

5-YEAR REVIEW

Short Form Summary

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

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2016. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 76 species in Hawaii, Oregon, Washington, Montana, and Idaho. Federal Register 81(29): 7571–7573.

Lead Region/Field Office:

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

Name of Reviewers:

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Gregory Koob, Conservation & Restoration Team Manager, PIFWO

Methodology used to complete this 5-year review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) beginning in August 2017. The review was based on a review of current, available information since the last 5-year review for *Schiedea lydgatei* (USFWS 2011). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Gregory Koob, Conservation and Restoration Team Manager.

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).

Review Analysis:

Please refer to the previous 5-year review for *Schiedea lydgatei* published in the Federal Register on September 20, 2011 (available at http://ecos.fws.gov/docs/five_year_review/doc3871.pdf) for a complete review of the species’ status, threats, and management efforts. We are not aware of any significant new information regarding the species’ biological status since listing to warrant a change in the Federal listing status of *S. lydgatei*.

This short-lived perennial subshrub in the Caryophyllaceae (pink) family is endangered and is endemic to Moloka‘i. The current status and trends for *Schiedea lydgatei* are provided in the tables below.

New Status Information:

- There are two populations (Kawela and Kūpā‘ia) on Moloka‘i estimated to total more than 1,000 individuals combined (Bakutis 2018, in litt.).
- Visits to the Kawela population in 2018 documented suspected hybrids between *Schiedea lydgatei* and *S. sarmentosa* (Weisenberger 2018, in litt.).
- In 2016, one critical habitat unit in the lowland mesic ecosystem was designated on Moloka‘i for *Schiedea lydgatei* (8,770 ac; 3,549 ha) (81 FR 17790, March 30, 2016).

New Threats:

- Climate change loss or degradation of habitat—We previously reported that climate change may pose a threat to this species, anticipating an analysis by 2013. The assessment conducted by Fortini *et al.* (2013) concluded that *S. lydgatei* is extremely vulnerable to the impacts of climate change, with a vulnerability score of 0.983 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). In addition, *S. lydgatei* is one of the most vulnerable native Hawaiian plant species that has a projected future climate envelope. Therefore, additional management actions are needed to conserve this taxon into the future, such as locating key microsites that overlap with current and future climate envelopes for outplanting efforts.

New Management Actions:

- Captive propagation for genetic storage and reintroduction—In 2014, the University of California–Irvine reported 10 plants from Mākolēlau in storage, representing 10 different individuals.

Synthesis:

Currently, there are two populations of *Schiedea lydgatei* on Moloka‘i, estimated to total more than 1,000 individuals. A landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections was made by Fortini *et al.* (2013) and their analysis showed that *S. lydgatei* is extremely vulnerable to the effects of climate change, in that this species is unlikely to tolerate expected changes in climate at its current location. Only a few plants are in storage. Hybridization with other *Schiedea* may be a threat to this species.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Recovery Plan for the Moloka‘i Plant Cluster (USFWS 1996), and have been updated according to the draft revised recovery objective guidelines developed by the Hawai‘i and Pacific Plants Recovery Coordinating Committee (HPPRCC 2011). The HPPRCC identifies an additional initial objective, the Preventing Extinction Stage, in addition to the Interim Stabilization, Delisting, and Downlisting objectives. Furthermore, life history traits such as breeding system, population size fluctuation or decline, and reproduction type (sexual or vegetative), have been included in the calculation of goals for the number of populations and reproducing individuals for each stage. The goals for each stage remain grouped by life span defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

Schiedea lydgatei is a short-lived perennial subshrub. To prevent extinction, which is the first step in recovering the species, the taxon must be managed to control threats (e.g., fenced) and have 50 individuals (or the total number of individuals if fewer than 50 exist) from each of three populations represented in *ex situ* (secured off-site, such as a nursery or seed bank) collections. In addition, a minimum of three populations should be documented on Moloka‘i. Each of these populations must be naturally reproducing (i.e., viable seeds, seedlings, saplings) and increasing in number, with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met as, although there are two populations of at least 50 reproducing individuals, genetic representation is incomplete (Table 1) and not all threats are being addressed (Table 2). Therefore, *Schiedea lydgatei* meets the definition of Endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

Hybridization may be a new threat to this species; however, we are not aware of any significant new information regarding the species’ biological status since the last 5-year review in 2011. Thus, the following recommendations for future actions are added or reiterated for the 5-year review for 2018.

