

5-YEAR REVIEW

Chorizanthe orcuttiana (Orcutt's Spineflower)

GENERAL INFORMATION

Species: *Chorizanthe orcuttiana* (Orcutt's spineflower), a plant species

Date listed under the Endangered Species Act: October 7, 1996

Federal Register citation(s): USFWS 1996 (61 FR 52370–52384)

Classification: Endangered

BACKGROUND

Under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq.*), the U.S. Fish and Wildlife Service (USFWS), referred to as “we” in this document, maintain lists of endangered and threatened wildlife and plant species (referred to as the List) in the Code of Federal Regulations (CFR) at 50 CFR 17.11 (for wildlife) and 17.12 (for plants). Section 4(c)(2)(A) of the Act requires us to review each listed species' status at least once every 5 years.

Most recent status review: USFWS. 2014. *Chorizanthe orcuttiana* (Orcutt's spineflower); 5-year Review: Summary and Evaluation. Carlsbad Fish and Wildlife Office. Carlsbad, California. 39 pp.

We initiated a status review for *Chorizanthe orcuttiana* on May 25, 2011 (USFWS 2011; 76 FR 30377). The review was finalized June 26, 2014 with no recommended change in status (USFWS 2014). This and other reviews can be viewed at the species page on the [Environmental Conservation Online System](#).

Federal Register Notice citation announcing this status review: On January 27, 2020, we published a *Federal Register* notice (85 FR 4692) announcing initiation of the 5-year review of this species, and the opening of a 60-day period to receive information from the public (USFWS 2020). We received no information about *Chorizanthe orcuttiana*.

ASSESSMENT

Information acquired since the last status review

This 5-year review was conducted by the USFWS Carlsbad Fish and Wildlife Office. Data for this review were solicited from interested parties through a *Federal Register* notice announcing this review on January 27, 2020. We also contacted U.S. Geological Survey (USGS), San Diego Management and Monitoring (SDMMP), and species experts to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files.

SUMMARY OF NEW INFORMATION SINCE 2014

Distribution and Abundance

At the time of listing, the historical range of *Chorizanthe orcuttiana* extended for 25 miles (mi) (40 kilometers) along coastal San Diego County from Point Loma to Encinitas and inland for about 6 mi (10 kilometers) with 10 known historical occurrences. However, we considered only 1 of the 10 historical occurrences known at the time to be extant (at Oak Crest Park in Encinitas [California Natural Diversity Database (CNDDDB) Element Occurrence (EO) 10]). In 2014, during the last 5-year review (USFWS 2014), we enumerated 14 historical occurrences of *C. orcuttiana*, 5 of which were extant or presumed extant [EO 14, EO 13, and EO 12 on Naval Base Point Loma (NBPL); EO 16 at Torrey Pines State Natural Reserve (TPSNR); and EO 10 (presumed extant) at Oak Crest Park].

Since the 2014 5-year review, we received new information from 2014–2019 San Diego Management and Monitoring Program (SDMMP) annual surveys conducted by The Chaparral Lands Conservancy (TCLC). During surveys in 2015, six new *Chorizanthe orcuttiana* occurrences were documented within a few miles of TPSNR in northern San Diego (Figure 1; TCLC 2015, p. 3). One occurrence was found at Crest Canyon Preserve (EO 20), two at Gonzales Canyon Preserve (EO 21), and three at Sorrento Hills (EO 19) (TCLC 2015, pp. 3–5). One previously known occurrence, CNDDDB EO 10 (Oakcrest Park), was considered presumed extant during our 2014 5-year review but we consider it possibly extirpated in this review (Appendix 1; Figure 1). We made this change because *C. orcuttiana* has not been observed at the Oakcrest Park site since 2005 and the habitat was noted to be overgrown during surveys between 2015 and 2017. Two reintroduced sites were seeded in December 2015 and January 2016 (EOs 22 and 23) in TPSNR south and TPSNR extension. No plants were observed at either site during surveys in 2016; in 2017, surveys recorded 50 plants at EO 22 and 405 at EO23. Additionally, two occurrences were experimentally established as part of a research study on National Park Service land. Currently, there are 21 occurrences of *C. orcuttiana* with 9 extant, 9 extirpated, 1 possibly extirpated, and 2 introduced research sites (Figure 1).

