

## **5-YEAR REVIEW**

Short Form Summary

**Species Reviewed:** *Alsinidendron obovatum* (No common name)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 69 species in Idaho, Washington, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 75(67):17947-17950.

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

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

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

Chelsie Javar, Fish and Wildlife Biologist, PIFWO

Marie Brueggemann, Plant Recovery Coordinator, PIFWO

Jess Newton, Recovery Program Leader, PIFWO

Assistant Field Supervisor for Endangered Species, PIFWO

### **Methodology used to complete this 5-year review:**

This review was conducted by staff of PIFWO of the U.S. Fish and Wildlife Service (USFWS), beginning on April 8, 2010. The review was based on a review of current, available information since the last 5-year review for *Alsinidendron obovatum* (USFWS 2007). Bernice Pauahi Bishop Museum 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 Chelsie Javar, Fish and Wildlife Biologist, 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 previous 5-year review for *Alsinidendron obovatum* published on August 2, 2007 (available online at [http://www.fws.gov/ecos/ajax/docs/five\\_year\\_review/doc1120.pdf](http://www.fws.gov/ecos/ajax/docs/five_year_review/doc1120.pdf)) and the recovery plan for the Oahu plants (USFWS 1998), for a complete review of the species' status, threats, and management efforts. No new threats or 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 *Alsinidendron obovatum*.

This short-lived perennial shrub is endangered and occurs on the island of Oahu (USFWS 1998). The current status and trends for *Alsinidendron obovatum* are provided in the tables below.

#### **New taxonomic information:**

Based on molecular phylogenetic studies and revised morphological data, the *Alsinidendron* clade was found to be moderately supported as sister to *Schiedea verticillata*, and the *Alsinidendron* – *Schiedea verticillata* clade were found to be nested within the genus *Schiedea*. Thus, all recognized taxa of *Alsinidendron* were moved to *Schiedea*, and therefore, *Alsinidendron obovatum* became *Schiedea obovata* (Wagner *et al.* 2005). Thus, this species will be referred to as *Schiedea obovata* for the remainder of this review. This change in taxonomy does not result in the change of the range of the taxon as it was listed. *Schiedea* is the fifth largest lineage in the native Hawaiian flora and the most diverse lineage with respect to breeding systems. The genus is monophyletic (Sakai *et al.* 2006). *Schiedea obovata* is a hermaphroditic species (Weller *et al.* 1990).

#### **New threats:**

Climate change may also pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

#### **New management actions:**

- Ungulate exclosures – The Kahanahaiki I and Pahole management units, and the population unit for *Schiedea obovata* in West Makaleha are fenced (U.S. Army Garrison 2010).
- Ungulate control – The population unit for *Schiedea obovata* at West Makaleha is considered pig-free (*Sus scrofa*) and the Kahanahaiki I and the Pahole management units are ungulate-free (U.S. Army Garrison 2010). In 2009, feral pigs were removed from the Makaha management unit fence (U.S. Army Garrison 2009). Ungulates were controlled in the Keawapilau to West Makaleha population unit (U.S. Army Garrison 2010).
- Ecosystem-altering invasive plant species control – In 2010, weeds were controlled around individuals of *Schiedea obovata* within the Kahanahaiki to Pahole and the Keawapilau to West Makaleha population units (U.S. Army Garrison 2010).

