

Santa Rosa Island Manzanita
(Arctostaphylos confertiflora)

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



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

December 2007

5-YEAR REVIEW

Species reviewed: Santa Rosa Island Manzanita (*Arctostaphylos confertiflora*)

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5-YEAR REVIEW

Santa Rosa Island Manzanita (*Arctostaphylos confertiflora*)

I. GENERAL INFORMATION

Santa Rosa Island manzanita (*Arctostaphylos confertiflora*) is a perennial shrub in the heath (Ericaceae) family that grows up to 2 meters (6.5 feet) and sometimes up to 6 meters (20 feet) tall. It occurs in both prostrate and upright forms, with the prostrate form most likely resulting from climatic influences and herbivory. This species is endemic to Santa Rosa Island in the northern Channel Islands of southern California, where it is found in only three populations. Santa Rosa Island manzanita occurs as a component of mixed chaparral, mixed woodland, Torrey pine woodland, and island pine woodland vegetation types (Service 2000).

I.A. Methodology used to complete the review

This review was conducted by Jen Lechuga from the Ventura Fish and Wildlife Office. Information was gathered from a variety of sources, including published and unpublished literature; information from species experts, especially the staff of the National Park Service (NPS) and the U.S. Geological Survey-Biological Resources Discipline (USGS-BRD) at the Channel Islands National Park; and Ventura Fish and Wildlife Office species files. A series of annual progress reports written by an NPS-appointed Scientific Panel were of particular importance. The progress reports span a period from 1998 through 2005 and track the impacts of ungulate activity on *Arctostaphylos confertiflora* at three study sites. Dirk Rodriguez of NPS provided valuable information about the species' status and seed bank. Kate Faulkner of NPS provided updated ungulate estimates that have been monitored since 1987. We incorporated all comments and information from our files into our review as appropriate. We received no new information as a result of the Federal Register notice announcing this review.

I.B. Reviewers

Lead Regional Office:

Region 8 (California and Nevada):

Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation
Planning, and Jenness McBride, Fish and Wildlife Biologist (916-414-6464)

Lead Field Office:

Ventura Fish and Wildlife Office:

Jen Lechuga, Fish and Wildlife Biologist (805-644-1766 ext. 224)
Connie Rutherford, Listing and Recovery Coordinator (805-644-1766 ext. 306)

I.C. Background

I.C.1. FR Notice citation announcing initiation of this review:

The initial FR notice was published on March 22, 2006 (71 FR 14538), and initiated a 60-day request for information. A second FR notice was published on April 3, 2006 (71 FR 16584), that clarified the contact office.

I.C.2. Species status:

Declining (as per the Service Region 1 October 2005 Annual Data Call)

I.C.3. Recovery achieved:

1 (0-25 percent of recovery objectives achieved), pursuant to the October 2005 Annual Data Call)

I.C.4. Listing history:

Original Listing
FR notice: 62 FR 40957
Date listed: July 31, 1997
Entity listed: Species (*Arctostaphylos confertiflora*)
Classification: Endangered

I.C.5. Associated rulemakings:

None

I.C.6. Review History:

None

I.C.7. Species' Recovery Priority Number at start of review:

2. This denotes a full species facing a high degree of threat and a high potential for recovery.

I.C.8. Recovery Plan or Outline:

Name of plan: *Thirteen Plant Taxa from the Northern Channel Islands Recovery Plan*
Date issued: 2000
Dates of previous revisions: N/A

II. REVIEW ANALYSIS

A. Application of the 1996 Distinct Population Segment (DPS) policy

1. Is the species under review listed as a DPS?

No. The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listings as distinct population segments (DPS) only to vertebrate species of fish and wildlife. Because the species under review is a plant and the DPS policy is not applicable, the application of the DPS policy to the species listing is not addressed further in this review.

B. Recovery Criteria

1. Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes
 No

2. Adequacy of recovery criteria.

a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

Yes
 No

In general, little is known about the specific life history of *Arctostaphylos confertiflora*. However, unlike other manzanitas that can resprout from burls after major catastrophic events, this species is dependent on its seed bank to replenish populations. The species does not require a natural disturbance such as fire to propagate; however, seed germination is probably stimulated by disturbance of various kinds (Dirk Rodriguez, NPS, pers. comm. 2006b). Disturbances are sporadic and fire occurs rarely on the islands. Likewise, recruitment of this species appears to be sporadic in the absence of a disturbance (Rodriguez, *in litt.* 2006a). Therefore, we recommend that the Service consider a recovery criterion that refers to the importance of maintaining a viable seed bank that would provide a meaningful addition to the current criteria.

b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

Yes
 No

3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. For threats-related recovery criteria, please note which of the 5 listing factors* are addressed by that criterion. If any of the 5 listing factors is not relevant to this species, please note that here.

Pursuant to the Recovery Plan, the following downlisting recovery criteria apply to *Arctostaphylos confertiflora*:

A. Maintain three populations on Santa Rosa Island that are stable or increasing. This criterion addresses Factors A, C, D, and E.

At the time of listing, *Arctostaphylos confertiflora* was known to occur in only two populations on the island; as of 2000, a third population was identified. Three populations of this species remain on the island, but we do not have enough information to determine whether the populations are stable, expanding, or decreasing at each site. Therefore, this criterion has not yet been met, but is up to date for the recovery of the species.

B. Have evidence of natural recruitment for a period of 30 years that includes the normal precipitation cycle. This criterion addresses Factors A, C, D, and E.

The NPS-appointed Scientific Panel and NPS have been collecting data on this species only since 1998. We do not have enough information to demonstrate that natural recruitment has occurred for a period of 30 years. Only two seedlings have been observed, at the Sierra Pablo population in 2005 (Schreiner et al. 2006), but their fates are unknown. This criterion has not been achieved, but is up to date for the recovery of the species.

Pursuant to the Recovery Plan, the criteria for delisting *Arctostaphylos confertiflora* include the following:

A. Demonstrate no decline for 10 years after downlisting. This criterion addresses Factors A, C, D, and E.

This criterion has not yet been met.

* A) Present or threatened destruction, modification or curtailment of its habitat or range;
B) Over-utilization for commercial, recreational, scientific, or educational purposes;
C) Disease or predation;
D) Inadequacy of existing regulatory mechanisms;
E) Other natural or manmade factors affecting its continued existence.

B. Ensure all potential habitat is surveyed. This criterion addresses Factors A, C, and E.

Not all of the potential habitat for the species has been surveyed. There have been recent surveys of areas where soils appropriate for *Arctostaphylos confertiflora* growth occur (NRCS 2006). However, because we do not know about all the limiting factors influencing the occurrence and persistence of this species, we do not have enough information to estimate the percentage of the potential habitat surveyed. Although surveying all potential habitat would help managers understand the status of the species and detect population trends, meeting this criterion does not influence the recovery of the species. This criterion has not been fully met, nor is it appropriate for the recovery of the species. Surveying all potential habitat is appropriately categorized as a recovery action rather than a recovery criterion.

The recovery plan recommends generalized recovery actions for all 13 listed species (including *Arctostaphylos confertiflora*) on the northern Channel Islands. Many of these recovery actions are based on the draft conservation strategy for the northern Channel Islands resources, which was prepared by biologists from NPS, the Service, and USGS in 1996 (Coonan et al. 1996). The primary recovery actions identified in the recovery plan for downlisting this species, and the extent to which they have been implemented, are provided in the Appendix.

C. Updated Information and Current Species Status

1. Biology and Habitat:

a. Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

NPS and its appointed Scientific Panel provided information on the abundance, population trends, and growth and vigor patterns of *Arctostaphylos confertiflora* in annual monitoring reports (Schreiner et al. 2001, 2002, and 2006).

