

**Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*)**

**5-Year Review: Summary and Evaluation**



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Ventura, California**

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**5-YEAR REVIEW**  
**Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*)**

**GENERAL INFORMATION:**

**Species:** Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*)

**Date listed:** February 4, 1994

**FR citation(s):** 59 FR 5499-5510

**Classification:** Endangered

**Critical Habitat Designation**

The U.S. Fish and Wildlife Service (Service) designated Critical habitat for Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*) in 2002 across two critical habitat units totaling 287 acres (ac): 1. Glenwood (214 ac); and 2. Polo Ranch (73 ac) (Service 2002, 67 FR 37345). We identified the following primary constituent elements (i.e., principal biological features today) of critical habitat for Scotts Valley spineflower (Service 2002, 67 FR 37344):

1. Thin soils in the Bonnydoon series that have developed over outcrops of Santa Cruz mudstone and Purisima sandstone;
2. “Wildflower field” habitat that has developed on these thin-soiled sites;
3. A grassland plant community that supports the “wildflower field” habitat, that is stable over time and in which nonnative species are absent or are at a density that has little or no adverse effect on resources available for growth and reproduction of Scotts Valley spineflower;
4. Sufficient areas around each population to allow for recolonization to adjacent suitable microhabitat sites in the event of catastrophic events;
5. Pollinator activity between existing colonies of Scotts Valley spineflower;
6. Seed dispersal mechanisms between existing colonies and other potentially suitable sites;
7. Sufficient integrity of the watershed above habitat for Scotts Valley spineflower to maintain soil and hydrologic conditions that provide the seasonally wet substrate for growth and reproduction of Scotts Valley spineflower.

We defined wildflower field habitat in the listing rule as patches of land that support a higher number of native herbaceous species relative to adjacent annual grasslands that are characterized by nonnative species. The wildflower field habitat is underlain by shallow, well-draining soils, in contrast to the deeper soils with a greater water-holding capacity of the annual grasslands (Service 2002, 67 FR 37337).

**State Listing:**

Not listed.

## **BACKGROUND:**

### **Species overview:**

Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*) is an annual plant in the buckwheat family (Polygonaceae) with rose-pink flowers. Plants are erect and may grow to 12 inches (in) (Reveal et al. 2022) but are typically found smaller, 1–3 in. tall (T. Lemein, personal observation). The species is restricted to thinly vegetated areas with shallow soil over bedrock. Scotts Valley spineflower is known from five properties in Scotts Valley, Santa Cruz County, California.

### **Most recent status review:**

[Service] U.S. Fish and Wildlife Service. 2019. Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*) 5-Year Review: Summary and Evaluation. Ventura, California. 9 pages.

We recommended no status change to Scotts Valley spineflower in the 2019 5-Year review.

### **FR Notice citation announcing this status review:**

[Service] U.S. Fish and Wildlife Service. 2023. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 47 Species in California, Nevada, and Oregon. Federal Register 88:56042–56044.

## **ASSESSMENT:**

### **Information acquired since the last status review:**

We, the Service’s Ventura Fish and Wildlife Office, conducted this 5-year review. We solicited data for this review from interested parties through a Federal Register notice announcing this review on August 17, 2023 (Service 2023). We did not receive any information from the public in response to our Federal Register Notice announcing this 5-year review. However, we conducted a literature review and contacted local botanists, consultants, land trusts, and private landowners. We provide updated information on abundance and threats in this 5-year review.

### **Distribution and habitat:**

Scotts Valley spineflower is a narrow endemic to the wildflower field habitat within undeveloped grasslands in Scotts Valley, Santa Cruz County, California. The species occurs on five properties all within 1.0 mile (mi) of each other: the Salvation Army property, Scotts Valley High School Ecological Preserve (High School Preserve), Polo Ranch, Glenwood Open Space Preserve (Glenwood), and the Sandraya Way development site (Sandraya). Historically, the properties would have been contiguous but are now separated by development and infrastructure.