- Invertebrate control –At Upper Kapuna, slugs are managed at three sites around individuals of *Schiedea obovata* to increase germination and survivorship of reintroduced individuals (U.S. Army Garrison 2010).
- Predator / herbivore control – During 2010, rats (*Rattus* sp.) were controlled within the Kahanahaiki to Pahole population unit (U.S. Army Garrison 2010).
- Threats research:
  - Research by Joe (2006) indicated that invasive slugs negatively impacted the regeneration of *Schiedea obovata*.
  - In 2009, slug control research using Sluggo<sup>®</sup>, a slug and snail bait, began in the field at the Kahanahaiki population unit on U.S. Army lands (U.S. Army Garrison 2009, 2010).
  - In October 2010, Sluggo<sup>®</sup> was registered for use by the Hawaii Department of Agriculture (2010) for control of slugs and nonnative snails in forested areas for the protection of native, threatened, and endangered plants of Hawaii. However, since native snails also exist in areas where threatened and endangered plants occur, additional research is need to find a control method that can be used in areas where native snail species co-occur with listed plants.
- Captive propagation for genetic storage and reintroduction:
  - In 2008, an additional seed collection from a new founder, located at a historical site in the Kahanahaiki to Pahole population unit, was received from the National Tropical Botanic Garden. The seed collection was germinated at the Harold L. Lyon Arboretum Micropropagation lab and will be used to supplement the existing reintroductions on Army lands (U.S. Army Garrison 2008).
  - The Honolulu Botanical Garden had 16 individual propagules of *Schiedea obovata* in storage representing 10 wild individuals in 2009 (Honolulu Botanical Garden 2009).
  - In 2009, the Center for Conservation Research and Training Seed Storage Laboratory (2009) had approximately 272,888 seeds in storage; 5,665 of the seeds were test sown and 1,886 of the seeds were withdrawn, with 265,337 remaining in storage.
  - There were 71 individuals in genetic storage at the Lyon Arboretum Micropropagation Laboratory in 2009 (Harold L. Lyon Arboretum 2009).
  - In 2008, the Pahole Rare Plant Facility had 35 propagules in storage (Pahole Rare Plant Facility 2008) and 26 propagules in 2010 (Pahole Rare Plant Facility 2010).
  - In 2008, Waimea Valley Arboretum had 20 seeds representing a single individual of *Schiedea obovata* in storage (Waimea Valley Arboretum 2008).
  - In 2010, there were two individuals of *S. obovata* in the U.S. Army’s micropropagation laboratory and 24 individuals in the Army’s Nursery (U.S. Army Garrison 2010).

- Reintroduction / translocation site identification – Sites were evaluated for future reintroduction of *Schiedea obovata* in the Makaha population unit (U.S. Army Garrison 2008); no individuals of *S. obovata* were reintroduced as of 2010 (U.S. Army Garrison 2010).
- Reintroduction / translocation site selection – A new reintroduction site was selected for *Schiedea obovata* in Keawapilau and genetic material gathered by Dr. Steven Weller from individuals located at Keawapilau will be used as reintroduction material (U.S. Army Garrison 2007).
- Reintroduction / translocation implementation – In 2009, staff from Oahu Army Natural Resources Program reintroduced 700 individuals of *Schiedea obovata* in Kahanahaiki as part of a study by Lauren Weisenberger, a graduate student from the University of Hawaii on *S. obovata* (U.S. Army Garrison 2009).
- Reintroduced / translocated population management and monitoring – At the Kahanahaiki to Pahole and Keawapilau to West Makalehu population units, reintroduced individuals of *Schiedea obovata* are naturally producing seedlings and immature plants (U.S. Army Garrison 2010).
- Genetic research – In 2008, greenhouse stock of *Schiedea obovata* was cross-pollinated by hand and seeds were collected as part of Weisenberger’s research to determine the effects of inbreeding and outbreeding within *S. obovata* (U.S. Army Garrison 2008).
- Population viability monitoring – Oahu Army Natural Resources program personnel monitored individuals of *Schiedea obovata* in existing sites and monitored individuals in wild sites. In 2010, new individuals of *S. obovata* were observed at all three of the remaining wild sites, which include two sites at West Makaleha and a single site at Keawapilau (U.S. Army Garrison 2010). At the larger wild site in Northwest Makaleha, several hundred seedlings of *S. obovata* were observed (U.S. Army Garrison 2010).
- Competitive invasive plant species control – In 2010, weeds were controlled around individuals of *Schiedea obovata* within the Kahanahaiki to Pahole and the Keawapilau to West Makaleha population units (U.S. Army Garrison 2010).

### **Synthesis:**

In 2010, the Kahanahaiki to Pahole population unit contained 191 reintroduced mature individuals, 358 immature individuals, and 297 seedlings of *Schiedea obovata* (U.S. Army Garrison 2010). In 2010, the Keawapilau to West Makaleha population unit contained 32 wild mature individuals, 127 immature individuals, and 535 seedlings of *S. obovata* (U.S. Army Garrison 2010). In the same year, the Keawapilau to West Makaleha population unit contained 229 reintroduced mature individuals, 285 immature individuals, and 294 seedlings of *S. obovata* (U.S. Army Garrison 2010).

