

Draft Recovery Plan Revision for Seven Coastal Plants and the Myrtle’s Silverspot Butterfly: *Chorizanthe valida* (Sonoma Spineflower)
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Original Approved: September 29, 1998

Original Prepared by: U.S. Fish and Wildlife Service, Ventura and Sacramento, California for Region 1 (Portland, Oregon)

We have identified the best available information that indicates the need to amend recovery criteria for this species since the completion of the original recovery plan. In this proposed modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, describe the rationale supporting the proposed recovery plan modification, and propose additional recovery actions (as needed). The proposed modification is an addendum, which supplements the recovery plan, superseding the following pages: from Section I: pp. 25-29, and Section II: pp. 89-90 for Sonoma spineflower (*Chorizanthe valida*)¹. The proposed criteria amendments appear as an appendix that supplements the recovery plan, superseding only the indicated sections of the recovery plan.

**For
U.S. Fish and Wildlife Service
Region 8
Sacramento, California**

December 2018

Approved: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Regional Director, Pacific Southwest Region, Region 8,
U.S. Fish and Wildlife Service

Date: XXXXXXXXXXXXXXXXXXXX

¹ The superseded material includes only the specific recovery criteria and synthesis described for this species. We do not supersede material other than the recovery criteria with this amendment.

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

This review was prepared by the Sacramento Fish and wildlife Office (SFWO), following the National Recovery Program guidance issued in May of 2018. We (The U.S. Fish and Wildlife Service) used information from our files, the original recovery plan (1998a), the most recent 5-year review (2010), information from experts at the National Park Service (NPS), and the California Natural Diversity Database (CNDDDB) maintained by the California Department of Fish and Game. The Sonoma spineflower only exists on lands owned and operated by the NPS. Information from *Sonoma Spineflower (Chorizanthe valida) TE018180-4 Annual Report 2017* compiled by NPS biologists was the primary document relied on to inform decision-making. National Park Service biologists provided much of the documentation, observations, and data used to inform the amended recovery criteria. The amended criteria will be peer reviewed in accordance with the OMB Peer Review Bulletin following the publication of the Notice of Availability.

We developed amended recovery criteria by assessing threats to species using the Endangered Species Act's five listing-factors. We used concepts from the Species Status Assessment (SSA) framework (Service, 2016) to augment this process. While a full SSA is beyond the scope of this recovery plan revision, the Service used the SSA framework to consider what species need to maintain viability by characterizing the status of the species in terms of its resiliency, representation, and redundancy (Wolf et al. 2015; Schaffer and Stein 2000):

Resiliency describes the ability of populations to withstand stochastic disturbance. With increasing resiliency comes increased population size and growth rate. Habitat connectivity also increases resiliency. Generally, populations need abundant individuals within habitat patches of adequate area and quality in order to survive and reproduce in spite of disturbance.

Representation describes the ability of a species to adapt to changing environmental conditions over time. Populations with a wide variety of genetic and environmental diversity within and among populations have higher representation.

Redundancy describes the ability of a species to withstand catastrophic events. Generally, species which have adequate individuals within multiple populations, minimize potential loss from catastrophic events. Redundancy is high when multiple, resilient populations are distributed within the species' ecological settings and across the species' range.

ADEQUACY OF RECOVERY CRITERIA

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." Legal challenges to recovery plans (see *Fund for Animals v. Babbitt*, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) have affirmed the need to frame recovery criteria in terms of threats assessed under the five delisting factors.

RECOVERY CRITERIA

See previous version of criteria in the recovery plan for Sonoma spineflower (*Chorizanthe valida*) (Section II, pp. 89-91) of the Recovery Plan for Seven Coastal Plans and the Myrtle's Silverspot Butterfly. [\[Click Here to View Document\]](#)

