

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Sanicula purpurea* (no common name)

**Current Classification:** Endangered

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

[USFWS] U.S. Fish and Wildlife Service. 2018. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 18 species in Hawaii, Oregon, Washington, Idaho, and Canada. Federal Register 83(14): 3014–3015, January 22, 2018.

### **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 January 2018. The review was based on a review of current, available information since the last 5-year review for *Sanicula purpurea* (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](http://ecos.fws.gov/tess_public)).

### **Review Analysis:**

Please refer to the previous 5-year review for *Sanicula purpurea* published in the Federal Register on August 2, 2011 (available at [https://ecos.fws.gov/docs/five\\_year\\_review/doc3789.pdf](https://ecos.fws.gov/docs/five_year_review/doc3789.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. purpurea*.

This short-lived perennial herb in the Apiaceae (parsley) family is endangered and known from west Maui and the Ko‘olau Mountains of O‘ahu. The current status and trends for *Sanicula purpurea* are provided in the tables below.

#### New Status Information:

- In 2012, Army Natural Resources reported 76 immature individuals, three mature, and two seedlings at East Range (O‘ahu) (Army Natural Resources 2018). Currently, two populations on west Maui total fewer than 10 individuals, and two populations in the Ko‘olau Mountains of O‘ahu total approximately 16 individuals (PEPP 2015, 2016, 2017a, 2017b, 2018; Oppenheimer 2018, in litt.). There is no new information regarding the status of populations on west Maui at Paunau and the ‘Eke Crater area (last observed in the early 2000s). The O‘ahu population at the Ko‘olau summit at Wailupe has not been monitored since 2013 (Ching 2018, in litt.). The IUCN recently estimated as many as 60 individuals in eight subpopulations for both islands (Keir *et al.* 2016).
- In 2012, critical habitat was designated in 14 units on O‘ahu in two ecosystems (lowland wet and wet cliff) (30,058 ac; 12,162 ha) (77 FR 57648, September 18, 2012). In 2016, two critical habitat units in one ecosystem (montane wet) were designated on west Maui for *Sanicula purpurea* (1,479 ac; 599 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 *Sanicula purpurea* is highly vulnerable to the impacts of climate change, with a vulnerability score of 0.705 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions may be needed to conserve this taxon into the future.

#### New Management Actions:

- Surveys and inventories—In 2016, the Plant Extinction Prevention Program (PEPP) noted that *Sanicula purpurea* on O‘ahu should be elevated to “POP” status (potential PEPP, with fewer than 50 individuals in the wild) and that additional surveys of known populations on west Maui were needed to determine if elevation to a “POP” status was necessary (PEPP 2016).
- Captive propagation for genetic storage and reintroduction—
  - In 2017, collections were made from five of 10 founders from Helemano (Oahu) and two of 27 founders from East Range (Oahu) (PEPP 2017b).
  - The Oahu Army Natural Resource Program’s seed bank stores seeds from one founder from Opaepala and five founders from Helemano (Army Natural Resources 2018).
  - In 2017, the Lyon Seed Conservation Laboratory reported 53 seeds in storage from Honokōhau (west Maui) and 81 seeds in storage from Honokōwai (west Maui) (Lyon Arboretum 2017).

#### Synthesis:

Currently, there are two populations of *Sanicula purpurea* in two locations on west Maui, totaling fewer than 10 individuals, two populations in the Ko‘olau Mountains of Oahu, totaling approximately 16 individuals, at least two populations with an unknown number

of individuals (as there have been no observations since early 2000s), with the most recent estimate for the entire species as high as 60 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. purpurea* is highly vulnerable to the effects of climate change. Seed collections and seed storage research are ongoing.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Recovery Plan for the Multi-Island Plants (USFWS 1999), 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.

*Sanicula purpurea* is a short-lived perennial herb. 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 west Maui and O‘ahu. 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, there are no populations of at least 50 individuals, genetic representation is incomplete (Table 1), and all threats are not being sufficiently managed throughout the range of the species (Table 2). Therefore, *Sanicula purpurea* meets the definition of Endangered as it remains in danger of extinction throughout its range.

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

We are not aware of any new threats or significant new information regarding the species’ biological status since the last 5-year review in 2011. Thus, the following recommendations for future actions are reiterated for 5-year review for 2018.

- Surveys and inventories—Continue to survey for additional populations of *Sanicula purpurea* in areas of potentially suitable habitat on west Maui. Reassess the status of populations at Paunau and ‘Eke on west Maui, and the status of the population at the Ko‘olau summit at Waimānalo on Oahu.
- Ungulate monitoring and control—Maintain existing fences to protect populations from the negative impacts of feral pigs.