Abundance

When *Arctostaphylos confertiflora* was listed in 1997, the species was known to occur in only two areas on Santa Rosa Island: the northeast portion of the island near, and east of, Black Mountain (from this point forward referred to as the Telephone Road study site); and the south side of the island (from this point forward referred to as the South Point study site) (see Figure 1) (Service 2000). When the recovery plan was written, these two populations comprised fewer than 400 plants at the Telephone Road site and approximately 200 plants at the South Point site (Service 2000). During USGS surveys conducted 1996-1998, more than 1,000 plants were discovered at a third location on the southeast side of the island, known as Sierra Pablo or Old Ranch (Service 2000; Schreiner et al. 2001; McEachern, *in litt.* 2006a). The NPS-appointed Scientific Panel began

monitoring the Sierra Pablo population in 2001 (Schreiner et al. 2002). Based on surveys completed in January and February 2006, a total of 4,700 to 6,700 plants were estimated to occur at Telephone Road, amounting to 4,300 to 6,300 more individuals than known at the time of listing from this site. Plant numbers did not change at South Point. Approximately 1,700 plants were counted at Sierra Pablo in 2006, amounting to 700 additional plants than were reported in the 2000 (Rodriguez, *in litt.* 2006d). The increased numbers at Telephone Road and Sierra Pablo do not, however, represent an increase in recruitment. Rather, the plants at Telephone Road had recovered from damage caused by browsing, making them more visible during the 2000 surveys, and the plants at Sierra Pablo were not detected previously (Rodriguez, pers. comm. 2006a). In addition, 11 plants that recovered from damage were found in the spring of 2004, approximately 500 meters west of the South Point enclosure (see Figure 1). These 11 plants are considered part of the South Point population (Rodriguez, *in litt.* 2006e).

Population Trends

There has been little change in the number of adult and seedling plants detected by surveys since monitoring began at Telephone Road and South Point in 1998 and at Sierra Pablo in 2001. Recruitment has been nearly zero at all three monitoring locations. Very little information has been reported on mortality. The NPS observed that three or four plants had died either in late 2005 or early 2006 (Rodriguez, *in litt.* 2006b). *Arctostaphylos confertiflora* is a long-lived perennial and individuals may live 50 years or longer (Schreiner et al. 2006). As with most long-lived species, long term monitoring is necessary to identify meaningful population trends. With only five to eight years of monitoring data, we do not have enough information to detect stable, increasing, or decreasing trends in plant numbers for this species.

Despite the number of inflorescences observed, the NPS-appointed Scientific Panel reported that no seedlings have become established on any site, inside or outside the enclosures, since 1998 (Schreiner et al. 2006). In 2005, Dale-Cesmat reported that only 2 or 3 seedlings have been recorded on the island in the last four years (Dale-Cesmat, *in litt.* 2005). In its 2006 report, the Scientific Panel stated that only two seedlings were found in 2005, one inside and one outside the Sierra Pablo enclosure. The seedlings were located in an area with the “lowest quality of litter, highest browse rate, and lowest inflorescence production” (Schreiner et al. 2006).

Growth and Vigor

Parameters used by Schreiner (et al. 2006) to measure growth and vigor within the monitored plots include: height of the longest stem per plant, percent of plant cover, number of inflorescences, and litter cover (indicating net primary production). The 2006 monitoring report shows that plants at all three sites have increased in height (Schreiner et al. 2006). The Telephone Road and South Point populations have grown taller from 1998 through 2005, and the Sierra Pablo population has grown taller since monitoring began in 2001 (see Figure 2). Plants

inside the exclosures were taller than those outside the exclosures at all three sites (Schreiner et al. 2006). The plants at South Point have shown the greatest increase and the plants at Sierra Pablo have shown the least increase in height. In particular, plants inside the exclosure at South Point increased in height by 200 percent over the eight-year period 1998-2005. Plants outside of the exclosure at Sierra Pablo only grew 21 percent taller in six years (see Figure 2).

The NPS-appointed Scientific Panel measured percent cover of *Arctostaphylos confertiflora* using transect data collected inside and outside the exclosures at all three monitored sites. In general, percent cover has increased at all three sites (see Figure 3). Plants outside of the exclosure at Telephone Road doubled in percent cover between 2000 and 2005 (Schreiner et al. 2006). In 2004, percent cover declined slightly at Telephone Road both inside and outside the exclosure, and outside the exclosure at Sierra Pablo. Conversely, percent cover inside and outside the exclosure at South Point increased between 2004 and 2005 from 81 to 100 percent. Increases in percent cover resulted from growth of existing plants, and not from recruitment of new individuals.

Potential reproductive success may be measured indirectly by the number of inflorescences counted (Rodriguez, *in litt.* 2006a). The South Point exclosure had the highest number of inflorescences overall since 2001 (see Figure 4). Plants inside the exclosure at South Point had the second highest number of inflorescences since 2003. The number of inflorescences was higher outside the exclosure at Telephone Road from 2001 to 2002 and again towards the end of 2004. The number of inflorescences has increased at Sierra Pablo since 2002 (Schreiner et al. 2006). Overall, the mean number of inflorescences has been variable at all three sites since 1998, and showed a notable increase only inside the exclosure at South Point, out of six sites monitored. This is likely due to temperature and precipitation conditions, and herbivory levels (Rodriguez, *in litt.* 2007a and 2006a). However, the NPS-appointed Scientific Panel reported that regardless of the number of inflorescences produced per plant, the number of seedlings is virtually nil (Schreiner et al. 2006).

The NPS is working on a study to estimate the number of intact and viable seeds found in the soil duff from the populations at Telephone Road, South Point, and Sierra Pablo (Rodriguez, *in litt.* 2006b). South Point had the most seeds per square meter (5,094 inside and 4,222 outside the exclosure) and the highest combined average of 4,695 (see Figure 7 and 8). Telephone Road had the second highest number of seeds (867 inside and 2,367 outside the exclosure) with a combined average of 1,617 seeds per square meter. Comparing the number of seeds inside the exclosure, South Point had almost six times as many seeds as Telephone Road. Likewise, South Point had almost twice as many seeds outside the exclosure compared to Telephone Road. Only two seeds were found at Sierra Pablo, both in open canopy outside the exclosure. The number of seeds appears to have a positive correlation with the number of inflorescences and mean height at each site (Rodriguez, *in litt.* 2007a). Differences in seed number at each site

are likely attributed to a combination of factors, including rainfall, plant size, number of inflorescences, pollination success, pressures from ungulate herbivory and insect damage, and historic grazing practices with cattle and sheep. More information is needed to determine trends in seed production and the percentage of seeds that are not intact (e.g., damaged) at each site. We also need information on the viability of these seeds. However, even with a large seed bank, recruitment would likely be sporadic at best, without a disturbance event, such as fire, to trigger germination (Rodriguez, pers. comm. 2006a).

Annual litter accumulation provides information on net primary productivity in many temperate plants (Schreiner et al. 2006). Litter cover, based on percent cover within subplots¹, tended to be slightly higher inside the enclosure than outside at all three sites. From 1998 through 2005, litter cover was significantly higher inside the enclosure only once out of 8 years at Telephone Road and once out of five years at Sierra Pablo, but six out of eight years at South Point (Schreiner et al. 2006). All three sites have shown an increase in litter from 1998 to 2005, with the greatest increase outside the South Point enclosure and the least at Telephone Road outside the enclosure (see Figure 6). The NPS-appointed Scientific Panel suggests that plants outside the Sierra Pablo and South Point enclosures are showing signs of recovery from ungulate herbivory based on the increase in litter accumulation at the locations over time. This may be due to periodic targeted hunting of ungulates outside the enclosures to reduce their numbers in these areas (Rodriguez, *in litt.* 2007b).

b. Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

There is no information to suggest that genetic factors are impacting this species' ability to recover (Rodriguez, *in litt.* 2007a; Rodriguez, pers. comm. 2006b).

c. Taxonomic classification or changes in nomenclature:

No change.

d. Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

With the exception of the Sierra Pablo population that was first reported in 2000, no more populations have been found since listing. Although we have more accurate counts of plants in the three known population areas since listing, general patterns of distribution remain the same as at the time of listing (McEachern, *in litt.* 2006a). Surveys in 2006 more accurately identify the outer boundaries of the three populations (NRCS 2006).

¹ A subplot is a 1 x 1 m unit of a 5 x 5 m study plot, as described in Barbour et al. (1998).

Animal trails are still present at all three sites. According to the NPS, browsing and trailing continues to be a source of within-population fragmentation, and separates *Arctostaphylos confertiflora* plants from one another (Rodriguez, *in litt.* 2006g). These gaps between plants are more susceptible to erosion (Rodriguez, *in litt.* 2006g).

e. Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

Litter accumulation may serve as an indicator for a plant's growth and vigor, as well as an anchor for seeds to remain in suitable habitat. Accumulation of litter also increases the chances that *Arctostaphylos confertiflora* seeds remain near the parent plants and do not get washed or blown away. However, we do not have information to suggest that litter accumulation increases the incidence of seed germination. On the contrary, the few seedlings that were found were located in areas that were disturbed and had little litter accumulation (Rodriguez, pers. comm. 2006b). More information is needed to understand the best habitat conditions for seed germination and plant survival.

