

Santa Rosa Island Manzanita (*Arctostaphylos confertiflora*)

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



Photo: Ken Niessen USFWS

**U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
Ventura, California**

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5-YEAR REVIEW

Santa Rosa Island Manzanita (*Arctostaphylos confertiflora*)

GENERAL INFORMATION:

Species: *Arctostaphylos confertiflora*

Date listed: July 31, 1997

FR citation: 62 FR 40957

Classification: Endangered

BACKGROUND:

Most recent status review:

U.S. Fish and Wildlife Service. 2014. *Arctostaphylos confertiflora* (Santa Rosa Island Manzanita) 5-Year Review: Summary and Evaluation. Ventura Field Office. Ventura, California.

FR Notice citation announcing this status review:

Initiation of 5-Year Status Reviews of 66 species in California and Nevada. Notice of initiation of reviews; request for information (85 FR 4692), January 27, 2020.

ASSESSMENT:

Information acquired since the last status review:

This 5-year review was conducted by the U.S. Fish and Wildlife Service (Service) Ventura 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 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.

Population data:

Arctostaphylos confertiflora occurs only on Santa Rosa Island in Santa Barbara County, California. Santa Rosa Island is entirely owned by Channel Islands National Park (CINP), and all land is managed for natural resource conservation. The island was used as a ranch for more than 150 years (Livingston 2016 pp. 143-254), with sheep removed in the 1960s, pigs removed in 1993, cattle removed in 1998, and deer and elk removed 2011-2014 (McEachern *et al.* 2016a pp. 759-760).

The 2014 5-Year Review lists three sites with natural populations: Black Mountain, South Point, and Sierra Pablo. The Sierra Pablo site was divided into two California Natural Diversity Database Element Occurrences (CNDDDB 2019), east and west, since they are separated by more than ¼ mile (400 meters, CNDDDB 2018 p.1). The occurrences are listed in Table 1. However, CNDDDB Element Occurrence numbers (Table 1, CNDDDB 2019) are generally not used by researchers in Channel Islands National Park, and repeat visits to sites are often not recorded as

occurrences; plant location visits are tracked in an internal U.S. Geological Survey (USGS)/CINP geodatabase (McEachern 2021).

In 2011, Channel Islands National Park began a detailed vegetation mapping project on Santa Rosa Island (Reyes *et al.* 2017 entire and geodatabase). The report and vegetation geodatabase remain unpublished, but the draft version shows that *Arctostaphylos confertiflora*-dominated polygons totaled 117.90 hectares (291.34 acre) on Black Mountain and 0.18 hectares (0.45 acre) on South Point (Table 1). *A. confertiflora* was not common enough at Sierra Pablo to be a defining component of vegetation polygons at that time. The vegetation map should be useful as a baseline for evaluating change in distribution of *A. confertiflora* across its range.

Table 1. *Arctostaphylos confertiflora* sites on Santa Rosa Island. (CNDDDB 2019, Reyes *et al.* 2017 geodatabase).

Site	CNDDDB Element Occurrence	Area of <i>Arctostaphylos confertiflora</i> dominated polygons (ha)
Black Mountain	1	117.90
South Point	6	0.18
Sierra Pablo West	8	no polygons
Sierra Pablo East	9	no polygons

There are no available population size estimates for *Arctostaphylos confertiflora* since the 2014 5-Year Review. There is some vegetation monitoring transect evidence that *A. confertiflora* increased in cover between 1990 and 2012 (Handley *et al.* 2013 in Davidson *et al.* 2019 pp. 174-176), concordant with pig, cattle, elk, and deer removal. Monitoring of *A. confertiflora* is part of the ongoing Section 6 grant coordinated by the Santa Barbara Botanic Garden (SBBG, Schneider 2017 pp. 3, 5, 6), but there are no current data available, and a revised or new monitoring protocol is recognized as an ongoing need for the species (ICBC 2021).

Seed biology, seed banking, and *ex-situ* collections:

The major obstacle in the recovery of *Arctostaphylos confertiflora* is that there is little evidence for natural recruitment from seed and little understanding of requirements for germination. Adult *Arctostaphylos confertiflora* lack a fire-resistant burl (Kauffmann *et al.* 2015 p. 54), and because of this, it is assumed that germination of seeds in the soil seed bank is stimulated by fire (Kauffmann *et al.* 2015 pp. 15-17). However, very little is known about the abundance or biology of seeds in soil seed bank, or the actual germination or seedling recruitment requirements. While few seeds are typically found in soil samples, and effective germination trials have not been completed, there is evidence that some seeds are being produced and seedlings are present (Davidson *et al.* 2019 p. 177). *Arctostaphylos confertiflora* seed germination trials are part of the ongoing Section 6 grant coordinated by the Santa Barbara Botanic Garden (Schneider 2017 pp. 3, 6), and they are planned for Channel Islands National Park mainland nursery facilities in 2021 (ICBC 2021).

