5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Schiedea stellarioides* (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 stellarioides* 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 stellarioides* published in the Federal Register on February 23, 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. stellarioides*.

Historically, *Schiedea stellarioides* was found at the sea cliffs of Hanakapiai Beach, Kaholuamanu-Opaewela region, the ridge between Waialae and Nawaimaka Valleys, and Haupu Range on the island of Kauai. At the time of listing this species was found only at the ridge between Waialae and Nawaimaka Valleys on State land, just 0.8 kilometer (0.5 mile) northwest of the Kaholuamanu-Opaewela region. This population of approximately 500 to 1,000 individuals was found on steep slopes in a closed *Acacia koa* (koa) – *Metrosideros polymorha* (ohia) lowland to montane mesic forest between 610 and 1,120 meters (2,000 and 3,680 feet) elevation. The plants were scattered in approximately a 2-kilometer (1.25-mile) by 0.3-kilometer (0.2-mile) area (USFWS 1996).

This situation remains substantially the same, although an additional population in Kawaiiki has been observed, and no plants have been noted from Nawaimaka Stream for some time. The total number of plants may now be less than 200 in the previously known populations (Perlman 2008; National Tropical Botanical Garden 2008). One hundred or more individuals were observed on the south rim of the Waialae Valley by botanists of the National Tropical Botanical Garden at 1,005 to 1,066 meters (3,300 to 3,500 feet) elevation in the years from 1991 through 2004 (Perlman 2008). At a visit in May 2008 Ken Wood of the National Tropical Botanical Garden estimated about 200 plants in the area (Wood 2008).

A smaller population occurs in upper Kawaiiki Valley, along the slope below Kaluahaula Ridge. Fifty to sixty scattered individuals were noted through 2001 by Ken Wood of National Tropical Botanical Garden in the Kawaiiki area (Wood 2008) and by Perlman in 2005 (Perlman 2008). The top of a drainage below Kawaiiki Ridge was visited in June 2004 by botanist Natalia Tangalin from the National Tropical Botanical Garden (Tangalin 2005) who saw 20 plants and collected seed from three of them, and in July 2005 by Perlman and Tangalin, who observed about 50 individuals (Perlman 2008; Tangalin 2005; National Tropical Botanical Garden 2008). In May 2008, Wood observed about 20 individuals in this area of Kawaiiki, off Kaluahaula ridge, in the upper forest and drainage to the south of Koaie and north of Waialae (Wood 2008).

The third location at the Nawaimaka stream near Waialae was last visited in February 1995 by Steve Perlman (Perlman 2008) and in July 1996 by Ken Wood (Wood 2008). Although the number of plants at that time was not noted, they were observed to be flowering in February (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-Vermillion, following field studies on Kauai in the summer of 2008.

The Waialae Valley above and east of Waialae Falls, at the south rim of Waialae Valley, is a north facing slope where habitat consists of *Acacia koa* (koa) – *Metrosideros*

polymorpha (ohia) mesic forest with *Schiedea viscosa* (no common name [NCN]), *Alyxia stellata* (maile), *Bidens cosmoides* (poola nui), *Carex meyenii* (NCN), *Chamaesyce atrococca* (akoko), *Charpentiera* sp. (papala), *Cheirodendron trygynum* (olapa), *Coprosma* sp. (pilo), *Cyanea leptostegia* (haha lua), *Dianella sandwicensis* (uki uki), *Dicranopteris linearis* (uluhe), *Diplazium sandwichianum* (hoio), *Dodonaea viscosa* (aalii), *Dubautia laevigata* (naenae), *D. raillardioides* (naenae ula), *Eragrostis variabilis* (kawelu), *Kadua affinis* (manono), *Kadua cordata* (kopa), *Labordia helleri* (kamakahala), *Lysimachia kalalauensis* (NCN), *Melicope barbigera* (uahiapele), *Myrsine* spp. (kolea), *Peperomia* spp. (ala ala wai nui), *Poa sandwicensis* (NCN), *Pouteria sandwicensis* (alaa), *Psychotria mariniana* (kopiko), *Syzygium sandwicense* (ohia ha), *Wikstroemia furcata* (akia), and *Xylosma* spp. (maua) (Perlman 2008; Tangalin 2005, Wood 2008)

