

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Schiedea helleri* (no common name)

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 helleri* and other species from the island of Kauai (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 Assistant Field Supervisor for Endangered Species and Acting Deputy Field Supervisor 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).

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 helleri* published in the Federal Register on February 27, 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. helleri*.

When the recovery plan for *Schiedea helleri* was published, three populations were known with a total of 43 to 53 individuals (USFWS 1998). Plants are thought to currently remain at two of these populations, totaling 85 to 101 individuals. At the Mohihi Stream, on banks of a small side stream, near the trail to Waialae, about 40 individuals were seen in 2005 (Perlman 2008), approximately the same number that was observed in 1996. In the summer of 2008, 22 to 30 sprawling, intertwined individuals were counted (Tangalin 2008; National Tropical Botanical Garden 2008). Katie Cassel of the Kokee Resource Conservation Program also found another population of 22 to 30 plants on a Mohihi tributary, past the first site (K. Cassel, Kokee Resource Conservation Program, pers. comm. 2008). At Nawaimaka Stream, near Waialae, Steve Perlman of National Tropical Botanical Garden observed one feeble individual in 2003 (National Tropical Botanical Garden 2008). Plants have not been observed at Kohua, about 1.25 miles in on the Waialae trail, located 20 to 33 meters (60 to 100 feet) off the trail since 1996, when five individuals were seen (Perlman 2008).

Genetic studies are being conducted by Dr. Molly Nepokroeff (M. Nepokroeff, University of South Dakota, pers. comm. 2008) of the University of South Dakota at Vermillion. Leaves were collected from 17 *Schiedea helleri* individuals on April 24, 2008 at a site off of Mohihi Road. Leaves were also collected from 22 individuals at a second site, off of Mohihi Road. The Nepokroeff laboratory has already extracted DNA from each plant and amplified eight nuclear microsatellite regions. These data are still incomplete, so they are unable to provide details of population genetic diversity at this time. They are also in the process of assaying a chloroplast region that can distinguish the chloroplast haplotypes. This experiment will allow the chloroplast and nuclear lineages to be compared, which will in turn allow them to infer when hybridization may have occurred (Willyard 2009).

Although the recovery plan did not consider pigs (*Sus scrofa*) to be a major problem to this species, botanists since that time have repeatedly observed them as a threat to the habitat (Factors A and D). Since weeding was done in the area at Mohihi-Waialae by Kokee Resource Conservation Program, a hunter's trail has been cut right through the population. Human trampling and damage is a concern for this population (Factor E). There were also signs of pigs in the area (Perlman 2008; National Tropical Botanical Garden 2008). Mule deer (*Odocoileus hemionus*) and goats (*Capra hircus*) are also considered threats because they modify the sloping terrain, causing erosion when heavy rains and flooding occur (Factors A and D) (Perlman 2008). Invasive introduced plant species which modify the habitat and compete with *Schiedea helleri* include *Hedygium gardnerianum* (kahili ginger), *Passiflora mollissima* (banana poka), and *Rubus argutus* (blackberry) (Factor E) (National Tropical Botanical Garden 2008). Climate change may also pose a threat to *Pteralyxia kauaiensis* (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 helleri* 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).

Control of invasive introduced plant species is being conducted in the Mohihi-Waialae area by the Kokee Resource Conservation Program in collaboration with the Kauai Watershed Alliance and The Nature Conservancy of Hawaii (K. Cassel, pers. comm. 2008).

The diversity within the Mohihi population of *Schiedea helleri* is well represented in seed storage at National Tropical Botanical Garden, and it is among other species being tested for long-term storage at the United States Department of Agriculture, Agricultural Research Service's National Center for Genetic Resource Preservation in Fort Collins, Colorado (M. Clark, National Tropical Botanical Garden, pers. comm. 2008). National Tropical Botanical Garden facility (2009) has 2,258 seeds in storage. The University of Hawaii's Harold L. Lyon Arboretum Micropropagation Laboratory (2008) has six individual propagules in storage.

Stabilizing, downlisting, and delisting objectives are provided in the addendum to the recovery plan for the Kauai 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 helleri* 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 Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The interim stabilization goals for this species have not been met (see Table 1), as no population has more than 50 mature individuals and all threats are not being managed. Therefore, *Schiedea helleri* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Continue to collect seeds for genetic storage and reintroduction.
- Control introduced invasive plant species around wild plants.
- Construct large-scale fences around all naturally occurring and reintroduced individuals to control feral ungulates.
- Assess genetic variability among and within extant populations.

- Reintroduce individuals into protected suitable habitat within historical range.
- Work with Hawaii Division of Forestry, The Nature Conservancy of Hawaii, and Wildlife and Hawaii State Parks to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Study *Schiedea helleri* 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.
- Investigate techniques to improve natural recruitment.

References:

Harold L. Lyon Arboretum Micropropagation Laboratory. 2008. Micropropagation database. University of Hawaii at Manoa, Honolulu, Hawaii. Unpublished.

National Tropical Botanical Garden. 2008. Herbarium database. National Tropical Botanical Garden, Kalaheo, Hawaii. Available online at <<http://ntbg.org/herbarium>>. Accessed 10 March 2008.

National Tropical Botanical Garden. 2009. Report on controlled propagation of listed and candidate species, as designated under the U.S. Endangered Species Act. National Tropical Botanical Garden, Kalaheo, Hawaii. Unpublished.

Perlman, S. 2008. *Schiedea helleri* field notes. National Tropical Botanical Garden, Kalaheo, Hawaii. 3 pages. Unpublished.

Tangalin, N. 2008. *Schiedea helleri* field notes. National Tropical Botanical Garden, Kalaheo, Hawaii. 1 page. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered or threatened status for nineteen plant species from the island of Kauai, Hawaii; final rule. Federal Register 61(198): 53070-53089.

[USFWS] U.S. Fish and Wildlife Service. 1998. Kauai II: Addendum to the recovery plan for the Kauai plant cluster. U.S. Fish and Wildlife Service, Portland, Oregon. 140 pages.

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

Willyard, A. 2009. *Schiedea helleri* report from the Nepokroeff lab. University of South Dakota at Vermillion, South Dakota. 1 page. Unpublished.

Personal Communications

Cassel, Katie. 2008. Coordinator, Koike Resource Conservation Program, Waimea, Hawaii. E-mail to Margaret Clark, National Tropical Botanical Garden, dated October 3, 2008. Subject: *Schiedea helleri*.

Clark, Margaret. 2008. Seed Bank Manager, National Tropical Botanical Garden, Kalaheo, Hawaii. Memo to the record from National Tropical Botanical Garden Seed Inventory, dated October 2, 2008.

Nepokroeff, Molly. 2008. Department of Biology, University of South Dakota. E-mail to Margaret Clark, National Tropical Botanical Garden, dated October 20, 2008. Subject: *Schiedea stellarioides* 5 year review.

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

Date	No. wild indivs.	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	30-70	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	43-53	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	50-60	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)	85-101	0	All threats managed	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No


U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Schiedea helleri* (no common name)

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

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



Date AUG 27 2010