The lack of seed in soil samples gives conservation seed banking more importance; however, collections for *Arctostaphylos confertiflora* conservation seed banking are extremely few, and all only from the Black Mountain site (Table 2).

Table 2. Conservation seed bank collections. (California Plant Rescue 2021 database download).

Site	Collection Date	# maternal lines	# seeds
Black Mountain	6/5/2015	1	22
Black Mountain	6/6/2015	2	140
Black Mountain	6/6/2015	3	761
Black Mountain	6/29/2015	5	2632

In 2018, several *Arctostaphylos confertiflora* cuttings were taken from Santa Rosa Island by Santa Barbara Botanic Garden to add to their mainland living collection (SBBG 2019 p. 1). Santa Barbara Botanic Garden also expanded the number of individuals in their mainland living collection by propagating from existing Garden plants in 2015 (SBBG 2016 p.1), 2018 (SBBG 2019 p.2), and 2019 (Schneider 2020 p.3). While these mainland living collections provide some degree of redundancy in case of a catastrophic island event, such as fire, they are not a substitute for the lacking broad, comprehensive, conservation seed bank.

Seed collections for seed research and possible restoration planting are also few (Table 2). At least some of the most recent collections (McEachern 2020 pp. 3-5) are meant for germination experiments, and some of the 2015 (SBBG 2016 p.1) seeds may have already been used in trial experiments.

Table 3. *Arctostaphylos confertiflora* research seed bank collections. (SBBG 2016 p.1., McEachern 2020 pp. 5, 11, 13).

Site	Collection Date	# maternal lines	# seeds
Black Mountain	6/29/2015	bulk collection	unknown
Black Mountain	6/29/2015	2	unknown
South Point	6/29/2015	3	unknown
Black Mountain	7/24/2020	50	unknown

Radar Peak cloud forest restoration:

In 2014, USGS and CINP began a cloud forest restoration project in the Radar Peak area of Santa Rosa Island (McEachern *et. al* 2016b). This area contains a few dozen several-hundred-year-old island oaks (*Quercus tomentella*) that are believed to be remnants of more extensive woodlands that were eliminated by long-term grazing. In the past, *Arctostaphylos confertiflora* seedlings occasionally recruited to this area, and the project successfully planted several rooted *A. confertiflora*. There is continued funding for this restoration project, and it may result in enhanced future recruitment of the species as the vegetation continues to recover to more natural conditions.

EVALUATION OF THREATS:

At the time of listing, the primary threats to *Arctostaphylos confertiflora* were soil loss and habitat alteration by non-native mammal species, low reproductive success because of browsing on reproductive structures by deer and elk, herbivory by deer and elk, absent or depleted seed bank caused by soil loss, and extinction from random naturally occurring events due to the species limited distribution and small population sizes. At the time of the 2007 5-Year Review, insect leaf, fruit, and seed predation was identified as an additional threat. At the time of the 2014 5-Year Review, CINP had completed removal of all but a few ungulates from Santa Rosa Island. Although not enough time had passed since the ungulates were removed for any new population trends to develop, the direct causes of habitat loss and predation had been alleviated; climate change was identified as an additional threat.

The current status of all threats identified as potentially affecting *Arctostaphylos confertiflora* is as follows:

Soil loss and habitat alteration by non-native mammal species

Sheep were removed in the 1960s, pigs were removed in 1993, cattle were removed in 1998, and deer and elk were removed from 2011 - 2014 (McEachern *et al.* 2016a pp. 759-760). Qualitatively the condition of the Santa Rosa Island vegetation and soil is gradually improving through passive restoration, similar to neighboring Santa Cruz Island, which had its last feral ungulates removed by 2007 (Beltran *et al.* 2014 entire). Therefore, although non-native ungulates have been removed, lingering habitat degradation remains but appears to be improving.

Low reproductive success because of browsing on reproductive structures by deer and elk; herbivory by deer and elk

Deer and elk were eliminated completely from Santa Rosa Island in 2011 - 2014, and these threats have been removed.

Absent or depleted seed bank caused by soil loss

No substantial studies have addressed soil seed banks since the 2014 5-Year Review, but seed bank and germination studies are planned. Therefore, this threat remains.