The Kawaiiki Valley, Kaluahaula Ridge, habitat consists of *Acacia koa* (koa) – *Metrosideros polymorpha* (ohia) mesic forest with *Alyxia stellata* (maile), *Schiedea viscosa*, *Antidesma platyphyllum* (hame), *Asplenium aethiopicum* (iwa iwa a), *A. macraei* (iwa iwa lau lii), *A. polyodon* (punana manu), *Bidens cosmoides* (poola nui), *Carex wahuensis* (NCN), *Cheirodendron* (olapa, lapalapa), *Claoxylon sandwicense* (poola), *Coprosma* spp. (pilo), *Cyanea leptostegia* (haha lua), *Cyrtandra kauaiensis* (ulunahele), *C. longifolia* (haiwale, kanawao keo keo), *Dianella sandwicensis* (uki uki), *Diplazium sandwichianum* (hoio), *Dodonaea viscosa* (aalii), *Dryopteris* spp. (palapalai), *Dubautia laevigata* (naenae), *Elaeocarpus bifidus* (kalia), *Ilex anomala* (kawau), *Kadua affinis* (manono), *Leptecophylla tameiameiae* (pukiawe), *Lobelia yuccoides* (panaunau), *Luzula hawaiiensis* var. *glabrata* (wood rush), *Melicope anisata* (mokihana), *M. barbigera* (uahiapele), *M. clusiifolia* (kukaemoa), *Microlepia strigosa* (palapalai), *Panicum nephelophilum* (konakona), *Perrottetia sandwicensis* (olomea), *Poa sandwicensis* (NCN), *Phyllostegia waimeae* (NCN), *Platydesma spathulata* (pilo kea), *Pleomele aurea* (hala pepe), *Pouteria sandwicensis* (alaa), *Psychotria mariniana* (kopiko), *Ranunculus mauiensis* (NCN), *Rubus argutus* (ohelo eleele), *Santalum* spp. (iliahi), *Scaevola gaudichaudii* (naupaka kuahiwi), *Solanum sandwicense* (popolo aiakeakua), *Tetraplasandra* sp. (ohe), *Wikstroemia furcata* (akia), *Zanthoxylum dipetalum var. dipetalum* (kawau), and *Zanthoxylum hawaiiense* (ae, manele) (National Tropical Botanical Garden 2008).

Waialae, Nawaimaka Valley, along the stream, has *Acacia koa – Metrosideros polymorpha* mesic forest with *Carex meyenii* (NCN), *Charpentiera elliptica* (papala), *Cheirodendron* spp. (olapa, lapalapa), *Coprosma kauaiensis* (pilo), *Dianella sandwicensis* (uki uki), *Dicranopteris linearis* (uluhe), *Diplazium sandwichianum* (hoio), *Dodonaea viscosa* (aalii), *Elaeocarpus bifidus* (kalia), *Labordia helleri* (kamakahala), *Myrsine mezii* (kolea), *Perrottetia sandwicensis* (olomea), *Psychotria greenwelliae* (kopiko), *Rubus argutus* (ohelo eleele), and *Scaevola procera* (naupaka kuahiwi) (Wood 2008).

Major threats to *Schiedea stellaroides* in Kawaiiki are feral goats (*Capra hircus*), deer (*Odocoileus hemionus*), pigs (*Sus scrofa*) (Factors A, C and D); fire (Factor E); and rats (*Rattus* spp.) (Factor C) (Perlman 2008). Invasive introduced plant species modifying the

habitat include *Rubus argutus* (Florida blackberry), *Bryophyllum pinnatum* (airplant), *Psidium cattleianum* (strawberry guava), *Grevillea robusta* (silk oak), *Morella faya* (firetree), *Mariscus meyenianus* (NCN), *Passiflora tarminiana* (banana poka), *Lantana camara* (lantana), *Setaria parviflora* (perennial foxtail), and *Ehrharta stipoides* (meadow ricegrass) (Factor E) (National Tropical Botanical Garden 2008).

Threats in Waialae include very heavy pig disturbance, goats, (Factors A, C, and D) and invasive introduced plant species such as *Mariscus meyenianus* (NCN), *Lantana camara* (lantana), *Psidium cattleianum* (strawberry guava), *Setaria parviflora* (perennial foxtail), *Erigeron karvinskianus* (daisy fleabane), and *Rubus argutus* (Florida blackberry) (Factor E) (Perlman 2001; Wood 2008).

Climate change may also pose a threat to *Schiedea stellarioides* (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.

The National Tropical Botanical Garden (2009) has 1,845 seeds from three populations on Kauai. The Hawaii Department of Land and Natural Resources (2008) on Kauai has propagated one cutting.

Stabilizing, downlisting, and delisting objectives are provided in the addendum to the recovery plan for Kauai Plant cluster (USFWS 1998), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Schiedea stellarioides* 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 only one population has more than 50 mature individuals and all threats are not being managed. Therefore, *Schiedea stellarioides* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Fence areas where this species grows to protect against pig damage.
- Determine and implement methods to control rat and slug control around known plants.
- Continue to collect seeds for genetic storage and reintroduction.
- Propagate plants for outplanting.

- 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.

References:

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National Tropical Botanical Garden. 2008. Herbarium database. National Tropical Botanical Garden, Kalaheo, Hawaii. Available online at <http://ntbg.org/herbarium/>. Accessed 30 December 2009.

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

Tangalin, N. 2005. Field notes on *Schiedea stellarioides*. National Tropical Botanical Garden, Kalaheo, Hawaii. 3 pages. 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.

Wood, K.R. 2008a. Notes on *Schiedea stellarioides* (Caryophyllaceae). National Tropical Botanical Garden, Kalaheo, Hawaii. 7 pages. Unpublished.

Personal Communications:

Nepokroeff, Molly. 2008. Associate Professor, Department of Biology, University of South Dakota. E-mail to Margaret Clark, National Tropical Botanical Garden, dated October 01, 2008.

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

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	500-1000	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	500-1000	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	1500	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Yes
2009 (5-year review)	200-300	0	All threats managed in all 3 populations	No
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	Partially

U.S. FISH AND WILDLIFE SERVICE
SIGNATURE PAGE for 5-YEAR REVIEW of *Schiedea stellarioides*
(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
__X__ No Change in listing status

Field Supervisor, Pacific Islands Fish and Wildlife Office

Date AUG 2 7 2010