- Invasive plant monitoring and control—Control established ecosystem-altering nonnative invasive plant species around all populations of *S. purpurea*.
- Rodent predation and herbivory—Control rats in the vicinity of known populations.
- Slug herbivory—Develop and implement methods to control slugs.
- 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.
- Human disturbance—Continue to maintain fencing to protect populations from hiking and trail maintenance impacts.
- Stochastic events—Reduced viability—Research life-cycle aspects of the species that affect seed production, viability, and regeneration.
- Climate change adaptation strategy—Assess the modeled effects of climate change on this species and use to determine future landscape needed for its recovery.
- Alliance and partnership development—Work with the west Maui and Oahu land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.

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

Date	No. wild individuals	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1996 (listing)	130–210	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals each	No
1999 (recovery plan)	181–261	0	All threats managed in all three populations	No
			Complete genetic storage	No

			Three populations with 50 mature individuals each	No
2003 (critical habitat)	21 (O'ahu) 200 (Maui)	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2011 (5-year review)	80 (O'ahu) ca 50 (Maui)	4	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2012 (critical habitat-Oahu)	24 (O'ahu)	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2016 (critical habitat-Maui Nui)	50 (Maui)	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No

Date	No. wild individuals	No. outplanted	*Preventing Extinction Criteria identified by HPPRCC	*Preventing Extinction Criteria Completed?
2018 (5-year review)	ca 16 (O‘ahu) > 10 (Maui)	0	All threats managed in all three populations	Partially
			Complete genetic storage	Partially
			Reproduction ( <i>i.e.</i> viable seeds, seedlings) at all three populations	No
			Three populations with 50 mature individuals each	No

\* 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 *Sanicula purpurea* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A	Ongoing	Partial, one population fenced
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, some monitored populations
Climate change degradation or loss of habitat	A	Ongoing	None
Ungulate predation or herbivory	C	Ongoing	Partial, one population fenced
Rodent predation or herbivory	C	Ongoing	None
Invertebrate predation or herbivory	C	Ongoing	None
Stochastic events—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.

Army Natural Resources. 2018. Species database.

Ching, S. 2018, in litt., Email re current status of *Sanicula purpurea* on O‘ahu, 20 SEP 2018.

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.

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

Keir, M., S.M. Gon, N. Sugii, J. Kwon, M. Chau, M. Bruegmann, V.L. Caraway, and L. Weisenberger. 2016. *Sanicula purpurea*. The IUCN Red List of Threatened Species 2016:e.T80212525A115505660.  
<http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T80212525A80212529.en>.

Lyon Arboretum. 2017. Micropropagation and seed conservation laboratory databases.

Oppenheimer, H. 2018, in litt. Current status of Maui plant species, Excel table.

[PEPP] Plant Extinction Prevention Program. 2015. PEPP annual report fiscal year 2015 (July 1, 2014-June 30, 2015). 179 pp.

[PEPP] 2016. Plant Extinction Prevention Program FY 2016 Annual Report (Oct 1, 2015-Sep 30, 2016), US FWS CFDA Program #15.657; Endangered Species Conservation-Recovery Implementation Funds, Coop Agreement F14AC00174, December 24, 2016, UH Manoa, PCSU, PEPP. 237 pp.

[PEPP] 2017a. Plant Extinction Prevention Program FY 2017 annual report (Oct 1, 2016-Sep 30, 2017), US FWS CFDA program #15.657; Endangered species conservation-recovery implementation funds, Cooperative Agreement F14AC00174, December 12, 2017, UH Manoa, PCSU, PEPP. 235 pp.

[PEPP] 2017b. Statewide species totals *ex situ*, excel table.

[PEPP] 2018. Maui Nui monthly report for February 2018. Excel table.

- [USFWS] U.S. Fish and Wildlife Service. 2011. *Sanicula purpurea* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/five\\_year\\_review/doc3789.pdf](https://ecos.fws.gov/docs/five_year_review/doc3789.pdf).
- [USFWS] 2012. Endangered and threatened wildlife and plants; Endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Department of the Interior, Federal Register 77 (181): 57648–57862, September 18, 2012.
- [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.
- [USFWS] 2018. Endangered and threatened wildlife and plants; initiation of 5-year status reviews for 18 species in Hawai‘i, Oregon, Washington, Idaho, and Canada. Federal Register 83(14): 3014–3015, January 22, 2018.

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**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**