occurrence in particular is threatened by naturally occurring rock slides and fire (Factor E) (Perlman 2008; USFWS 2003).

Seedlings of *Schiedea* species occurring in mesic or wet sites are apparently consumed by introduced unidentified slugs and snails, which have been observed feeding on *Schiedea membranacea*, a mesic forest species from Kauai (Factor C). In contrast, *Schiedea* occurring in dry areas produce abundant seedlings following winter rains, presumably because dry areas have fewer nonnative predators (USFWS 2003), so introduced slugs and snails may not be a threat to this species.

Other factors that threaten this species are lack of pollinators, and risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of existing occurrences (Factor E) (USFWS 2003). Climate change may also pose a threat to *Schiedea kealiae* (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.

In addition to all of the other threats, species like *Schiedea kealiae* 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 (Factor E). The effects of these processes on this single-island endemic are exacerbated by anthropogenic threats, such as habitat loss for human development or predation by introduced species (Factor E) (USFWS 1998).

To safeguard existing genetic material, propagation for genetic storage and reintroduction is occurring. There are 15 seeds in storage from three individuals on the Kealia Trail at University of California Irvine (2009). Fifteen plants are being grown at Waimea Arboretum (Waimea Arboretum 2009).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for plants from the island of Oahu (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Schiedea kealiae* 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* (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 the island of Oahu. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

It is unclear whether the interim stabilization goals for this species have been met (see Table 1), as the current status of the species is unknown. However, all threats are not being managed. Therefore, *Schiedea kealiae* meets the definition of endangered as it remains in danger of extinction throughout its range.

#### **Recommendations for Future Actions:**

- Survey historical locations to determine the species' current status.
- Collect seeds from any wild individuals found for genetic storage and propagation for reintroduction (if needed).
- Fence any wild individuals found to protect them from feral ungulates.
- Control invasive introduced species around any wild individuals found.

- Determine if there is a need to augment wild populations.
- Work with Hawaii Division of Forestry and Wildlife to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species, once its status is known.

**References:**

Hatheway, W.H. 1952. Composition of certain native dry forests: Mokuleia, Oahu, T.H. Ecological Monographs 22(2):16.

Perlman, S. 2008. *Schiedea kealiae*. National Tropical Botanical Garden, Kalaheo, Hawaii. Unpublished. 2 pages.

[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 + appendices.

[USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; final designation or nondesignation of critical habitat for 101 plant species from the island of Oahu, Hawaii; final rule. Federal Register 68(116):35949-35998.

University of California, Irvine. 2009. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. University of California, Irvine, California. Unpublished.

Waimea Arboretum. 2009. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. Waimea Arboretum, Waimea, Hawaii. Unpublished.

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

<b>Date</b>	<b>No. wild indivs.</b>	<b>No. outplanted</b>	<b>Stability Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1996 (listing)	300- 500	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	300-500	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	265-315	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2009 (5-year review)	Unknown	0	All threats managed	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Yes

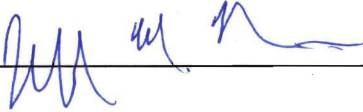
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SIGNATURE PAGE for 5-YEAR REVIEW of *Schiedea kealiae* (ma oli oli)

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

*for* **Field Supervisor, Pacific Islands Fish and Wildlife Office**

  
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Date   AUG 27 2010