- Surveys and inventories—Survey areas where *Schiedea lydgatei* has been reported to determine current status of the species on Moloka‘i.
- Ungulate monitoring and control—Fence existing populations to provide protection from negative impacts of feral ungulates.
- Invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species around all populations of *S. lydgatei*.
- Fire destruction or degradation of habitat—Develop and implement a wildfire management plan.
- Captive propagation for genetic storage and reintroduction—Continue collection of genetic resources for storage, propagation, and reintroduction into protected suitable habitat within historical range.
- Reintroduction and translocation—
 - Augment known populations and reintroduce individuals into suitable habitat within historic range that is being managed for known threats to this species.
 - Research methods to increase and maintain numbers of female individuals within populations.
 - Study the possible effects of hybridization on this species.
- Rodent predation and herbivory—Control rats in the vicinity of all populations.
- Invertebrate predation and herbivory—Develop and implement methods to control slugs.

- Climate change adaptation strategy—Assess the modeled effects of climate change on this species and use to determine future landscape needed for the recovery of the species.
- Alliance and partnership development—Work with the East Molokaʻi Watershed Partnership program, the Hawaiʻi Division of Forestry and Wildlife, and other land managers to initiate planning and contribute to ecosystem-level restoration and management to benefit this species.

Table 1. Status and trends of *Schiedea lydgatei* from listing through current 5-year review.

Date	No. wild individuals	No. outplanted	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
1992 (listing)	>8,000	0	5–7 populations with 300 individuals each	No
			Populations secure from threats	No
			Populations stable or increasing in numbers for five years	No
1996 (recovery plan)	>8,000	0	5–7 populations with 300 individuals each	No
			Populations secure from threats	No
			Populations stable or increasing in numbers for five years	No
2003 (critical habitat)	1,000	0	5–7 populations with 300 individuals each	No
			Populations secure from threats	No
			Populations stable or increasing in numbers for five years	No
2011 (5-year review)	200+	0	5–7 populations with 300 individuals each	Partially

			Populations secure from threats	No
			Populations stable or increasing in numbers for five years	No
2016 (critical habitat)	200+	0	5–7 populations with 300 individuals each	No
			Populations secure from threats	No
			Populations stable or increasing in numbers for five years	No
Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2018 (5-year review)	1,000+	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Reproduction (<i>i.e.</i> viable seeds, seedlings) at all three populations	No
			Three populations with 50 mature individuals each	Partially, two populations

* The Preventing Extinction Stage was established in 2011. Prior to 2011, the Interim Stabilization Stage was the first stage towards recovery (now it is the second after Preventing Extinction).

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

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A	Ongoing	Partial, current status of partial fence unknown
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, current status of partial fence unknown
Fire destruction or degradation of habitat	A	Ongoing	None
Ungulate predation or herbivory	C	Ongoing	Partial, current status of partial fence unknown
Rodent predation or herbivory	C	Ongoing	None
Invertebrate predation or herbivory	C	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Reduced viability	E	Ongoing	None

References:

See the previous 5-year review for a full list of references (USFWS 2011). Only references for new information are provided below.

Chu, P-S. and H. Chen. 2005. Interannual and interdecadal rainfall variations in the Hawaiian Islands. *Journal of Climate* 18: 4796–4813.

Diaz, H.F., P-S. Chu, and J.K. Eischeid. 2005. Rainfall changes in Hawai‘i during the last century. 16th Conference on Climate Variability and Change, abstract.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change vulnerability for all native Hawaiian plants. Technical report HCSU-044. Hawai‘i Cooperative Studies Unit, University of Hawai‘i at Hilo, Hawai‘i. 134 pp.

[HNP] Haleakalā National Park. 2013. Controlled propagation report.

[HNP] 2015. Controlled propagation report.

[HNP] 2016. Controlled propagation report.

[HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

- Robertson, R. 2016, in litt. Email regarding request for information on Haleakalā National Park species for 5-year reviews, 23 MAY 2016.
- [USFWS] U.S. Fish and Wildlife Service. 2011. *Schiedea haleakalensis* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. https://ecos.fws.gov/docs/five_year_review/doc3869.pdf.
- [USFWS] 2016. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 76 species in Hawai‘i, Oregon, Washington, Montana, and Idaho. Federal Register 81(29): 7571–7573, February 12, 2016.
- [USFWS] 2016. Endangered and threatened wildlife and plants; designation and nondesignation of critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species; final rule. Federal Register 81 (61): 17790–18110, March 30, 2016.
- [US-GCRP] US GCRP Advisory Committee. 2009. Global climate change impacts in the United States. Karl, T.R., J.M. Melilo, and T.C. Peterson (eds.), Cambridge University Press. 189 pp.
- [US-NSTC] US National Science and Technology Council. 2008. Scientific assessment of the effects of global change on the United States. Committee on Environment and Natural Resources. 261 pp.
- University of California–Irvine. 2014. Controlled propagation report.
- Weisenberger, L. 2018, in litt., Observations of *Schiedea* populations on Moloka‘i.

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SIGNATURE PAGE for 5-YEAR REVIEW of *Schiedea lydgatei* (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

For Field Supervisor, Pacific Islands Fish and Wildlife Office