SYNTHESIS

Background and Status

Sonoma spineflower (*Chorizanthe valida*) is an erect-to-spreading annual herb in the buckwheat family (Polygonaceae). This federally endangered plant is endemic to the Point Reyes Peninsula along central California coast. Currently there is one wild, or natural, population within Point Reyes National Seashore (PRNS) (Reveal and Hardham 1989). Since its listing in 1998, National Park Service (NPS) botanists have implemented a number of introductions, at least five of which have been successful at establishing new occurrences (Parsons and Ryan 2018) (Service 1998a). The spatial distribution of the population fluctuates seasonally, but does not appear to be contracting (Williams 2008; Parsons and Ryan 2018). Staff at PRNS have conducted some level of monitoring since the species re-discovery, and efforts were improved in 2004 (Davis 1990; Parsons pers comm). Evidence shows that the surviving wild population of Sonoma spineflower occurs within California's annual coast-prairie grassland on Sirdrak sand. Sirdrak sand is a rare, well-drained Pleistocene soil type found in dunes with a 2-4% slope bearing to the north-northwest (NRCS 2007; Parsons and Ryan 2018). Most of the successful established populations of Sonoma spineflower have been introduced on Sirdrak soil. It is likely these drier, low nutrient soils exclude competition from perennial species of grasses and forbs (Amelia Ryan pers. comm). Within Marin County, 90% (about 2,300 acres) of the Sirdrak soil lies within PRNS. Outside of PRNS, there are also soils of this type within the vicinity of Dillon Bean and Rodeo Lagoon.

The confirmed historical range of Sonoma spineflower is limited (Service 1998a). The species is further constrained by inhabiting naturally rare habitat within its geographic range (Ryan, pers. comm.). In addition, the species has a poor ability to disperse by natural means (Parson and Ryan 2018). Due to efforts on the part of the NPS, the species seems to be increasing in recent years. However, habitat loss and degradation are still the main threats to Sonoma spineflower. Non-native plants, trampling from hiking/recreation and livestock, drought, and climate change all pose a continuing threat to the plant.

Threats

The most significant threat to Sonoma spineflower is degradation to habitat. Non-native, invasive grasses compete for sunlight and alter the nutrient content of dune soils. Reports (Parsons and Ryan 2018) identified common velvetgrass (*Holcus lanatus*), yellow bush lupine (*Lupinus arboreus*), and non-native annual grasses as foremost among these threats. Employees at PRNS have been monitoring the extent of velvetgrass in relation to Sonoma spineflower to determine if management will be needed in the future (Parsons and Ryan 2018). Yellow bush lupine is thought to alter the soil nutrient composition, and thus over time renders habitat unsuitable to the Sonoma spineflower. Studies indicate that other grasses and forbs threaten Sonoma spineflower as well (*Festuca bromoides*, *Bromus hordeaceus*, *Aira caryophyllea*, *Cynosurus echinatus*).

Because bush lupine appears to pose a greater threat to Sonoma spineflower than other non-native plants, PRNS staff has focused removal efforts on this species.

Research suggests that grazing might be an effective method for removing invasive plant species in areas occupied by Sonoma spineflower (Davis and Sherman 1992). Sonoma spineflower is probably unpalatable to grazers, unlike many of the invasive grasses (Davis and Sherman 1992). By allowing cattle and other livestock to graze, Point Reyes National Seashore grants livestock-grazing easements to several in-holders (Parsons and Ryan 2018). Staff at PRNS have worked with in-holders to adjust grazing and agricultural infrastructure to benefit Sonoma spineflower populations in recent years (Parsons and Ryan 2018). Grazing by cattle and sheep is likely not a direct threat to the Sonoma spineflower; however, populations should be monitored to ensure threats do not exist from grazing (Service 2010).

Climate change could pose additional threats to the persistence of Sonoma spineflower. Assessing this threat is difficult, as the extent of average temperatures increases in California/Nevada is difficult to predict, as are the likely related changes to the level of threat posed by factors such as drought and fire (Loarie et. al. 2008; Keeley 2002). Literature on climate change includes predictions of hydrological changes, higher temperatures, and expansion of drought areas, resulting in a northward and/or upward elevation shift in range for many species (Blair et. al 2017; Loarie et. al. 2008).

AMENDED RECOVERY CRITERIA

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered at the point which it might be downlisted to threatened or that the protections afforded by the Act are no longer necessary and Sonoma spineflower might be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from endangered to threaten. The term “endangered species” means any species (species, sub-species, or Distinct Population Segment) which is in danger of extinction throughout all or a significant portion of its range. The term “threatened species” means any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to listing decisions, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered or threatened entity or not, based on the current scientific knowledge of existing threats. Section 4(b) of the Act requires a determination be made “solely on the basis of the best scientific and commercial data available.” Thus, recovery plans provide important guidance and measurable objectives against which to measure recovery progress. However, they serve as guidance for these actions, and are not regulatory documents.

