

Gilia tenuiflora ssp. *hoffmannii*
(Hoffmann's Slender-Flowered Gilia)

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



Photo by: Steve Junak, Santa Barbara Botanic Garden

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

July 14, 2009

5-YEAR REVIEW

Gilia tenuiflora ssp. *hoffmannii* (Hoffmann's slender-flowered gilia)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

As summarized from the recovery plan for this species (Service 2000), *Gilia tenuiflora* ssp. *hoffmannii* (Hoffmann's slender-flowered gilia) is a small, erect, annual herb in the phlox family (Polemoniaceae). It is restricted to Santa Rosa Island off the coast of southern California, where it has historically been collected from Carrington Point and East Point. A third population was discovered in 1994 at Skunk Point (Rindlaub 1994). It is often associated with dune and lupine scrub vegetation. The plant is threatened by soil damage and habitat alteration resulting from decades of herbivory by sheep, horses, cattle, elk, and deer, competition from nonnative grasses, small population size, and climate change. Population monitoring has been conducted annually at the East Point location since 1994.

Methodology Used to Complete This Review:

This review was prepared by the Ventura Fish and Wildlife Office (VFWO), following the guidance issued by Region 8 in March 2008. We used information from the recovery plan, survey information from experts who have been monitoring various localities of this species, and the California Natural Diversity Database (CNDDDB) maintained by the California Department of Fish and Game. The recovery plan and personal communications with experts were our primary sources of information used to update the species' status and threats. We received no information from the public in response to our Federal Notice initiating this 5-year review. This 5-year review contains updated information on the species' biology and threats, and an assessment of that information compared to that known at the time of listing or since the last 5-year review. We focus on current threats to the species that are attributable to the Act's five

listing factors. The review synthesizes all this information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

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Federal Register Notice Citation Announcing Initiation of This Review: A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register (FR) on March 25, 2009 (74 FR 12878). No information was received in relation to this species.

Listing History:

Original Listing

FR Notice: 62 FR 40954

Date of Final Listing Rule: July 31, 1997

Entity Listed: *Gilia tenuiflora* ssp. *hoffmannii* (subspecies)

Classification: Endangered

Associated Rulemakings: N/A

Review History: N/A

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for *Gilia tenuiflora* ssp. *hoffmannii* is 3 (Service 2000). This is based on a 1-18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 FR 43098, September 21, 1983). The recovery priority number of 3 indicates that the subspecies faces a high degree of threat and has a high potential for recovery.

Recovery Plan

Name of Plan: Thirteen Plant Taxa from the Northern Channel Islands Recovery Plan

Date Issued: September 26, 2000

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy

The Act defines “species” as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate wildlife. This definition of species under the Act limits listing as distinct population segments to species of vertebrate fish or wildlife. Because the species under review is a plant, the DPS policy is not applicable, and the application of the DPS policy to the species’ listing is not addressed further in this review.

Information on the Species and its Status

Species Biology and Life History

Gilia tenuiflora ssp. *hoffmannii* is a small, erect annual herb in the phlox family (Polemoniaceae). The central stem arises from a rosette of densely hairy, strap-shaped, short-lobed leaves. The flowers are purplish and funnel-shaped below, widening to five pinkish corolla lobes (Service 2000). Plants range in height from approximately 5 to 25 centimeters (cm) (2 to 10 inches (in)) (Faulkner and Chaney 2007).

Gilia tenuiflora ssp. *hoffmannii* thrives in open patches of habitat where bare ground ranges from about 50 to 95 percent (Faulkner and Chaney 2007). Plants germinate with winter or spring rains, primarily in January or February, and flowers and produces seed by late April or early May. Emergence and seed-set times vary across years, depending on the amount and timing of the rains. Each plant can produce from one to several dozen seed capsules. An individual can produce from 200 to several hundred seeds (Faulkner and Chaney 2007). Numbers of plants germinating vary widely from year to year.

The most recent research on the life history of *Gilia tenuiflora* ssp. *hoffmannii* discovered that there was not a significant correlation between total annual precipitation and *Gilia* density or flower number (Levine et al. 2008). This study examined a data set spanning from 1994 to 2007 for the East Point *Gilia tenuiflora* ssp. *hoffmannii* population. The study found that the density of the species was better correlated by the average nightly low temperature after the first major rain of the season. In addition, while density is typically low in drought years, the population exhibited extreme variation in density during non-drought years. Because much of the variation is correlated by the temperature at the time of the first major rain, this is thought to be a germination cue (Levine et al. 2008).

Distribution

Gilia tenuiflora ssp. *hoffmannii* has only been collected from three locations on Santa Rosa Island of the northern Channel Islands. A collection was made by Reid Moran from the “arroyo between Ranch and Carrington Point” in 1941 (Rutherford and Thomas 1994). In 1994, Kathy Rindlaub located a population of 88 individuals covering 2 square meters (m) (21 square feet (ft)) that reasonably corresponded to Moran’s site, and was grazed by cattle (Rindlaub 1994). The other historical location is at the type locality near East Point, where the species is still found today. It was not until 1994 surveys that Rindlaub discovered a third population that was

comprised of three colonies at Skunk Point on Santa Rosa Island. This population was comprised of approximately 3,000 to 3,500 individuals in 1994 and had been cropped by cattle (Rindlaub 1994).