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U.S. Fish & Wildlife Service

Chorizanthe orcuttiana (Orcutt's spineflower)



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Data: USFWS, CNDD, SDMMMP
 Basemap: ESRI World Terrain
 Date: 1/11/2021
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- Extant (known in 2014)
- Extant (new since 2014)
- ▲ Possibly Extirpated
- Extirpated
- Reintroduced Occurrences
- ★ Research Site
- Military Installation

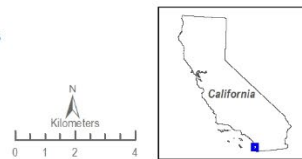


Figure 1. Distribution and status of *Chorizanthe orcuttiana* (Orcutt's spineflower) occurrences.

Species Ecology and Seed Biology

Since the 2014 5-year review, we received new information about *Chorizanthe orcuttiana* ecology and phenology:

1. A multi-year, observational study of three natural and two experimentally established *Chorizanthe orcuttiana* occurrences on Point Loma, and one natural occurrence in TPSNR determined that microhabitat variation between eastern and western aspects drives natural variation in population size, germination, and plant fitness (Kaur *et al.* 2020, entire). The study, which occurred over a period of 4 years, revealed that occurrence sites with an easterly aspect had larger population sizes, higher plant fitness, and higher germination than those with a westerly facing aspect (Kaur *et al.* 2020, pp. 9–10). Cooler air and soil temperatures, along with higher soil moisture at the easterly facing sites, is suspected to contribute to the increased plant fitness observed at these sites (Kaur *et al.* 2020, p. 13). While larger and longer studies are needed to provide definitive information on the relationship between the environmental variables studied and plant fitness, the preference of *C. orcuttiana* for cooler and wetter microhabitats may be a driving factor in the persistence of the species at the westerly-facing sites (Kaur *et al.* 2020, p. 13). Survival of the species at the less favorable sites may demonstrate a localized, genetic adaptation (Kaur *et al.* 2020, p. 13). Therefore, populations present in these areas may provide genetic variation, supporting species representation (the ability of species to adapt to changing conditions).
2. Kaur *et al.* (2016) described distinguishable morphological features of *Chorizanthe orcuttiana* in comparison two co-occurring and similar looking species in the early parts of the annual life cycle. Additionally, the researchers documented the occurrence of anthesis (flowering) in *C. orcuttiana* earlier than has previously been reported (Kaur *et al.* 2016, p. 58). The researchers observed this phenological stage in mid-February over a period of 3 years, as opposed to the previously reported flowering period of March and May (Kaur *et al.* 2016, p. 58).
3. Additionally, several studies of *Chorizanthe orcuttiana* are ongoing. A multi-year study targeted to reveal the interplay of genomics and environment was initiated in 2020 (Sharma 2021, *in litt.*). This will be a long-term study to inform future adaptive management actions. Another multi-year study is in progress to investigate long-term seed bank dynamics of the species at NBPL to assess the interaction of environment and plant fitness (Sharma 2021, *in litt.*). Lastly, several *in situ* and *ex situ* research investigations are underway at Naval Base Point Loma to understand the reproductive fitness of the species under changing climatic conditions, and to understand the patterns of viability of seeds generated via ex-situ and in-situ bulking (Sharma 2021, *in litt.*).

Conservation efforts

In 2021, SDMMMP completed a plan that provides a framework to manage rare plants on conserved lands in San Diego County, including *Chorizanthe orcuttiana* (CBI and AECOM 2021a,

pp. 253–294). The Plan identifies best management practices to restore *C. orcuttiana* habitat and occurrences, makes recommendations for reintroduction, introduction, and translocation, and identifies additional research needs (CBI and AECOM 2021a, pp. 253–294).

CONCLUSION

In summary, annual monitoring of *Chorizanthe orcuttiana* occurrences since 2014 has provided new information about plant abundance. We have updated our 2014 occurrence status determinations and added the additional occurrences (Appendix A). Based on those updates, there are 21 occurrences of *C. orcuttiana* with 9 extant, 9 extirpated, 1 possibly extirpated, and 2 research sites. While the extant distribution within the range has increased since the last review, the historical range of *C. orcuttiana* remains highly limited and has not changed since the previous review. Occurrences of *C. orcuttiana*, including the newly discovered sites, remain small and isolated throughout the range, and likely susceptible to local stochastic events. Additionally, all occurrences continue to face multiple threats including habitat degradation (trampling, recreational use, erosion), habitat loss (development, road/trail maintenance, fire), invasive species pressure, small population size, and climate change. The information received since the previous review does not appreciably alter our understanding of the species' distribution, ecology, or threats (Appendix A).

After reviewing the best available scientific information, we conclude that *Chorizanthe orcuttiana* remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species in our 2014 5-year review remains an accurate reflection of the species current status.