Scotts Valley spineflower occurs in a microhabitat that is referred to as “wildflower fields” to separate it from the surrounding annual grasslands. The wildflower field habitat is characterized by thin soils in the Bonnydoon series that have developed over outcrops of Santa Cruz mudstone and Purisima sandstone. This microhabitat supports a more diverse native forb community compared to surrounding annual grasslands that are often typified by nonnative grasses in deeper soil (Service 2002, 67 FR 37337). The annual grasslands are interspersed within oak woodlands and riparian corridors.

**Abundance:**

Partners have collected abundance estimates periodically from 1997 through 2014 at the High School Preserve and Polo Ranch. Annual abundance estimates have been collected regularly at both properties from 2015 through 2024 (Lyons 2024, pp. 7-9; Marty et al. 2024, Appendix 1). The data from the High School Preserve and Polo Ranch suggest stable populations that may have large fluctuations between years (Table 1). Less data is available from Glenwood, but the available data suggest that 2015 was a high abundance year while more recent values are about half of that high point (LTSCC 2017, p. 20; Service 2019, p. 5). Historical data that was collected infrequently between 1992 and 2015 suggest a range of abundance slightly higher than the range of values observed between 2015 and 2023. This may coincide with a reduction in occupied area in the western portion of Glenwood, an increase in annual grasses, differences in methodologies through time, or a combination thereof. Abundance data is not available for the Salvation Army property, although the presence of the species is frequently noted during monitoring of the High School Preserve. There is no regular management that occurs for Scotts Valley spineflower at the Salvation Army property although local botanists weed small areas therein when possible. Scotts Valley spineflower was first observed at the Sandraya property in 2018 in a small area planned for development (Allegretti 2022, entire). The property has continued to support Scotts Valley spineflower. In 2024, the Service, developer, and City of Scotts Valley agreed to a plan for offsite mitigation at Glenwood in 2024 (Timmer 2024, entire). The available data suggest that Scotts Valley spineflower appears stable in the areas where it is directly managed for (by controlling annual grass biomass) and is decreasing in areas where such management does not occur.

**Table 1.** Estimated abundance of Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*) at the five properties where it is known to occur between 2015 and 2023. “na” represents years where no data was collected, “P” represents years when the plant was observed present but no formal estimation of abundance occurred. Methodology between sites and between years is different.

Site	2015	2016	2017	2018	2019	2020	2021	2022	2023
Salvation Army	na	na	P	P	P	P	P	P	P
Scotts Valley High School Ecological Preserve	3500	7688	3725	19021	19966	18922	13337	21913	26581
Glenwood Open Space Preserve	40890	na	na	2764 – 15720	na	na	na	16350	19950
Polo Ranch	13090	15064	14495	21723	8293	17135	21880	16371	15348
Sandraya Way Development	-	-	-	P	51-100	na	na	185	P

### **Threats:**

At the time of listing, we described threats to Scotts Valley spineflower and its associated habitat as residential, golf course, and commercial developments, and stochastic events due to small population size (Service 1994, 59 FR 5505, 5507). In our 2009 5-Year Review, we identified habitat destruction due to existing and proposed developments, invasive and competitive native species, stochastic extinction, and climate change as the threats to the species (Service 2009, pp. 8-15). We reviewed these threats again in 2019, finding that the threats persisted. Updates to our threat assessment since the 2019 5-Year Review follow.

### *Development*

Development continues to be the greatest and most active threat to Scotts Valley spineflower. The City of Scotts Valley approved a development project at the Sandraya Way development site in July 2024 that will result in the loss of the Sandraya population. Mitigation for the project has been planned and coordinated with the Service and will be implemented at the Glenwood Open Space Preserve, managed by the Land Trust of Santa Cruz County (Timmer 2024, entire). The population at Sandraya was spatially small (approximately 140 square feet) and contained relatively few individuals (approximately 185 in 2022 and a similar amount in 2024) (Allegretti 2022, entire; T. Lemein personal observation). The Service did not consider on site mitigation feasible due to edge effects from a small preserve size, a high likelihood of inadequate management because of inadequate funding, and cost. All stakeholders agreed that offsite mitigation was the best option, and seed was collected in 2023 to establish new colonies at Glenwood. The Service planned to collect seed in 2024, but the site was mowed before seed matured. There is a small chance that the site may remain undeveloped long enough to collect seed in 2025, but this is not guaranteed. This project shows that unless a property is owned or managed by a durable conservation agreement for the benefit of Scotts Valley spineflower, development remains a threat. Although a naturally occurring population will be lost, the agreed upon mitigation provides an opportunity to expand where the species occurs at Glenwood as well as to understand the needs and processes of reintroduction, augmentation, and management, which will aid in recovery.