Recovery criteria should help indicate when we would anticipate an analysis of the species’ status under section 4(a)(1) would result in a determination in which the species no longer exists in a threatened or endangered status.

We provide both downlisting and delisting criteria for the Sonoma spineflower. These criteria supersede those included in the Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly.

DOWNLISTING RECOVERY CRITERIA

In addition to what was included in the original recovery plan (Service 1998a), not in italics below, we have added new recovery criteria revisions, in italics below. Because the appropriateness of delisting is assessed by evaluating the five-factors identified in the Act, the recovery criteria below pertain to and are organized by these factors.

Factor A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range Protect existing populations and habitats.

The main threat to the persistence of Sonoma spineflower is habitat change and destruction. These threats must be reduced or eliminated in order to downlist, or delist, the plant. This will be accomplished when the following have occurred:

- A/1 *At least six successful populations have been established. These populations will be considered self-sustaining populations after 15 years, which includes a normal precipitation cycle.*
- A/2 *The area of each Sonoma spineflower population is maintained at or above approximately 2 acres in size².*
- A/3 *Invasive bush lupine cover at all sites is controlled at <1% within areas containing Sonoma spineflower.*
- A/4 *There are management measures implemented to address the threats of invasive species and other problems including...pedestrians and off-road vehicles at some sites.*
- A/5 *Monitoring reveals that management actions are successful in reducing threats of invasive non-native species.*

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The only known populations of Sonoma spineflower exist on lands owned and operated by the National Park Service. Although recreation occurs on these lands³, populations of Sonoma spineflower are probably not threatened by recreational activities. Therefore, no criteria were developed for this factor.

² During prolific years, the wild population of Sonoma spineflower occupies an area of approximately 2 acres (Parsons and Ryan 2018). This is large enough for a population to persist for the foreseeable future.

³ The mission of the National Park Service is to preserve natural and cultural resources for public benefit.

Factor C: Disease or Predation

Cattle rarely graze on Sonoma spineflower (Davis and Sherman 1992). Research suggests grazing might actually benefit populations over time (Davis and Sherman 1992). Because there is little or no threat to the persistence of Sonoma spineflower from grazing, no recovery criteria were developed for this factor.

Factor D: Inadequacy of Existing Regulatory Mechanisms

The inadequacy of existing regulatory mechanisms not considered a threat to Sonoma spineflower at this time. Therefore, no recovery criteria were developed for this factor.

Factor E: Other Natural or Manmade Factors Affecting Its Continued Existence

E/1 *The number of individuals within each Sonoma spineflower population remains at or above 90,000⁴ for 15 years⁵, which includes cycles of normal precipitation.⁶*

E/2 Seeds are stored in at least two Center for Plant Conservation certified facilities; seed germination, propagation, and out-planting propagation techniques are understood.

DELISTING

Full recovery of the Sonoma spineflower will occur when the dune systems they inhabit are secure, with evidence demonstrating exotic plants and other threats (such as recreational use and off-road vehicles) are controlled and managers have shown their ability to keep threats under control. The Sonoma spineflower needs to be secure in their presently-occupied ranges, and opportunities should be taken to introduce these plants to restored habitat in or near historic ranges. The area occupied by the plants should increase commensurate with improving habitat conditions. The determination that delisting is possible must be based on at least fifteen years of monitoring for the endangered taxa, to include wet and drought years.

Factor A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range Protect existing populations and habitats

A/1 *At least eight successful populations have been established on restored habitat [that] has been secured within the historic range. Populations will be self-sustaining after 15 years, which includes a normal precipitation cycle.*

A/2 *Further invasion or increase in non-native invasive plant species has been prevented, including bush lupine and coyotebrush, within all Sonoma spineflower populations.*

⁴ This number is based on expert opinion of NPS biologists managing the only extant population of Sonoma spineflower (Ryan 2018).

⁵ 15 years of monitoring is considered sufficient to ensure a population will persist for the foreseeable future (Service 1998a).

⁶ A normal precipitation cycle is a series of years that include above average, and below average rainfall conditions, starting and ending with average precipitation (Service, 1998b).

A/3 Habitat occupied by the species that is needed to allow delisting has been *voluntarily* secured, with long-term commitments and, if possible, endowments to fund [the] conservation of the native vegetation.

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The only known populations of Sonoma spineflower exist on lands owned and operated by the National Park Service. Although recreation occurs on these lands³, populations of Sonoma spineflower are probably not threatened by recreational activities. Therefore, no criteria were developed for this factor.