Erosion has been observed at all three sites. Erosion has been more concentrated in some areas at Telephone Road and South Point, likely due, at least in part, to ungulate activity. There is an active "wildlife trail" outside the exclusion fence (and inside the monitored control area) at South Point that increases the amount of erosion in the local area. The combination of erosion and an actively used wildlife trail does not provide suitable conditions for *Arctostaphylos confertiflora* recruitment at South Point (Dale-Cesmat, *in litt.* 2006).

2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

a. Present or threatened destruction, modification or curtailment of its habitat or range:

Factor A threats identified in the listing rule for *Arctostaphylos confertiflora* were soil loss (through erosion) and habitat alteration by non-native mammal species (cattle, deer, and elk) (62 Federal Register 40967, 1997). Erosion was still observed as a problem in 2006, particularly at the South Point location (Dale-Cesmat, *in litt.* 2006). Cattle were removed from Santa Rosa Island in 1998. However, elk and deer remain and erosion continues to affect habitat for *Arctostaphylos confertiflora*; their hooves scrape and pulverize the soil crust (important for holding soil particles and water filtration) and litter near the plant populations (Rodriguez, pers. comm. 2006b). Although there have been small increases in the amount of litter cover at three of the six study plots, since 2003 (see Figure 6), there has been little change in the habitat quality for the species

overall since it was listed.

b. Over utilization for commercial, recreational, scientific, or educational purposes:

Overutilization for any purpose was not identified as a threat to this species at the time of listing, and we know of no commercial, recreational, scientific, or educational activities focused on *Arctostaphylos confertiflora* now (Rodriguez, pers. comm. 2006a).

c. Disease or predation:

Damage from ungulates

Sources of predation identified in the rule to list this species in particular included cattle, deer, and elk. Cattle were removed from Santa Rosa Island in 1998. The numbers of deer and elk were on a reduction schedule from 1998 to 2000, and have been adaptively managed since 2000 through both general and targeted hunts intended to decrease numbers at sites with the greatest amount of disturbance at all three study sites (Telephone Road, South Point, and Sierra Pablo; see Figure 1) (Rodriguez, *in litt.* 2007b; Schreiner et al. 2006; Faulkner, *in litt.* 2006). Starting in 2008, deer and elk will be removed on a phased schedule, to be completely removed by 2011² (Rutherford and Chaney 1999; Rodriguez, pers. comm. 2007). Elk numbered 891 in 1987, approached a peak of 1,114 in 1995, decreased to approximately 535 in January 2001, and increased again to approximately 691 in 2005 (see Figure 9) (Faulkner, *in litt.* 2006). Deer numbers were estimated to be 900 in 1995, experienced a peak of 1,550 in 1997 (Faulkner, *in litt.* 2006), and were approximately 377 as of December 2005 (see Figure 10) (Rodriguez, *in litt.* 2006c). It is worth noting that the actual numbers of deer were consistently higher than the permitted levels for at least some portion of each year from 1998 through early 2003 (Figure 11) (Faulkner, *in litt.* 2006).

Despite the decrease in deer numbers, browsing and twig damage are still evident. One NPS-appointed Scientific Panel member reported that the portion of twigs browsed increased from less than 20 percent to 31 percent on average at South Point in 2004 (see Figure 5). During the same year, the portion of twigs browsed at Sierra Pablo reached over 60 percent (Schreiner, *in litt.* 2005) (see Figure 5). The same panel member stated in February 2005 that targeted deer removal is no longer effective at South Point and has never been effective at Sierra Pablo (Schreiner, *in litt.* 2005). Further, there is a significant difference in fruit and flower production between the exclosed plants and the unexclosed plants at two of the three population sites, most likely due to greater ungulate herbivory at Sierra Pablo and South Point than at Telephone Road (Rodriguez, pers. comm. 2007). Lower fruit and flower production outside the exclosures at South Point and

² In 2008, each population of deer and elk would be reduced to 75 percent of the 2007 numbers (approximately 425 for deer and 700 for elk); in 2009 the populations would be reduced to 50 percent of the 2007 level; in 2010 to 25 percent, and finally by 2011 there would be no deer and elk on the island (Rodriguez, pers. comm. 2007).

Sierra Pablo suggest that ungulate grazing pressure at those sites may continue to be a problem for this species (Galipeau, *in litt.* 2005). In summary, the percent of twig damage was variable from year to year. Since monitoring began, five out of six sites experienced an increase in twig damage, and only plants inside of the enclosure at Sierra Pablo showed a decrease in twig damage overall.

Since the time of listing, the information that we have on *Arctostaphylos confertiflora* has increased and we know more about the species' range on Santa Rosa Island. Based on available information, the habitat and range of the species has not changed. The Sierra Pablo population that was first recorded in 2000 does not represent a newly-established population, but rather a newly discovered population since listing. Due to heavy grazing, the population was not visible during the time of listing; however, the plants have since grown and have become more visible (Schreiner et al. 2001).

Damage from other predators

Insect damage is generally evident at all three monitored sites. During the 2004 surveys, insect predation of fruits and seeds was observed (Rodriguez, pers. comm. 2006a). The highest level of predation was found at Telephone Road, followed by South Point (Rodriguez, pers. comm. 2006a). In January 2005, Dale-Cesmat reported that insect damage has been observed on a regular basis and is very visible at the Telephone Road and Sierra Pablo Sites (Dale-Cesmat, *in litt.* 2005). At Sierra Pablo, insects caused leaf galls, where leaf edges turn red and deformed on some of the plants (Dale-Cesmat, *in litt.* 2005; Rodriguez, pers. comm. 2006b). The NPS has observed an apparently higher level of “die-back” and insect damage at Telephone Road (Rodriguez, *in litt.* 2006b). The extent to which insect damage represents a threat to the species is unknown at this time.

Recent observations indicate that *Arctostaphylos confertiflora* seeds are being consumed by island fox, yet they appear to pass through the fox digestive system intact (Rodriguez, *in litt.* 2007a). Due to the low number of fox on the island and their omnivorous diet, the number of seed being consumed likely is extremely low (Rodriguez, *in litt.* 2006f).

d. Inadequacy of existing regulatory mechanisms:

The Channel Islands National Park was established in 1980 by Public Law 96-199 “...to protect the nationally significant natural, scenic, wildlife, marine, ecological, archaeological, cultural, and scientific values of the Channel Islands in the State of California. . . .” The NPS purchased Santa Rosa Island from the Vail and Vickers Ranching Company in 1986. The cattle ranching operation and a subleased commercial deer and elk hunting operation were allowed continuing operating rights under 5-year special use permits, renewable until the year 2011 (62 FR 40955). A special use permit was initially issued to the Vail and Vickers Company and the Vail family on condition that a range management plan would be adopted when the NPS issued the second special use permit. However, as

stated in the listing rule, that plan does not address protection of *Arctostaphylos confertiflora*, among other taxa in the rule. Thus, the Endangered Species Act provided protections to the species not afforded it through the range management plan. *Arctostaphylos confertiflora* has received some protections through NPS guidelines for natural resource management, although the special use permits limited NPS' ability to manage the land for recovery of federally listed species. Pursuant to a settlement agreement, cattle were removed in 1998 and the ungulate numbers were to be reduced through a phased approach to complete removal by 2011 (United States District Court for the Central District of California 1997). This agreement has facilitated NPS' habitat management efforts on Santa Rosa Island. A draft NPS Conservation Strategy (Coonan et al. 1996) also included specific guidelines for *Arctostaphylos confertiflora* that has assisted NPS in these efforts. Congressional legislation passed in the fall of 2006 regarding the deer and elk on Santa Rosa Island may change the planned removal of deer and elk on the island by 2011 (Faulkner, *in litt.* 2007).

In the listing rule, the Service did not consider *Arctostaphylos confertiflora* having adequate protection by its inclusion on List 1B of the California Native Plant Society's Inventory. Inclusion on List 1B indicates that a species is eligible for State listing, in accordance with sec. 1901, chapter 10 of the California Department of Fish and Game Code. The California Endangered Species Act (CESA) provides protection for plant species occurring only on private or State land. Because this species was not (and has not been) listed under CESA and occurred only on Federal land, the Federal Endangered Species Act provided protections to the species that did not otherwise exist.