Development remains a threat at the Salvation Army property because that location is not under a conservation easement or other agreements protecting Scotts Valley spineflower and its habitat from development.

Glenwood, Polo Ranch, and the High School Preserve all have conservation agreements in place that prohibit development of those sites and provide some amount of management for Scotts Valley spineflower at each (DDA 1998, pp. 4–25, 4–159, Appendix B; LTSCC 2017, entire; Marty et al. 2024, p. 1; LSA 2021, entire; Ford and Rao 2010, entire).

### *Invasive and Competitive Native Species*

Invasive species continue to be a persistent threat at each of the properties where Scotts Valley spineflower occurs. Competition from annual grasses is unmanaged at the Salvation Army property, and Scotts Valley spineflower persists only because the soil is too thin for annual grasses to overwhelm each of the wildflower field microhabitats. This has restricted Scotts Valley spineflower to only those areas with the shallowest soil. Currently, the most abundant

invasive species are annual grasses such as *Festuca perennis.*, *Avena* spp., *Bromus hordeaceus*, *Bromus diandrus*, *Hordeum murinum*, and annual forbs such as *Hypochaeris glabra*, *Erodium botrys*, *Anthemis cotula*, *Dittrichia graveolens*, and *Dipsacus* sp. (Lyons 2024, p. 1; Marty et al. 2024, Appendix 1).

Invasive species are managed by horse grazing and hand pulling at the High School Preserve, cattle grazing in portions of Glenwood, and mowing at Polo Ranch. In many cases, the immediate area where Scotts Valley spineflower occurs must be fenced off to reduce the chance that management impacts the lifecycle of Scotts Valley spineflower. The mowing in 2024 at Sandraya that went through the Scotts Valley spineflower site before seeds could mature is an example. Cases like this highlight the need for management to facilitate the species' life cycle and not to merely reduce the amount of competing biomass.

Native species may also affect the habitat in negative ways for Scotts Valley spineflower. Encroachment of shrubs (particularly coyote brush (*Baccharis pilularis*)) and trees (e.g. oaks (*Quercus* spp.)) may shade out existing locations. The greatest threat of this is at the High School Preserve and Polo Ranch. The grazing regime at the High School Preserve inhibits shrub encroachment, and tree trimming is planned at Polo Ranch to reduce the amount of shading in some areas occupied by Scotts Valley spineflower.

#### *Stochastic Extinction*

Scotts Valley spineflower has an extremely limited range and occupies a very specific habitat niche within the broader annual grasslands or oak woodlands. The specificity of habitat and the fragmentation of the areas where the species occur make Scotts Valley spineflower highly susceptible to random (stochastic) events (e.g., catastrophic disturbance, demographic collapse). The threat of stochastic variation in demography and the environment has likely increased proportionately to the amount of habitat lost due to development and the increase in fragmentation since the time of listing.

#### *Climate Change*

Climate change may affect Scotts Valley spineflower most directly through changes in precipitation patterns, changes in seasonal average temperatures, and changes in minimum and maximum temperatures. Changes to these environmental conditions may decrease the suitability of existing habitat for Scotts Valley spineflower germination, survival, and reproduction, or increase the ability of non-native invasive species to colonize and outcompete Scotts Valley spineflower in areas where the species occurs or had occurred (Sandel and Dangremond 2012, p. 281; Thorne et al 2017, p. 6).

#### **Evaluation of Recovery Criteria:**

We developed downlisting criteria for Scotts Valley spineflower in the Recovery Plan for Insect and Plant Taxa from the Santa Cruz Mountains in California (Recovery Plan) (Service 1998, pp. 45–47). The recovery criteria are:

1. All four parcels of private land that support the Scotts Valley spineflower have permanent conservation easements or have been acquired.

