

*Schiedea spergulina* var. *spergulina*  
(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 spergulina* var. *spergulina* (no common name)

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**5-YEAR REVIEW**  
*Schiedea spergulina* var. *spergulina*/ (no common name)

**1.0 GENERAL INFORMATION**

**1.1 Reviewers**

**Lead Regional Office:**

Region 1, Endangered Species Program, Division of Recovery, Jesse D'Elia,  
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**Lead Field Office:**

Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (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 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 spergulina* var. *spergulina* 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.

**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. 1994. Endangered and threatened wildlife and plants; determination of endangered or threatened status for 24 plants from the island of Kauai, Hawaii; final rule. Federal Register 59(38):9304-9329.

**Date listed:** February 25, 1994

**Entity listed:** Species

**Classification:** Threatened

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 spergulina* var. *spergulina* in three units totaling 429 hectares (1,060 acres) on the island of Kauai. This designation includes habitat on State land (USFWS 2003).

### 1.3.4 Review History:

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

Declining

### 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:

9

### 1.3.6 Current Recovery Plan or Outline

**Name of plan or outline:** U.S. Fish and Wildlife Service. 1995.

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 spergulina* var. *spergulina* 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 Kauai. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

There are 6 known populations totaling 440 to 585 individuals. However genetic storage is not complete and not all threats are being managed to control threats. This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Schiedea spergulina* var. *spergulina* 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 spergulina* var. *spergulina* 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 spergulina* var. *spergulina* 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>
1994 (listing)	>5,000	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	No
			5-7 populations with 300 mature individuals each	Partially
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
1995 (recovery plan)	>5,000	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	Partially
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
2003 (critical habitat)	>5,000	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	No
			3 populations with 300 mature individuals each	Partially
			Naturally reproducing,	Unknown

			stable, and increasing in number	
			Stable for five consecutive years	Unknown
2008 (5-year review)	440-585	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	Partially
			5-7 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**

Historically, *Schiedea spergulina* var. *spergulina* was known from Kalalau Rim, Olokele Canyon, and four populations in Waimea Canyon on State land. These populations were estimated to total more than 5,000 individuals in 1995. In 2003, it was known only from the right branch of Kalalau Valley, Koaie Canyon, and Waimea Canyon. These 3 populations were estimated to total 208 individuals, but it has also been suggested that this species may have numbered in the thousands (USFWS 2003).

In Waimea Canyon, *Schiedea spergulina* var. *spergulina* occurs at Poo Kaeha at 244 meters (800 feet) elevation on the trail up the valley to the pump house where about 20 individuals occur at about 21 meters (70 feet) up on a vertical cliff (N. Tangalin, National Tropical Botanical Garden, pers. comm. 2009; Wood 2009a, b; National Tropical Botanical Garden 2008). It also is known from cliffs below Waimea Canyon Road (Highway 550) at locations between 128 to 331 meters (420 to 1,086 feet) and 616 to 719 meters (2,020 to 2,360 feet) elevation, where approximately 20 to 165 mature individuals grow (National Tropical Botanical Garden 2008; Tangalin, pers. comm. 2009; Wood 2009b). An estimated 200 individuals occurs in Koaie Canyon at 533 to 640 meters (1,750 to 2,100 feet) elevation (Perlman 2009; Tangalin, pers. comm. 2009; Wood 2009a, b). Observations in the 1990s also included Hipalau at 600 to 700 meters (1,969 to 2,297 feet) elevation, now estimated to have 100 individuals (Wood 2009b); Kalalau rim, north below Puu o Kila with an estimated 10 individuals; Kalalau rim, north of Kahuamaa Flat at 800 meters (2,625 feet); and Waialae Canyon at 351 to 427 meters (1,150 to 1,400 feet) with an estimated 100 individuals (Wood 2009a, b). The total number of individuals of *Schiedea spergulina* var. *spergulina* is 440 to 585 in 6 populations.

National Tropical Botanical Garden collected leaves from 32 *Schiedea spergulina* individuals at each of the two populations on Waimea Rim in May 2008. A researcher at the University of South Dakota will be assessing genetic diversity for these populations as a measure of genetic health, using microsatellites. Population level sampling will also assess the degree of gene flow between populations of the same species, and interspecific gene flow between other Kauai *Schiedea* species. Results of these studies will be published when the work is completed (Willyard 2008).