In summary, the Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1997. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the ESA. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Endangered Species Act.

e. Other natural or manmade factors affecting its continued existence:

Low reproductive success was identified as a threat to *Arctostaphylos confertiflora* when it was listed. The natural seed bank was considered absent or very depleted as a result of soil loss. Erosion continues to occur on areas of Santa Rosa Island where the species found. NPS and USGS are studying the natural seed bank of the plant. Seeds were collected and their numbers estimated in 2004. The NPS and USGS study on the viability of the seeds collected is currently underway (McEachern, *in litt.* 2006b). The results of this study are not available in time to include in this review.

Natural disturbance such as fire seems to facilitate seed germination, yet disturbances of any kind occur sporadically on Santa Rosa Island. Exposed soils such as those on roads or animal trails tend to experience higher disturbance which may be enough to stimulate seed germination as well. Open soil is also prone to increased erosion which may also help to scarify the seeds (Rodriguez, *in litt.* 2006g).

Seed production can be inferred by the number of inflorescences per plant. The number of inflorescences and percent cover of *Arctostaphylos confertiflora* seem to be correlated, in part, with rainfall (see Figure 12). Higher numbers of inflorescences and percent cover correspond to wetter years (Schreiner et al. 2006). As the listing rule pointed out, this species requires scarification of the seed coat, through a mechanism such as fire, to regenerate. However, if the natural seed bank is low in number or is not viable, a fire could likely result in the extinction of the species. Because of the low reproductive success of the species, the infrequent occurrence of fire on the island, lack of seedlings, and the impacts of soil loss on the natural seed bank, the threats to the continued existence of *Arctostaphylos confertiflora* still exist.

D. Synthesis

The NPS has implemented a number of recovery efforts for *Arctostaphylos confertiflora*, including removing cattle in 1998, managing ungulate numbers on the island, erecting exclosure fencing, and continuing a natural seed bank study. Erecting exclosures for monitoring the species populations and controlling the numbers of deer and elk have benefited the species through small increases in some parameters at some sites. Parameters showing positive trends include growth in height, percent cover, and litter accumulation. Trends in all of these parameters are influenced by rainfall and other climatic conditions. The years with the least amount of rainfall corresponded to a slowing or reversing of upwards trends. Parameters that show a negative trend include recruitment rates, number of inflorescences, and percent damage. In general, twig, fruit, and seed damage due to deer and insects continues to impact *Arctostaphylos confertiflora* populations on the island.

Despite NPSs' recovery efforts, the threats identified when *Arctostaphylos confertiflora* was listed (erosion, low reproductive success, and herbivory and damages caused by nonnative deer and elk on the branches, inflorescences, and soil) still exist. Based on the information provided by the NPS-appointed Scientific Panel, NPS, and USGS, our assessment is that the status of *Arctostaphylos confertiflora* has not changed since the species was listed in 1997.

III. RESULTS

A. Recommended Classification:

- Downlist to Threatened
- Uplist to Endangered
- Delist (Indicate reasons for delisting per 50 CFR 424.11):
- Extinction
- Recovery
- Original data for classification in error
- No change is needed

B. New Recovery Priority Number: No change.

IV. RECOMMENDATIONS FOR FUTURE ACTIONS.

1. Because the plant height is higher overall inside the exclosures and the percentage of twig and inflorescence damage tends to be higher outside the exclosures, it appears that ungulate herbivory is affecting this species' ability to recover. Therefore, the Service supports and encourages continued removal of ungulates on Santa Rosa Island.
2. Because this species is an obligate seeder and regeneration is sporadic without the presence of disturbance such as fire, an important measure of recovery is the size and viability of the seed bank. A large and viable seed bank is critically important because during a fire, the seedlings and adult plants would perish, and the only chance of the population's survival would be through the germination of the seeds. We suggest that the Service consider adding the following recovery criterion to the recovery plan for *Arctostaphylos confertiflora*: The species should show an increased production of a viable seed bank over a minimum of a 15-year period. This criterion should be monitored at regular intervals (such as every 3 years) by surveying the amount of seeds in the soil seed bank and conducting seed viability analysis on the seed samples collected during the surveys.
3. The Service should work with the NPS and the USGS-BRD to develop measurable parameters for delisting criterion number 2 (evidence of natural recruitment over 30 years).
4. Due to the evidence of insect damage at all three sites, an initial assessment of the extent of insect damage should be undertaken by the NPS. If the initial assessment indicates insect damage is a concern, then the NPS should consider a trial insect control program and an additional monitoring component for tracking the extent of insect damage.
5. Because *Arctostaphylos confertiflora* is a long-lived species that may depend, in part, on episodic disturbances to stimulate seed germination, maintaining appropriate seed accumulation conditions through erosion control is critical for the establishment and survival of new generations and recovery of the species. Research is also needed on the appropriate habitat conditions for seed germination and seedling survival.

6. We suggest that the Service consider removing the third recovery criterion for delisting that is included in the recovery plan, requiring all potential habitat be surveyed. Surveying all potential habitat helps resource managers better understand the status of the species population, rather than contribute to influencing the recovery of the species. Surveying all potential habitat is appropriately categorized as a recovery action rather than a recovery criterion.

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2006b. Dirk Rodriguez, National Park Service, Channel Islands Field Station. Conference call to discuss monitoring reports and letters on *Arctostaphylos confertiflora*. June 14, 2006.

VI. FIGURES

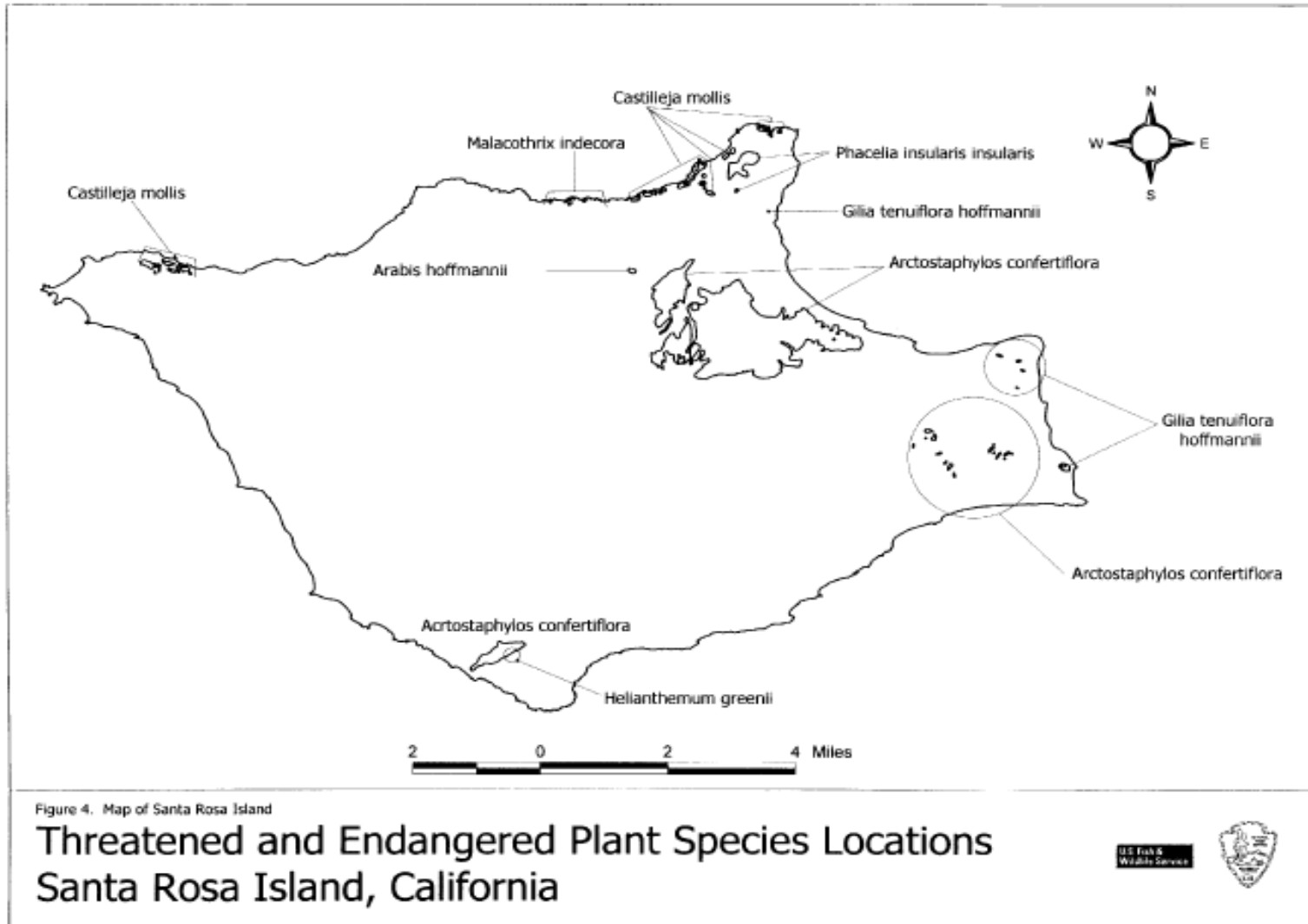


Figure 1. *Arctostaphylos confertiflora* distribution on Santa Rosa Island, as reported in the 2000 Recovery Plan.