Extinction from random naturally occurring events due to the species limited distribution and small population sizes

As in the 2014 5-Year Review, stochastic extirpation of small populations, leading to species extinction, remains a threat. This is especially true with the apparent lack of recruitment by seed throughout the species, and the relatively small number of plants at the South Point and Sierra Pablo sites.

Insect leaf, fruit, and seed predation

No research has been conducted on the occurrence or magnitude of this threat since the 2014 5-Year Review. This potential threat remains.

Climate change

As in our 2014 5-year review (Service 2014, p. 10), we recognize that climate change may have important potential effects on *Arctostaphylos confertiflora* and its habitat. A recent synthesis applicable to the northern Channel Islands (Langridge *et al.* 2018, pp. 10-33) predicts increasing temperatures under all scenarios, and greater likelihoods of extreme storms, drought, and wildfire. While adequate biological information to make accurate predictions regarding the effects of these and other aspects of climate change on *A. confertiflora* is lacking, we expect that an increase in temperatures, storms, drought, and wildfire will have an overall negative effect on the species in the future.

Summary of threats:

The immediate threats identified at time of listing to adult plants have largely been removed or ameliorated with the removal of all grazing ungulates from Santa Rosa Island. The threats of residual soil loss and habitat alteration, extirpation or extinction due to small population sizes, absent or depleted seed banks from soil erosion and loss, potential insect predation on the plants, and expected effects of climate change remain.

EVALUATION OF DOWNLISTING AND DELISTING CRITERIA:

The current status of criteria in the 2000 Recovery Plan (Service 2000, p. 64) is as follows:

Downlisting criterion for *Arctostaphylos confertiflora*:

1. Maintain three populations on Santa Rosa Island that are stable or increasing with evidence of natural recruitment for a period of 30 years that includes the normal precipitation cycle.

While qualitatively the number of the populations and their areal extents have not decreased since the 2000 date of the Recovery Plan, recruitment remains negligible. This criterion has not been met.

2. Seed stored in CPC (Center for Plant Conservation) cooperating facilities.

Seeds banked for conservation are from relatively few maternal individuals and not all populations are represented. Conservation seed banks are not funded in perpetuity. This criterion has not been met.

3. Seed germination, propagation techniques, and fire ecology understood .

The major obstacle in the recovery of *Arctostaphylos confertiflora* is that there is little evidence for natural recruitment from seed and little understanding of requirements for germination. This criterion has not been met.

4. Natural seed bank developed and maintained.

The natural seed bank is believed to remain low, even as soils stabilize following ungulate removal. This criterion has not been met.

5. Fire management plan developed.

As presented in the 2014 5-year review, Channel Islands National Park completed a fire management plan (CINP 2006). The plan states that fire has the potential to adversely impact recovering native plants (p. 28), especially *Arctostaphylos confertiflora* with its limited seed bank (p. 62), and this species has been given a protection priority (p.37). This criterion has been met.

6. Protected from browsing to allow reproduction.

No non-native ungulates remain on Santa Rosa Island. This criterion has been met.

7. Life history research conducted and incorporated into recovery criteria.

Many facets of the species biology, especially seed production, soil seed bank, and germination and seedling requirements need further investigation. This criterion has not been met.

8. If declining, determine cause and reverse trend.

Because of irregular monitoring, it is unclear whether natural populations are declining, stable, or increasing. A robust population monitoring protocol needs to be developed. This criterion has not been met.

Delisting criteria for *Arctostaphylos confertiflora*:

1. No decline after downlisting for 10 years.

Not currently applicable.

2. All potential habitat surveyed.

Santa Rosa Island has been extensively surveyed during vegetation surveys (Reyes *et al.* 2017 entire), and the distribution of the species on Santa Rosa Island is well understood. This criterion has been met.

Summary of downlisting and delisting criteria:

Most of the criteria for downlisting, except for removal of ungulates and development of a fire management plan, have not been met. Delisting criteria have either been met, or are not applicable because downlisting criteria have not been met.

CONCLUSION:

The analysis of the status of the species and evaluation of threats affecting the species under the factors in 4(a)(1) of the Act in our 2014 5-Year Review remain accurate reflections of the species current status. After reviewing the best available scientific information, we conclude that *Arctostaphylos confertiflora* remains an endangered species.

RECOMMENDATIONS FOR FUTURE ACTIONS:

1. Develop a monitoring plan to track population sizes and distribution.
2. Bolster conservation seed banks with additional maternal lines from all populations.
3. Research seed germination and seedling recruitment requirements.
4. Monitor soil seed bank seed abundance, and develop methods to enhance the soil seed bank.

APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approved _____ Date 2/10/21

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