Two varieties of *Schiedea spergulina*, *Schiedea spergulina* var. *leiopoda* and *Schiedea spergulina* var. *spergulina*, previously recognized by Wagner on the basis of the presence or absence of pubescence, and geographical separation, have more recently been recombined as one taxon without varietal distinction. The presence of hairs is a characteristic with variation within other *Schiedea* species, and is noted to be a changeable characteristic (Wagner and Herbst 2003; Wagner *et al.* 2005). At present, *Schiedea spergulina* var. *leiopoda* is federally listed as endangered and *Schiedea spergulina* var. *spergulina* is listed as threatened.

*Schiedea spergulina* var. *spergulina* is found on sparsely vegetated rocky cliffs in diverse lowland mesic forests and shrublands. In Waimea Canyon, *S. spergulina* var. *spergulina* occurs at Poo Kaeha at 244 meters (800 feet) elevation in *Sapindus oahuensis* (lonomea) - *Erythrina sandwicensis* (wiliwili) lowland dry forest associated with *Acacia koa* (koa), *Alyxia stellata* (maile), *Artemisia australis* (ahinahina), *Bidens sandwicensis* (kookoolau), *Carex meyenii* (no common name [NCN]), *Charpentiera obovata* (papala), *Diospyros sandwicensis* (lama), *Dodonaea viscosa* (aalii), *Doryopteris decora* (NCN), *Eragrostis variabilis* (kawelu), *Ipomoea* sp. (morning glory), *Korthalsella complanata* (kaumahana), *Lipochaeta connata* (nehe), *Macrothelypteris torresiana* (NCN), *Melanthera waimeaensis* (nehe), *Metrosideros polymorpha* var. *glaberrima* (ohia), *Microlepia strigosa* (palapalai), *Nesoluma polynesicum* (keahi), *Peperomia blanda* var. *floribunda* (alaala wai nui), *Psilotum nudum* (moa nahele), *Psydrax odorata* (alahee), *Pteridium aquilinum* var. *decompositum* (kilau), *Rauvolfia sandwicensis* (hao), and *Sida fallax* (ilima). Adjacent cliffs have shrubland with *Bidens sandwicensis*, *Chamaesyce celastroides* var. *hanapepensis* (akoko), *Lipochaeta connata* var. *acris*, *Lobelia niihauensis* (NCN), and *Nototrichium sandwicense* (kulei) (National Tropical Botanical Garden 2008; Tangalin, pers. comm. 2009; Wood 2009a).

In Koaie Canyon, *Schiedea spergulina* var. *spergulina* occurs on north facing cliffs west of Lonomea Camp and Kawaiiki and east of Hipalau, at 640 meters (2,100 feet) elevation. The habitat is lowland mesic mixed cliff community dominated by small trees, shrubs and subshrubs of species such as *Acacia koaia* (koa), *Artemisia australis*, *Chamaesyce celastroides* var. *hanapepensis*, *Chenopodium oahuense* (aheahea), *Dodonaea viscosa*, *Hibiscadelphus distans* (hau kuahiwi), *Lobelia niihauensis*, *Neraudia melastomifolia* (maaloa), *Nototrichium sandwicense*, and *Sida fallax*; herbs such as *Dianella sandwicensis* (uki uki), *Lipochaeta connata* var. *acris*, *Plectranthus parviflorus* (alaala wai nui wahine); vines *Alyxia stellata* and *Sicyos* sp. (anunu); sedges and grasses such as *Carex meyenii*, *Carex wahuensis* (NCN), *Eragrostis variabilis*, *Panicum beecheyi* (NCN), *Panicum lineale* (NCN); and the fern *Doryopteris decora*. The adjacent mixed mesic forest community above the cliffs includes trees such as *Bobea timonioides* (ahea), *Diospyros hillebrandii* (lama), *Diospyros sandwicensis*, *Flueggea neowawraea* (mehamehame), *Hibiscus waimeae* subsp. *waimeae* (kokio keokeo), *Kadua affinis* (manono), *Melicope barbigera* (uahiapele), *Metrosideros polymorpha* var. *glaberrima*, *Munroidendron racemosum* (NCN), *Myoporum sandwicense* (naio), *Myrsine lanaiensis* (kolea), *Nesoluma polynesicum*, *Pleomele aurea* (hala pepe), *Pouteria sandwicensis* (alaa), *Pteralyxia kauaiensis* (kaulu) and *Santalum freycinetianum* var. *pyrularium* (iliahi). Vines include *Canavalia kauaiensis* (awikiwiki) and *Smilax melastomifolia*