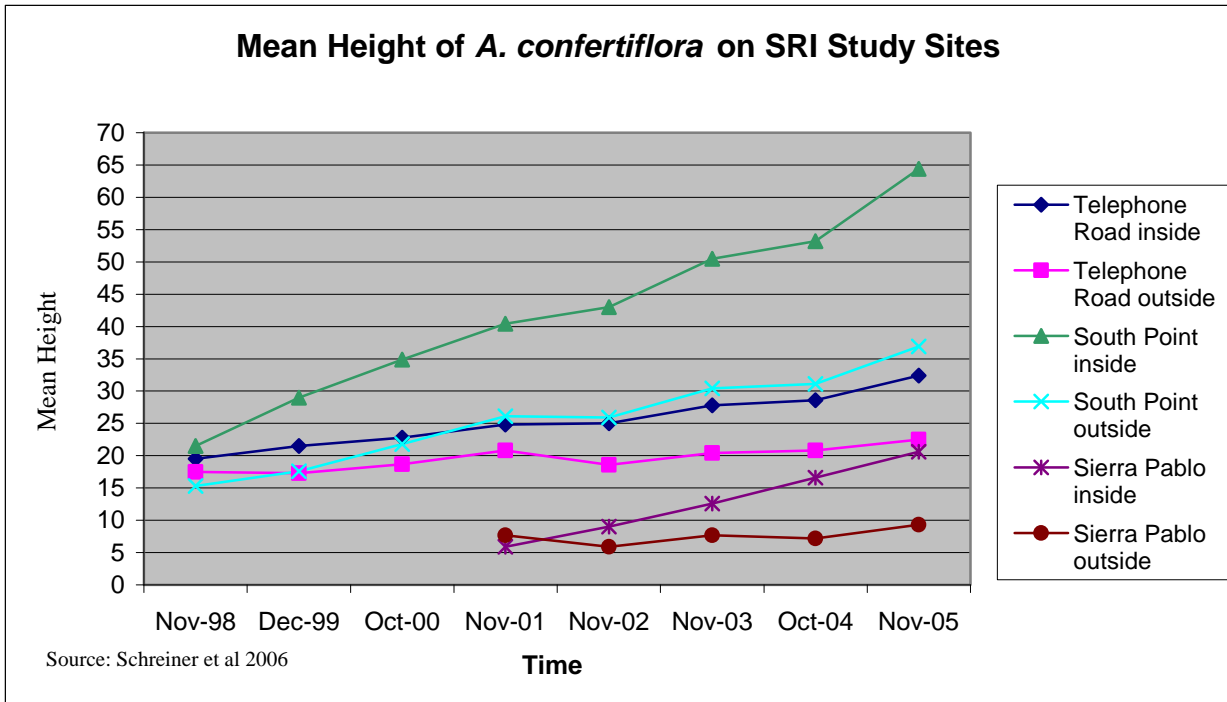


Figure 2. Mean stem height (cm) by monitoring site over a seven year period.

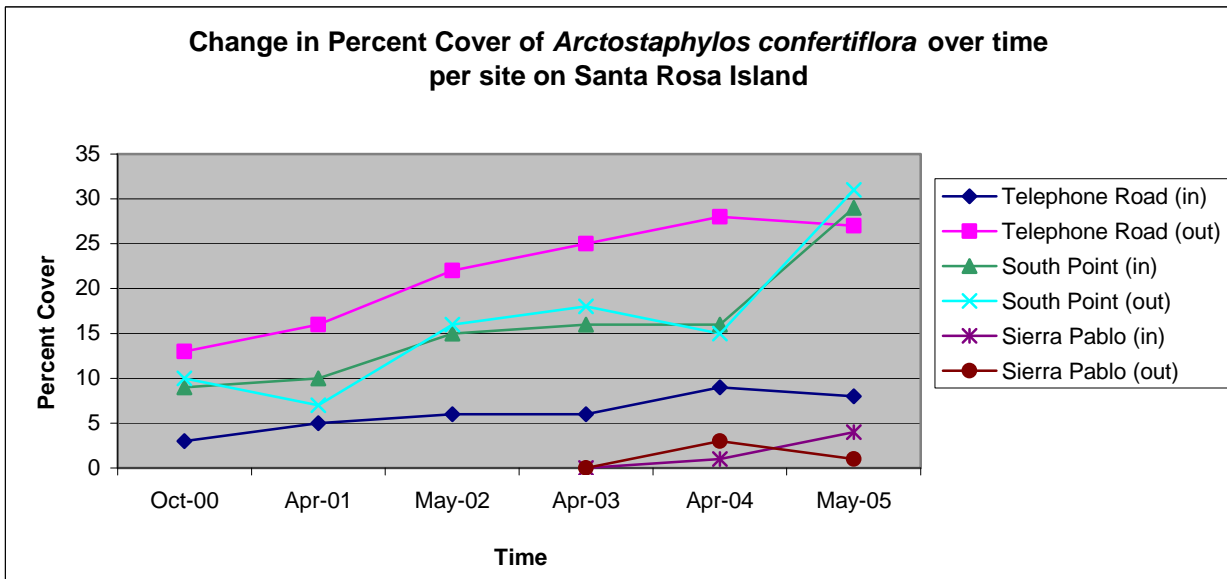


Figure 3. Percent cover of *Arctostaphylos confertiflora* was based on transect data inside and outside the exclosures at the three known populations sites (Schreiner et. al. 2006).

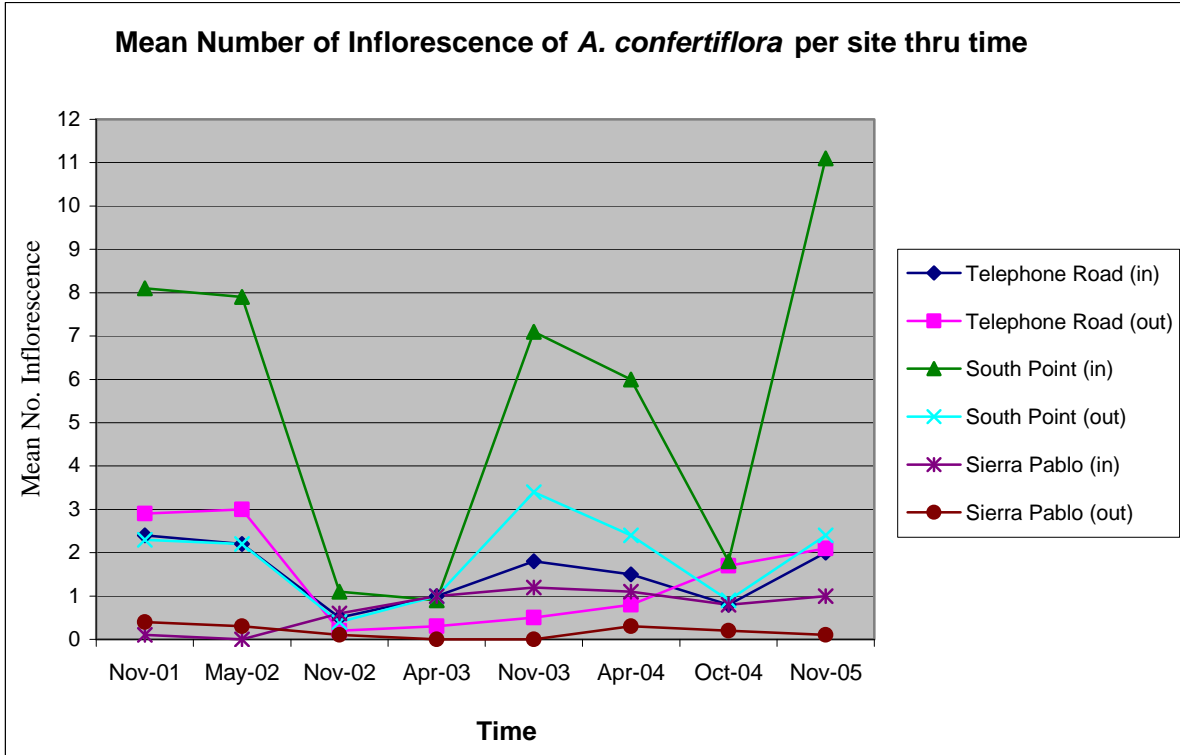


Figure 4. Trend in the mean number of inflorescences over a five-year period.