Factor C: Disease or Predation

Cattle rarely graze on Sonoma spineflower (Davis and Sherman 1992). Research suggests grazing might actually benefit populations over time (Davis and Sherman 1992). Because there is little or no threat to the persistence of Sonoma spineflower from grazing, no recovery criteria were developed for this factor.

Factor D: Inadequacy of Existing Regulatory Mechanisms

The inadequacy of existing regulatory mechanisms is not known to threaten Sonoma spineflower at this time. Therefore, no recovery criteria have been developed for this factor.

Factor E: Other Natural or Manmade Factors Affecting Its Continued Existence

E/1 *Ensure that seed banking practices, including seed germination, propagation, and out-planting propagation techniques, are understood and implemented as needed.*

E/2 *Seeds at banking facilities are renewed at a rate to ensure that seed stores remain viable in perpetuity.*

All classification decisions consider the following five factors: (1) is there a present or threatened destruction, modification, or curtailment of the species' habitat or range; (2) is the species subject to overutilization for commercial, recreational scientific or educational purposes; (3) is disease or predation a factor; (4) are there inadequate existing regulatory mechanisms in place outside the ESA (taking into account the efforts by states and other organizations to protect the species or habitat); and (5) are other natural or manmade factors affecting its continued existence. When delisting or downlisting a species, we first propose the action in the *Federal Register* and seek public comment and peer review. Our final decision is announced in the *Federal Register*.

Rationale for Recovery Criteria

We have amended the recovery criteria for Sonoma spineflower to include delisting criteria that incorporate the biodiversity principles of resiliency, redundancy, and representation (Service 2016) and threats addressed under the five factors. The amended criteria were developed based on the Service's current understanding of the species needs and requirements. This

understanding includes information gathered since the original recovery plan was published, such as more recent information about population status and trends, along with an updated understanding of the threats acting on the species, as summarized in the syntheses above. The criteria presented are based on the reduction of threats to the species, ensuring that sufficient redundancy exists to withstand potential catastrophic events, and they include a temporal aspect to ensure that the species are resilient to expected variation within a reasonable timeframe.

ADDITIONAL SITE SPECIFIC RECOVERY ACTIONS

The actions identified below are those that, based on the best available science, are necessary to bring about the recovery of all listed species in this amendment and ensure their long-term conservation. However, these actions are subject to modification as might be indicated by new findings, changes in species status, and the completion of other recovery actions. The actions listed here are new and should be considered in addition to the actions in the original recovery plan. The most stepped down (detailed) actions have been assigned a priority for implementation, according to our determination of what is most important for the recovery of these species based on the life history, ecology, and threats.

Key to Terms and Acronyms Used in the Recovery Action Narrative and Implementation Schedule:

Priority numbers are defined per Service policy (Service 1983) as:

- Priority 1: An action that must be taken to prevent extinction or to prevent a species from declining irreversibly.
- Priority 2: An action that must be taken to prevent a significant decline of the species population/habitat quality or some other significant negative impact short of extinction.
- Priority 3: All other actions necessary to provide for full recovery of the species.

The following Recovery Actions Narrative provides detail of the actions necessary to achieve full recovery. The priority assigned to each action is specified within parentheses at the end of the description.

The numeric recovery priority system follows that of all Service recovery plans. Because situations change over time, priority numbers must be considered in the context of past and potential future actions at all sites. Therefore, the priority numbers assigned are intended to guide, not to constrain, the allocation of limited conservation resources.

The actions below are based on the best available science and observations, which the Service believes are necessary to move towards the recovery and downlisting of Sonoma spineflower.

1. Establish or protect additional populations of Sonoma spineflower.

- 1.1 Introduce at least three new self-sustaining populations (**Priority 1**)
- 1.2 Continue work on seedbank dynamics with the goal of using the information to run a population viability analysis on the species (**Priority 2**).

2. Conduct research to better understand life history and annual establishment.

- 2.1 Determining the extent of Sirdrak Sand outside of the park to help inform the location of potential introduction sites (**Priority 3**).
- 2.2 Conduct an analysis of soil type and nutrients/water balance, vegetation cover, disturbance dynamics (grazing, rodents, rabbits) to identify new introduction sites (**Priority 3**).
- 2.3 Research the potential to augment nesting habitat for main pollinators near some of the current and future introduction sites (**Priority 3**).