2. Conservation measures for the Scotts Valley spineflower are included in a Habitat Conservation Plan with the City of Scotts Valley.
3. Population numbers are stable or increasing.

Conservation agreements have been created for Polo Ranch, Glenwood, and the High School Preserve. Polo Ranch and Glenwood have conservation easements managed by Wildlife Heritage Foundation and the Land Trust of Santa Cruz County respectively. The Scotts Valley High School Ecological Preserve is managed for the benefit of federal and state listed plant species as described in a habitat management plan as part of the school's Environmental Impact Report but is not held in a conservation easement. There are currently no plans for a conservation easement or acquisition of the Salvation Army property. The Sandraya property was not known of until 2018 and is not considered in the Recovery Plan. The Sandraya property is planned for development with mitigation to occur at Glenwood. For this criterion to be considered met, the Salvation Army property needs to be protected by a durable conservation agreement.

There is currently no plan to create a habitat conservation plan with the City of Scotts Valley. This criterion has not been met.

Continuous population data are only available for the High School Preserve and Polo Ranch, with less continuous data available for Glenwood. The available data suggest that Scotts Valley spineflower at these areas fluctuates from year to year but appear to be stable. We cannot make a claim about the stability of the Salvation Army property without quantitative data. However, we may infer that a downward trend is likely from our understanding that without management, annual grasses will increase, and that Scotts Valley spineflower will decrease as annual grasses increase. Without further information from all properties, this criterion has not been met.

In 2019, we amended delisting criteria for Scotts Valley spineflower (Service 2019b, entire). Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list." The delisting criteria in the Recovery Plan stated that "Delisting of this species [Scotts Valley spineflower] may not be feasible due to limited range and limited conservation opportunities" (Service 1998, p. 47). The amended criteria are:

1. Threats are reduced or eliminated so that populations are capable of persisting without significant human intervention or perpetual endowments are secured for management necessary to maintain the continued existence of the species;
2. An ex situ seedbank is maintained in a Center for Plant Conservation-affiliated botanic garden. While sufficient seedbank in the soil would typically provide a strategy for the taxon to persist through several years of short- or medium-term drought, it may not be sufficient to persist through long-term drought. Therefore, an ex situ seedbank would provide assurance that a population could be reseeded, should long-term drought – or other stochastic events – make it necessary; and

3. All existing populations are stable or increasing in the wild for at least 10 years. We expect above-ground population size to fluctuate annually in response to amount and timing of rainfall (e.g. see Fox et al. 2006). Therefore, a period of 10 years should be long enough to include most of the variability in rainfall that occurs in this region (Zedler & Black 1989; NOAA 2018)

We did not evaluate the delisting criteria because the downlisting criteria have not been met.

**Conclusion:**

Development is the primary threat to Scotts Valley spineflower. The Sandraya population will be lost due to development, although offsite mitigation is expected to mitigate the loss.

Development remains a threat at the Salvation Army property because no conservation agreement exists. The lack of regular management exacerbates the threats of invasive and competitive native species, stochastic extinction, and climate change at the Salvation Army property. The remaining populations are threatened by invasive and competitive native species, stochastic extinction, and climate change. However, regular management at Glenwood, Polo Ranch, and the High School Preserve provide increased resiliency for Scotts Valley spineflower at these properties. None of the recovery criteria have been met. After reviewing the best available scientific and commercial information, we conclude that Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*) remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and the analysis of the status of the species in our 2009 5-year review (Service 2009, entire) remains an accurate reflection of the species' current status.

**RECOMMENDATIONS FOR FUTURE ACTIONS:**

We recommend the following actions:

- Regular management and monitoring should begin at the Salvation Army property.
- Introduction and augmentation should be implemented at Glenwood for loss of Sandraya property.
- Seed from all locations should be collected and stored in a Center for Plant Conservation approved seed bank.
- To address the inadequacy of the current preserve designs and associated management, the creation of a single large management unit that brings together the Salvation Army property, Scotts Valley High School Ecological Preserve, Polo Ranch property, and Glenwood Preserve should be explored.

**Field Supervisor, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service**

Approved \_\_\_\_\_

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