RECOMMENDATIONS FOR FUTURE ACTIONS

The recommended actions listed below are to be initiated or completed over the next 5 years. Successful implementation of these actions will reduce threats to *Chorizanthe orcuttiana* and provide information to better understand the biological and physical factors limiting the population growth and distribution. We recognize that conservation of this taxon will require cooperation and coordination with partners to minimize impacts from current threats and aid with future restoration efforts.

1. Conduct additional discovery surveys of potential *Chorizanthe orcuttiana* habitat.
2. Enhance habitat where *Chorizanthe orcuttiana* occur, through nonnative plant control, erosion control, removal of excessive plant litter, selective trimming or removal of encroaching vegetation, and other appropriate measures.
3. Augment small occurrences (<1,000 individuals; CBI and AECOM 2021a, table 3.6-1) where necessary into areas of suitable habitat with a genetically appropriate seed source to increase population size and support gene flow. Follow best management practices for seed reintroduction as outlined in the Rare Plant Management Plan and the Seed Collection, Banking, and Bulking Plan (CBI and AECOM 2021a, pp. 253–294;

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CBI and AECOM 2021b, pp. 132–145) and IUCN Guidelines for Reintroductions and Translocations (IUCN/SSC 2013, entire).

4. Identify areas for habitat enhancement and conduct reintroduction of *Chorizanthe orcuttiana* to establish additional populations.
5. Prioritize additional research needs outlined in the SDMMP Rare Plant Management Plan (CBI and AECOM 2021a, pp. 293–294), with higher priority towards research that can directly inform species' management. For example:
 - a. Research effects of fire and nonnative grasses and forbs on *Chorizanthe orcuttiana* fitness.
 - b. Investigate effects of grass-specific herbicide on *Chorizanthe orcuttiana* to assess efficacy for controlling nonnative grasses in *C. orcuttiana* habitat.
 - c. Determine viability rates of wild-collected and first-generation bulked seed to assess variability.

REFERENCES CITED

- [CBI and AECOM] Conservation Biology Institute and AECOM Technical Services, Inc. 2021a. Management strategic plan framework rare plant management plan for conserved lands in western San Diego County. San Diego Association of Governments, Strategic Plan. San Diego Management and Monitoring Program. 392 + xvi pp. and appendices.
- [CBI and AECOM] Conservation Biology Institute and AECOM Technical Services, Inc. 2021b. Management strategic plan seed collection, banking, and bulking plan for conserved lands in western San Diego County. San Diego Association of Governments, Strategic Plan. San Diego Management and Monitoring Program. 182 + xiv pp. and appendices.
- [IUCN/SSC] International Union for Conservation of Nature Species Survival Commission. 2013. Guidelines for reintroductions and other conservation translocations, version 1.0. Gland, Switzerland. IUCN Species Survival Commission. viii + 57 pp.
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- [TCLC] The Chaparral Lands Conservancy. 2015. Results of Orcutt's spineflower mapping and population surveys Cooperative Endangered Species Conservation Fund (Section 6) Grant Agreement No. P1482008. Report. 9 pp. + appendices.
- [USFWS] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered or threatened status for four southern maritime chaparral plant taxa from coastal southern California and northwestern Baja California, Mexico. *Federal Register* 61:52370–52384
- [USFWS] U.S. Fish and Wildlife Service. 2011. Endangered and threatened wildlife and plants; 5-year reviews of species in California, Nevada, and the Klamath Basin of Oregon. *Federal Register* 76:30377–30382
- [USFWS] U.S. Fish and Wildlife Service. 2014. *Chorizanthe orcuttiana* (Orcutt's spineflower) 5-year review: summary and evaluation. Carlsbad Fish and Wildlife Office, 39 pp.
- [USFWS] U.S. Fish and Wildlife Service. 2020. Endangered and threatened wildlife and plants; initiation of 5-year Status Reviews of 66 species in California and Nevada. *Federal Register* 85:4692–4694.

Personal Communications

Sharma, J. 2021. Associate Professor of Plant Ecology and Conservation, Department of Plant and Soil Science, Texas Tech University. Email correspondence to Sandra Hamilton, USFWS, Carlsbad Fish and Wildlife Office, Carlsbad, California. Dated June 17, 2021. Subject: *C. orcuttiana* 5-year Review.

FIELD OFFICE APPROVAL

Lead Field Supervisor, Fish and Wildlife Service

Approve

Scott A. Sobiech
Field Supervisor

APPENDIX A

Table A1. Occurrences of *Chorizanthe orcuttiana*; prepared for 2021 5-year review.