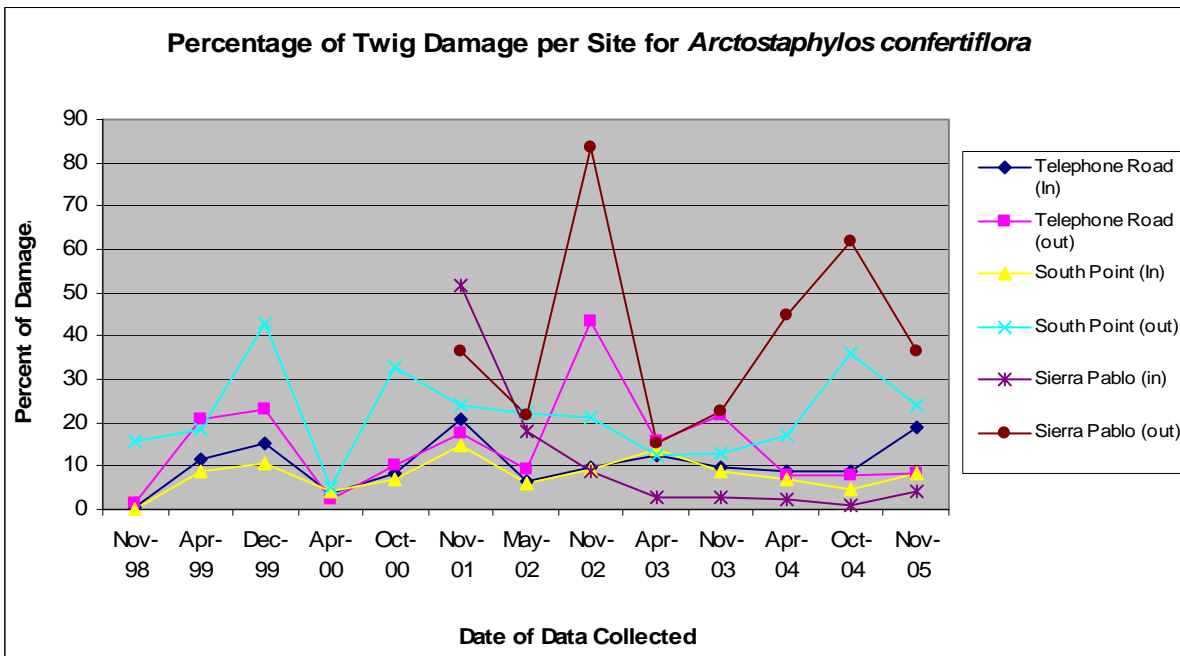


Figure 5. Percentage of twig damage at each site through time.

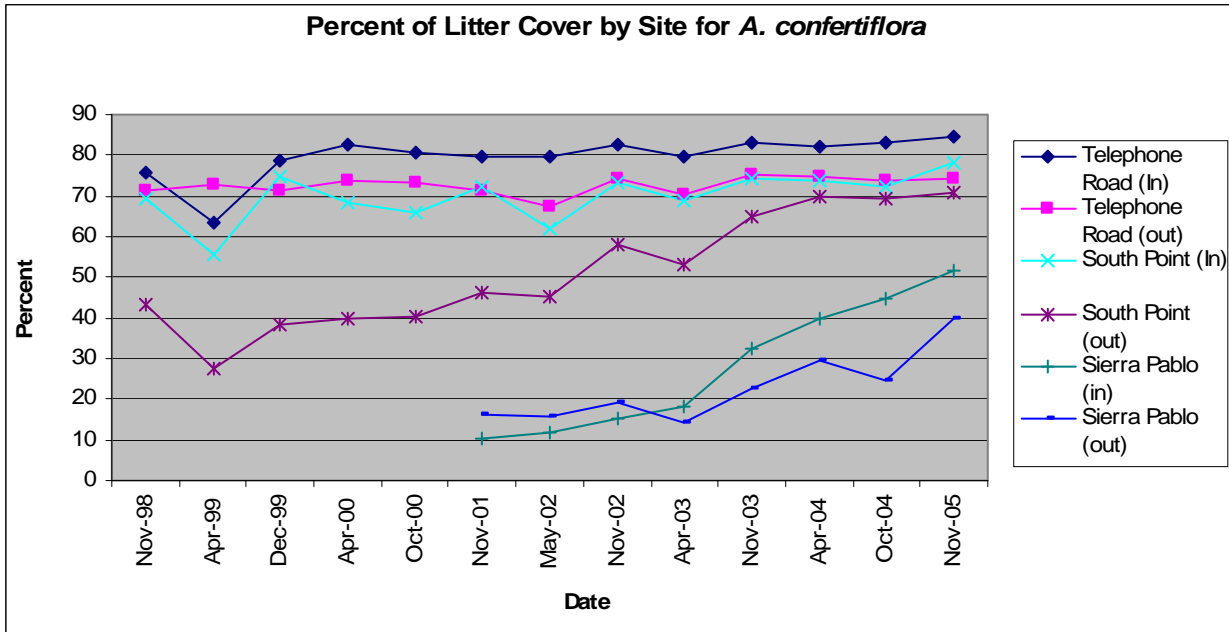


Figure 6. Trend in the accumulation of litter through time at each monitoring site

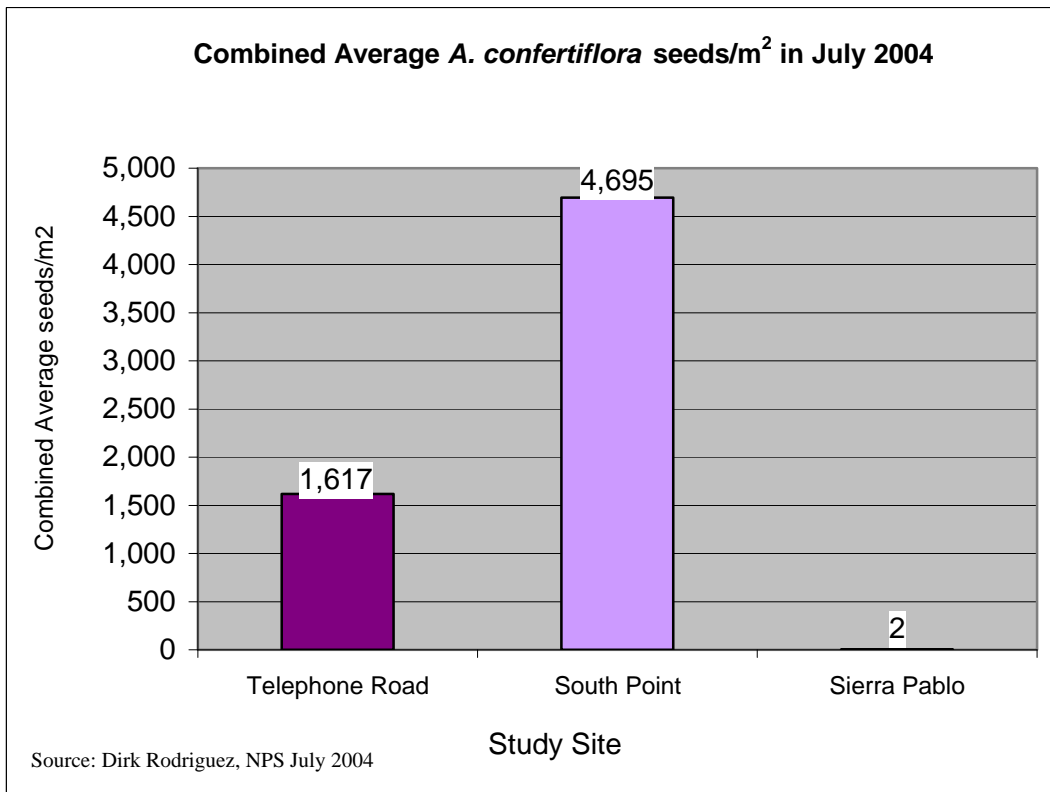


Figure 7. Combined average of the number *A. confertiflora* seeds counted per square meter per site.