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*

*obovata* 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.

The interim stabilization goals for this species have only been partially met, there are only 32 wild mature individuals remaining (Table 1) and threats are being partially managed throughout all of the populations (Table 2). In addition, not all populations of *Schiedea obovata* are naturally reproducing, stable, and increasing in number. Therefore, *S. obovata* meets the definition of endangered as it remains in danger of extinction throughout its range.

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

- Captive propagation for genetic storage and reintroduction:
  - Continue to collect seeds from tagged individuals, keeping close track of the maternal source for use in *ex situ* propagation.
  - Continue to collect seeds from all existing populations and send to at least two or three different venues for propagation.
- Reintroduction / translocation implementation – Continue to reintroduce the species back into its known historical range.
- Ungulate exclosures:
  - Continue to construct fenced exclosures around existing and reintroduced populations to provide protection from feral ungulates.
  - Monitor fenced exclosures for evidence of breaching by feral ungulates.
- Ungulate control – Continue to protect all populations against disturbances from feral ungulates.
- Ecosystem-altering invasive plant species control – Continue to control invasive introduced plant species around all populations.
- Predator / herbivore control – Continue to implement effective control methods for rodents.
- Surveys / inventories – Continue to conduct thorough surveys of all suitable habitats where *Schiedea obovata* was historically seen.
- Threats research:
  - Continue to conduct research on the use of Sluggo® for control of nonnative slugs around all known populations.
  - Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

- Fire protection – Continue to implement the wildland fire management plan developed by the U.S. Army for *Schiedea obovata*.
- Population viability monitoring – Study populations of *Schiedea obovata* with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.
- Alliance and partnership development – Work with the U.S. Army, Hawaii Division of Forestry and Wildlife, and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Federal Register update – Update the listed entity on 50 CFR 17 to match the currently recognized taxonomy.

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

<b>Date</b>	<b>No. wild indivs</b>	<b>No. outplanted</b>	<b>Stabilization Criteria identified in Recovery Plan</b>	<b>Stabilization Criteria Completed?</b>
1996 (listing)	~100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1998 (recovery plan)	12	8	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	8-10	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2007 (5-yr review)	41	58	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No
2012 (5-yr review)	32	420 and 700 (as part of breeding research)	All threats managed in all 3 populations	Partially (see Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

**Table 2. Threats to *Schiedea obovata* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Ungulates – Degradation of habitat and herbivory	A, C, D	Ongoing	Partially: Ungulate control at Keawapilau to West Makaleha population units (PU), Kahanahaiki to Pahole PU is ungulate-free, Makaha PU is pig-free
Established ecosystem-altering invasive plant species	A	Ongoing	Partially: Weed control at Keawapilau to West Makaleha PU and Kahanahaiki to Pahole PU
Rodent predation or herbivory – Rats	C	Ongoing	Partially: Rat control at Kahanahaiki to Pahole PU
Slugs herbivory	C	Ongoing	Partially: Localized slug control at Kahanahaiki PU and Upper Kapuna
Fire	E	Ongoing	No
Established invasive plant species competition	E	Ongoing	Partially: Weed control at Keawapilau to West Makaleha PU and Kahanahaiki to Pahole PU
Low numbers	E	Ongoing	Partially: Captive propagation and genetic storage, reintroduction / translocation implementation, and monitoring
Climate change	A, E	Increasing	No

**References:**

See previous 5-year review for a full list of references (USFWS 2007). Only references for new information are provided below.

Center for Conservation Research and Training Seed Storage Laboratory. 2009. Seed bank inventory. Honolulu, Hawaii. Microsoft Access database. Unpublished.

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Weller, S.G., A.K. Sakai, W.L. Wagner and D.R. Herbst. 1990. Evolution of dioecy *Schiedea* (Caryophyllaceae: Alsinoideae) in the Hawaiian Islands: biogeographical and ecological factors. Systematic Botany 15(2):266-276.

**Signature Page**  
**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Alsinidendron obovatum* (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

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

**Review Conducted By:**

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Jess Newton for

Date 8/28/2012