3. Monitor and manage existing populations on protected lands.

- 3.1 Maintain shrub cover within existing sites at acceptable levels through removal, as necessary (**Priority 3**).
- 3.2 Determine where some of the main pollinators identified in the two years of study on Sonoma spineflower nest near these populations (**Priority 3**).
- 3.3 Research the potential to augment nesting habitat for main pollinators near some of the current and future introduction sites (**Priority 3**).

LITERATURE CITED

- Blair, C.M., D.D. Ackerly, P. Z. Klos, J. Natali, T. E. Dawson, and S. E. Thompson. 2017. Hydrologic refugia, plants, and climate change. *Global Change Biology* 23:2941-2961.
- Davis, L. and R. J. Sherman. 1990. The rediscovered Sonoma spineflower at Point Reyes National Seashore. *Fremontia* 18:17-18
- Davis, L. and R. J. Sherman. 1992. Ecological study of the rare *Chorizanthe valida* (Polygonaceae) at Point Reyes National Seashore, California. *Madroño*. 39:271-280.
- (GAO) Government Accountability Office. 2006. Endangered Species: Time and Costs Required to Recover Species Are Largely Unknown (Publication No. GAO-20548).
- Keeley, J. E. 2002. Native American impacts on fire regimes of the California coast ranges. *Journal of biogeography* 29:303-320.
- Loarie, S.R., B. E. Carter, K. Hayhoe, S. McMahon, C. A. Knight, and D.D. Ackerley. 2008. Climate change and the future of California's endemic flora. *PLOS One* 3:110.
- Parsons, L., and A. Ryan. 2018. Sonoma Spineflower (*Chorizanthe valida*) TE018180-4 Annual Report 2017.
- Reveal, J.L. and C. B. Hardham, 1989. A revision of the annual species of *Chorizanthe* (Polygonaceae: Eriogoniodeae). *Phytologia* 66:98-198.
- Schaffer, M. L., and B. A. Stein. 2000. Safeguarding our precious heritage (Chapter 11), IN B.A. Stein, L.S. Kutner, and J.S. Adams editors, *Precious heritage: the status of biodiversity in the United States*. Oxford University Press, New York: 301-321.
- [Service] U.S. Fish and Wildlife Service. 1992. Endangered and Threatened Wildlife and Plants; Six Plants and Myrtle's Silverspot Butterfly from Coastal Dunes in Northern and Central California Determined to be Endangered. Final Rule. *Federal Register* 57:27848-27859
- [Service] U.S. Fish and Wildlife Service. 1998a. Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan. Portland, Oregon. 141 pp.
- [Service] U.S. Fish and Wildlife Service. 1998b. Recovery plan for serpentine soil species of the San Francisco Bay area, California, Region 1, Portland, OR. 442 pp
- [Service] U.S. Fish and Wildlife Service. 2010. Sonoma Spineflower (*Chorizanthe valida*) 5-year review summary and evaluation.
- [Service] U.S. Fish and Wildlife Service. 2016. USFWS Species Status Assessment Framework: an integrated analytical framework for conservation. Version 3.4 dated August 2016.
- Williams, A. 2008. Sonoma spineflower (*Chorizanthe valida*) Annual Report 2008. TE018180-4.

Wolf, S., B. Hartl, C. Carroll, M. C. Neel, and D. Greenwald. 2013. Beyond PVA: Why Recovery under the Endangered Species Act is More than Population Viability. *BioScience*. Vol 65 No. 2. Feb 2015. Madroño 61(1): 64-76.

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Parsons, L. 2018. National Park Service. Electronic mail correspondence to Amelia Ryan, NPS, and Elizabeth Bainbridge, Sacramento Fish and Wildlife Office. July 20th. Subject: Recovery Plan Sonoma Spineflower.

Parsons, L. 2018. National Park Service. Phone interview with Elizabeth Bainbridge, Sacramento Fish and Wildlife Office, August 1, 2018.

Ryan, A. 2018. National Park Service. Electronic mail correspondence to Lorraine Parsons, NPS, and Elizabeth Bainbridge, Sacramento Fish and Wildlife Office. July 20th. Subject: Recovery Plan Sonoma Spineflower.

Ryan, A. 2018. National Park Service. Phone interview with Elizabeth Bainbridge, Sacramento Fish and wildlife Office, August 1, 2018.