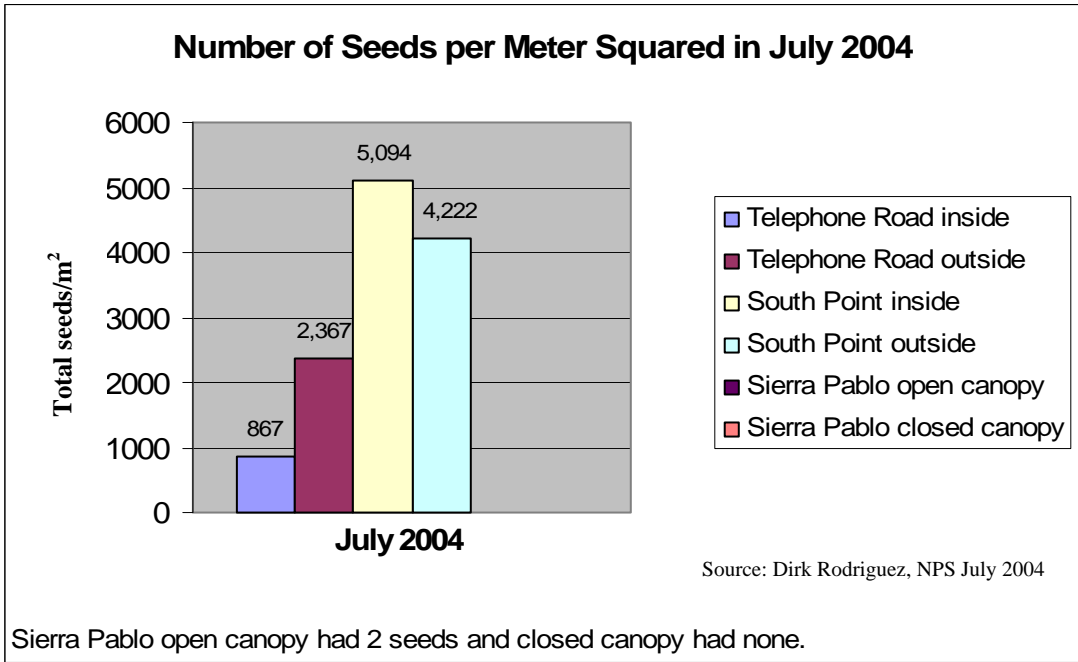


Figure 8. Total number of *Arctostaphylos confertiflora* seeds counted per square meter per site.

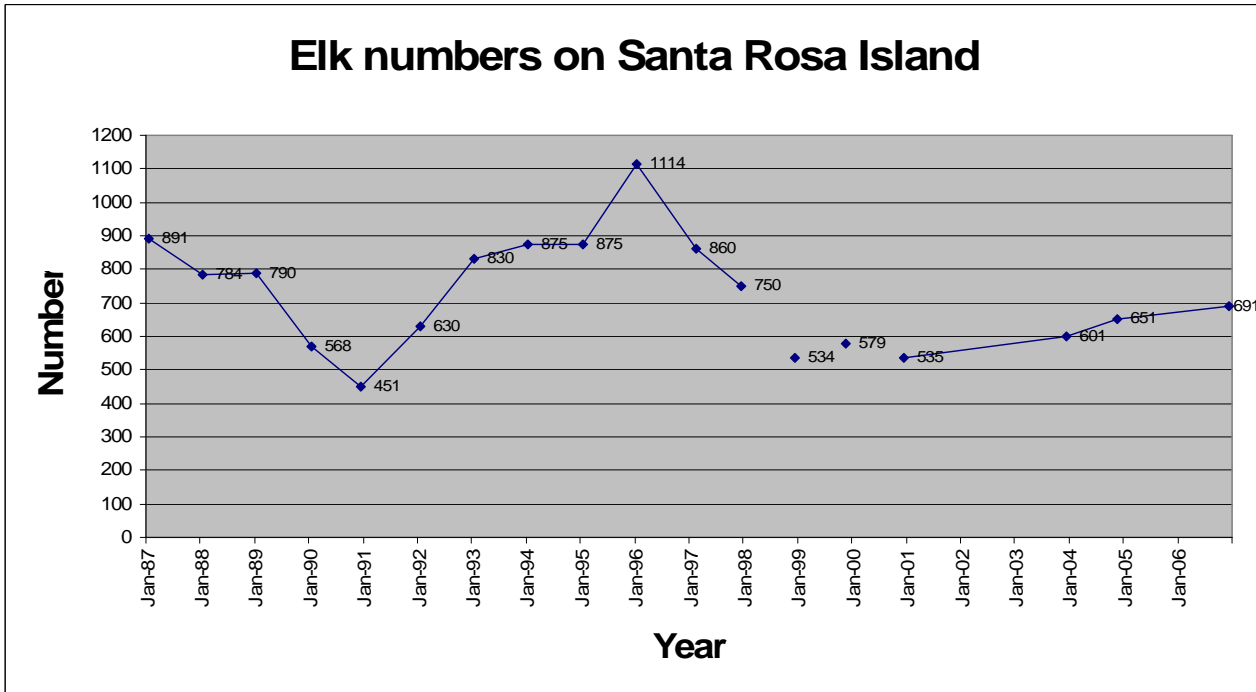


Figure 9. Estimated elk number trends over time on Santa Rosa Island.

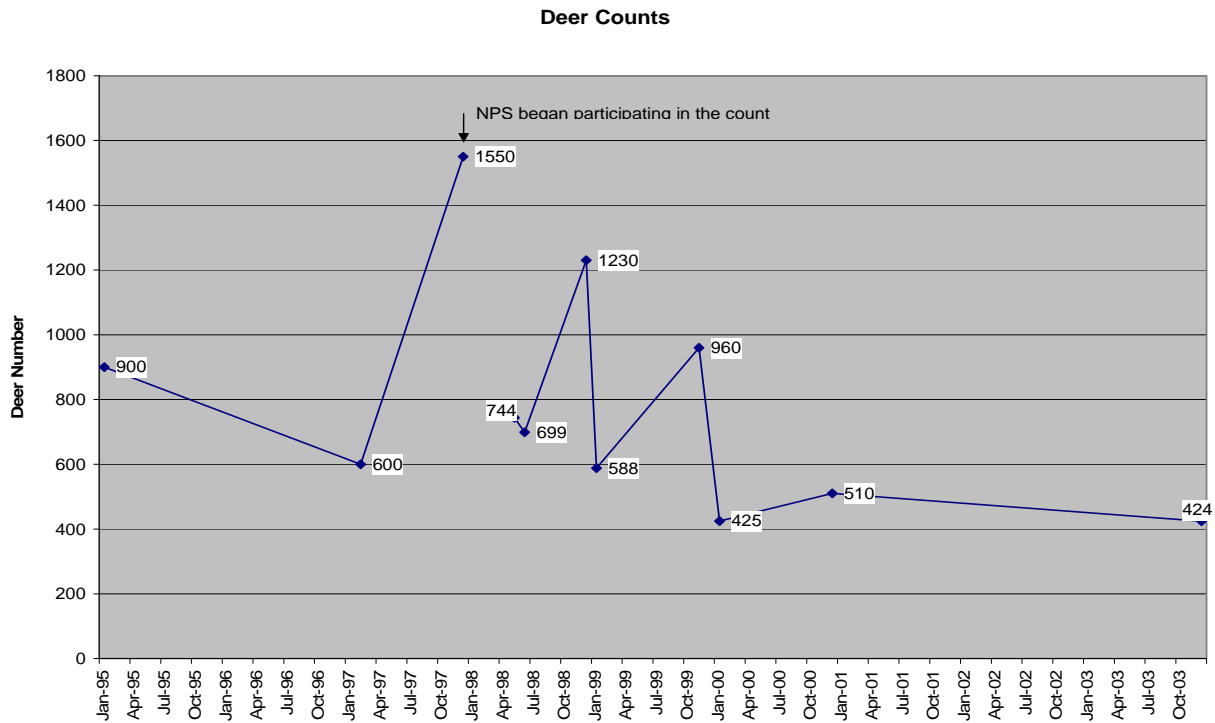


Figure 10. Deer number estimates on Santa Rosa Island from January 1995 to October 2003.