Occurrence (north to south)	CNDDDB EO Number	SDMMP Occurrence ID	Owner	Status at Listing	2014 Status	2021 Status; Current Threats
Encinitas, 2.5 miles east	7	N/A	Unknown	Extirpated	Extirpated & too vague	Extirpated & too vague
Oakcrest Park; south of Encinitas Blvd, west of El Camino Real	10 (includes 1 and 11)	CHOR_6OAPA003	City of Encinitas	Extant	Presumed Extant	Possibly Extirpated A: Trampling, development, invasive plants, fire regime E: Small population size, recreational use, trail/road maintenance, climate change
Rancho Santa Fe, hilltop	6	N/A	Unknown	Extirpated	Extirpated & too vague	Extirpated & too vague
South of Del Mar Racetrack	4	N/A	Unknown	Extirpated	Extirpated & too vague	Extirpated & too vague
Gonzales Canyon	21	CHOR_6GOCA001	City of San Diego	Unknown	Unknown	Extant A: Trampling, invasive plants E: Recreational use, trail/road maintenance, climate change
Crest Canyon	20	CHOR_7CRCA005	City of San Diego	Unknown	Unknown	Extant A: Trampling, invasive plants, fire regime, erosion E: Small population size, recreational use, trail/road maintenance, climate change
Torrey Pines State Natural Reserve, north grove	16	CHOR_7GUTR004	California Department of Parks and Recreation	Unknown	Extant	Extant A: Trampling, invasive plants, fire regime, erosion E: Recreational use, trail/road maintenance, climate change

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Occurrence (north to south)	CNDDDB EO Number	SDMMP Occurrence ID	Owner	Status at Listing	2014 Status	2021 Status; Current Threats
Torrey Pines State Natural Reserve, extension	23	CHOR_7GUTR004	California Department of Parks and Recreation	Unknown	Unknown	Extant Reintroduced Occurrence A: Trampling, invasive plants, fire regime, erosion E: Small population size, recreational use, trail/road maintenance, climate change
Sorrento Hills	19	CHOR_6SOHI002	City of San Diego	Unknown	Unknown	Extant A: Trampling, invasive plants, fire regime, erosion E: Small population size, recreational use, trail/road maintenance, climate change
Torrey Pines State Natural Reserve, east	5	N/A	California Department of Parks and Recreation	Extirpated	Extirpated	Extirpated
Torrey Pines State Natural Reserve, west	15	N/A	California Department of Parks and Recreation	Unknown	Extirpated & too vague	Extirpated & too vague
Torrey Pines State Natural Reserve, south	22	CHOR_7TPSR007	California Department of Parks and Recreation	Unknown	Unknown	Extant Reintroduced Occurrence A: Trampling, invasive plants, fire regime, erosion E: Small population size, recreational use, trail/road maintenance, climate change
Kearny Mesa	9	N/A	MCAS Miramar	Extirpated	Extirpated	Extirpated
Ocean Beach (Mussel Beds)	N/A	N/A	Unknown	Unknown	Extirpated	Extirpated

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Occurrence (north to south)	CNDDB EO Number	SDMMP Occurrence ID	Owner	Status at Listing	2014 Status	2021 Status; Current Threats
Point Loma, Point Loma Nazarene University (Brotherhood Grounds)	17	N/A	Unknown	Unknown	Extirpated	Extirpated
Point Loma, 0.6 miles south of Point Loma Nazarene College	14	CHOR_1NBPL008	U.S. Naval Base Point Loma	Unknown	Extant	Extant A: Invasive plants, fire regime, erosion E: Small populations, climate change
Point Loma, west of Cabrillo Memorial Drive	13 (includes EO 3)	CHOR_1NBPL009	U.S. Naval Base Point Loma	Extirpated	Extant	Extant A: Invasive plants, fire regime E: Small populations, climate change
Point Loma, east of Cabrillo Memorial Drive	12	CHOR_NBPL010	U.S. Naval Base Point Loma	Unknown	Extant	Extant A: Trampling, invasive plants, fire regime, erosion E: Small populations, climate change
Point Loma, north of Fort Rosecrans National Cemetery	2	CHOR_1FRNC011	U.S. Naval Base Point Loma	Extirpated	Extirpated	Extirpated
NPS 2 Experimental Occurrence ¹	N/A	N/A	U.S. National Park Service	Unknown	Unknown	Research Site
NPS 1 Experimental Occurrence ¹	N/A	N/A	U.S. National Park Service	Unknown	Unknown	Research Site

¹ These plots were established as part of a research study and are not experimental populations as defined in section 10(j) of the ESA.