(pioi). Herbs include *Spermolepis hawaiiensis* (NCN) and *Korthalsella complanata*, and ferns are *Dicranopteris linearis* (uluhe), *Microlepia strigosa*, *Psilotum nudum*, *Pteris x hillebrandii* (NCN), and *Selaginella arbuscula* (lepelepe a moa) (Wood 2009a).

On Kalalau Rim, *Schiedea spergulina* var. *spergulina* occurs at elevations of 719 to 780 meters (2,360 to 2,560 feet) with *Artemisia australis*, *Bidens sandwicensis*, *Carex wahuensis*, *Chamaesyce* sp., *Dodonaea viscosa*, *Eragrostis variabilis*, *Lepidium serra* (anaunau), *Lobelia niihauensis*, and *Nototrichium sandwicensis* (Perlman 2009).

The main threats to the Waimea Canyon population includes habitat degradation and erosion caused by feral goats (*Capra hircus*) (Factors A and D), competition with invasive introduced plant species such as *Abutilon grandifolium* (hairy abutilon), *Adiantum hispidulum* (rough maidenhair fern), *Ageratum conyzoides* (billygoat-weed), *Aleurites moluccana* (candlenut), *Bryophyllum pinnatum*, *Clusia rosea* (autograph tree), *Crotalaria pallida* (smooth rattlepod), *Chrysopogon aciculatus* (golden beard grass), *Emilia fosbergii* (Florida tasselflower), *Ficus* sp. (fig), *Furcraea foetida* (Mauritius hemp), *Grevillea robusta* (silk oak), *Hylocereus undatus* (night-blooming cereus), *Hyptis pectinata* (comb hyptis), *Lantana camara* (lantana), *Leucaena leucocephala* (koa haole), *Triumfetta semitriloba* (Sacramento bur), *Melia azedarach* (China berry), *Melinis minutiflora* (Molasses grass), *Opuntia* sp. (cactus), *Panicum maximum* (Guinea grass), *Pluchea carolinensis* (sourbush), *Rubus rosifolius* (thimbleberry), *Senna* spp. (NCN), *Stachytarpheta jamaicensis* (Jamaica vervain), *Syzygium cumini* (Java plum), and numerous weedy grasses (Factor E). Fire is another threat in this dry habitat (Factor E) (National Tropical Botanical Garden 2008; Perlman 2009). Climate change may also pose a threat to *Schiedea spergulina* var. *spergulina* (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 has 400 seeds in storage (National Tropical Botanical Garden 2009).

The downlisting goals for this species have not been met (see Table 1), as there are no populations of 300 mature individuals and all threats are not being managed. Therefore, *Schiedea spergulina* var. *spergulina* meets the definition of endangered as it remains in danger of extinction throughout its range, as the taxon was listed.

### 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**

- Control goats around existing populations.
- Continue to collect for adequate genetic storage and propagation.
- Establish reintroductions within protected suitable habitat.
- Conduct surveys throughout historical range to determine the current status of the species, which is necessary before the species can be reclassified.
- Work with Hawaii Division of Forestry and Wildlife and other landowners to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Update the listed entity on 50 CFR 17 to match the currently recognized taxonomy after thorough surveys of the species have been conducted.

**5.0 REFERENCES**

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**Personal Communications:**

- Tangalin, Natalia. 2009. Field Botanist, National Tropical Botanical Garden, Kalaheo, Hawaii. E-mail to Margaret Clark, National Tropical Botanical Garden, dated January 15, 2009. Subject: *Schiedea spergulina*.