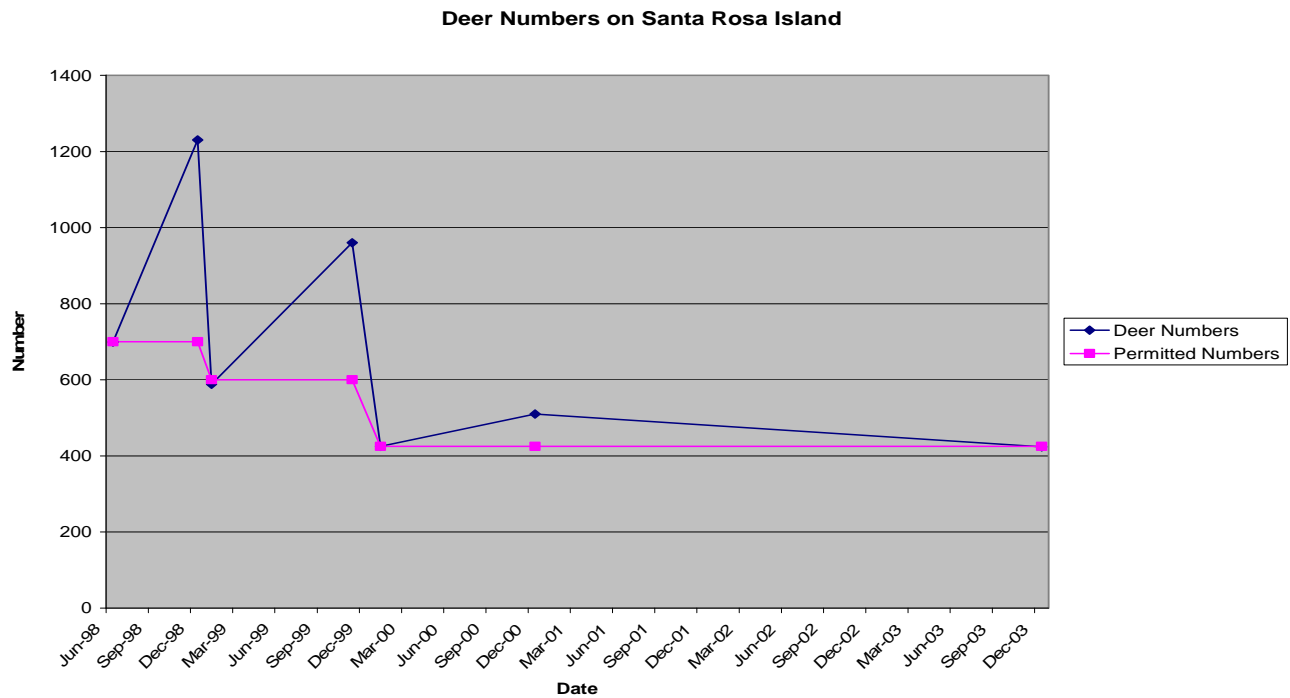
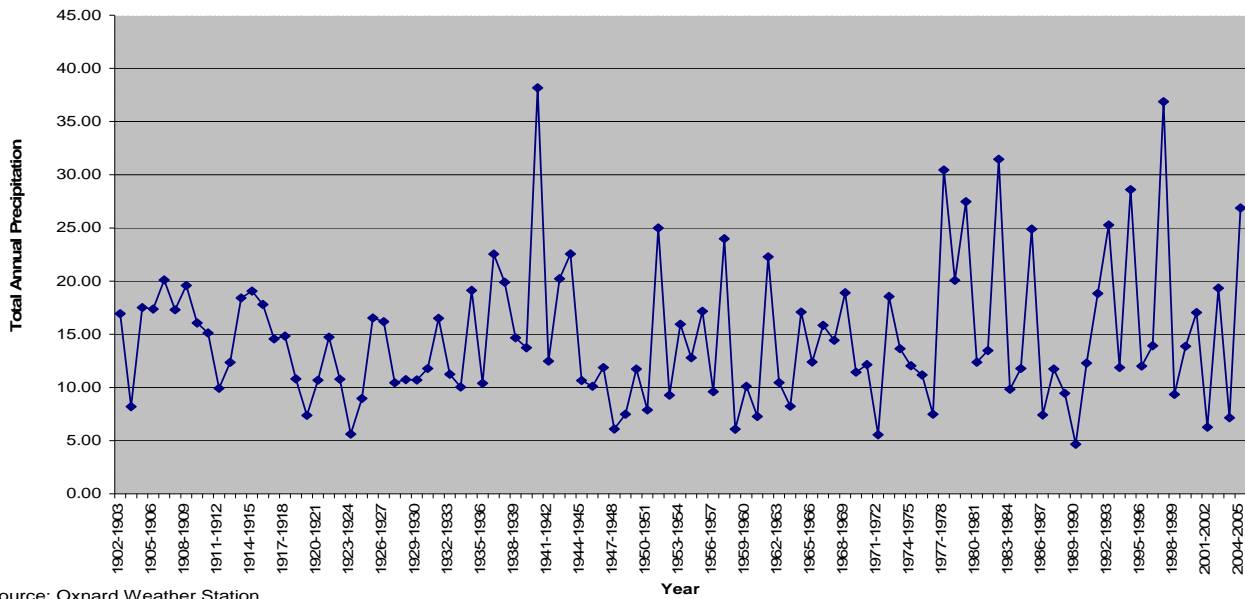


Figure 11. A comparison of estimated deer counts to those permitted numbers from 1998 to 2003.

Rainfall Trend



Source: Oxnard Weather Station
 Transmitted by Dirk Rodriguez, NPS, May 2006

Figure 12. The Oxnard Weather Station Precipitation Table provides information to estimate rainfall trends on Santa Rosa Island.

VII. APPENDIX

The primary recovery actions identified in the recovery plan for downlisting this species and the status to which they have been completed are as follows:

1. Seed is stored in Center for Plant Conservation cooperating facilities.

Due to funding constraints, seeds have not been stored in these facilities.

2. Seed germination, propagation techniques, and fire ecology are understood.

A seed germination trial is underway. No studies have been completed on the fire ecology or propagation of *Arctostaphylos confertiflora* (Rodriguez, pers. comm. 2006b).

3. A natural seed bank is developed and maintained.

NPS is working on a study on the presence of a natural seed bank on sight (see section C.1.e. below). An on-sight seed bank has not previously been developed or maintained (Rodriguez pers. comm. 2006a and 2006b).

4. A fire management plan is developed.

The NPS completed a fire management plan for the five Channel Islands managed by the Park in June 2006 (McEachern, *in litt.* 2007). The plan includes a requirement that NPS must consider measures to prevent, protect, and mitigate potential adverse impacts of wild land fire (National Park Service 2006).

5. *Arctostaphylos confertiflora* is protected from browsing to allow reproduction.

Browsing pressure by cattle, deer, and elk was identified as a threat to this species in the listing package and recovery plan. Cattle removal in 1998 and the reduction of deer numbers have reduced browsing pressure on the species since listing.

The NPS and its appointed Scientific Panel have established study plots at all three population sites. A portion of each site contains exclusion fencing (approximately 45 meters square) to compare monitoring data on plants exposed to browsing with plants protected from browsing. This fencing has protected between approximately one and two percent of the plants at Telephone Road (approximately 50 out of 3,000) and Sierra Pablo (21 out of approximately 1,700), and a fairly high percentage of plants at South Point (35 to 50 percent), from browsing by large ungulates (Rodriguez, *in litt.* 2007a; Rodriguez, pers. comm. 2007). Small mammals, such as the island fox (*Urocyon littoralis*), however, are not excluded by fencing.

6. Life history research is conducted and incorporated into recovery criteria.

This action has not yet been completed (Rodriguez, pers. comm. 2006a).

7. If declining, determine the cause and reverse the trend.

The NPS-appointed Scientific Panel, NPS, and USGS are involved in studies examining population trends. Some parameters show a positive trend (e.g., growth and litter accumulation), but others (e.g., reproduction and inflorescence damage) do not. We do not have enough information to conclude that the populations are declining, stable, or increasing.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of
Santa Rosa Island Manzanita (*Arctostaphylos confertiflora*)

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change is needed

Appropriate Listing/Reclassification Priority Number, if applicable: N/A

Review Conducted By: Jen Lechuga

FIELD OFFICE APPROVAL:

Field Supervisor, Fish and Wildlife Service

Approve Diane K. Noh Date 12/31/07

REGIONAL OFFICE APPROVAL:

Regional Director, Fish and Wildlife Service

Approve Paul Henon Date 1/10/08