At the time of listing, all three populations of *Gilia tenuiflora* ssp. *hoffmannii* were extant. Our most recent data indicates that the Carrington Point population has possibly been extirpated, although there have not been any exhaustive field surveys conducted for the species in recent years (McEachern 2008, McEachern pers. comm. 2008, Faulkner and Chaney 2007). The East Point population of the species has been estimated to occupy 37.6 acres (15 hectares (ha)), and is approximately twice the size of the Skunk Point population (Faulkner and Chaney 2007). These two remaining populations are located about 2 miles (3.2 kilometers) apart on the east side of Santa Rosa Island. The limited number of historical collection locations described above suggests that the taxon was probably not much more widespread than its current distribution. This may be due in part to its restriction to old, stabilized sand dune habitats, which are naturally rare on the island (Faulkner and Chaney 2007).

Abundance

In 1994, Rindlaub estimated the Carrington Point population of *Gilia tenuiflora* ssp. *hoffmannii* to comprise 88 individuals covering 2 square meters (Service 1997). At that time, the population was known to be grazed by cattle. The Carrington Point population may have since been extirpated; however, as noted above, extensive monitoring efforts have not been undertaken for this population in recent years (McEachern 2008, McEachern pers. comm. 2008, Faulkner and Chaney 2007).

At the time of listing, Rindlaub estimated the East Point population to consist of about 2,000 plants (Rindlaub 1994). Surveys conducted by the U.S. Geological Survey (USGS) and collaborators since 1995 show that the annual *Gilia tenuiflora* ssp. *hoffmannii* population size at East Point has ranged from about 20,000 to 256,000 individuals with germination rates depending on climatic factors, including the nightly low temperature after the first major rain (Levine et al. 2008, Faulkner and Chaney 2007, McEachern 2008). Levine et al. (2008) showed that while population growth rates of *Gilia tenuiflora* ssp. *hoffmannii* fluctuated during the period analyzed (from 2004 to 2006), the population size had an overall positive trend. Samples collected in 2008 fall within the range of plant density described by Levine et al. (2008). Preliminary results from surveys conducted in the spring of 2009 suggest the population size also fell within this range (McEachern in litt. 2009b).

The Skunk Point *Gilia tenuiflora* ssp. *hoffmannii* population is known to be extant; however, the site has not been extensively surveyed since 1994. At that time, between 3,000 and 3,500 individuals were estimated within three locations along Skunk Point (Rindlaub 1994). Periodic checks indicate that the Skunk Point population occupies generally the same area as it did at the time of listing, and, like the East Point population, the population size at Skunk Point fluctuates widely from year to year (McEachern 2008).

CNDDDB #	Location	Pop. at time of listing (individuals)	Current Trend	Pop. Size (Year surveyed)	Reference
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1	East Point	2,000	Extant	<ul style="list-style-type: none"> • 2,000 (1994) • 20,000-256,000 (1995-2008) 	<ul style="list-style-type: none"> • Rindlaub 1994 • Faulkner and Chaney 2007 • McEachern 2008 • Levine et al. 2008
2	Carrington Point	88	Possibly Extirpated	<ul style="list-style-type: none"> • 88 (1994) 	<ul style="list-style-type: none"> • Rindlaub 1994
3	Skunk Point	3000-3500	Presumed Extant	<ul style="list-style-type: none"> • 3000-3500 (1994) 	<ul style="list-style-type: none"> • Rindlaub 1994 • McEachern 2008

CNDDDB #= number assigned by the California Natural Diversity Database (CNDDDB 2009).

Habitat or Ecosystem

Gilia tenuiflora ssp. *hoffmannii* can be found growing on ancient stabilized sand dunes on the northeastern side of Santa Rosa Island where soil textures are characterized by loamy sand. The species prefers open habitat among other low herbaceous vegetation where competition for resources is low (Faulkner and Chaney 2007). In addition, it is most abundant where bare ground ranges from about 50 to 95 percent (Faulkner and Chaney 2007).

A component of dune and lupine scrub vegetation, *Gilia tenuiflora* ssp. *hoffmannii* often occurs with sand verbena (*Abronia umbellata*), wild oats (*Avena barbata*), rip-gut grass (*Bromus diandrus*), beach evening-primrose (*Camissonia cheiranthifolia*), and sand mat (*Cardionema ramosissima*) (Service 2000). Silver beach-weed (*Ambrosia chamissonis*), saltgrass (*Distichlis spicata*), miniature lupine (*Lupinus bicolor*), plantain (*Plantago erecta*), and sand-dune blue grass (*Poa douglasii*) also occur in the species' habitat.

Changes in Taxonomic Classification or Nomenclature

No changes in taxonomy or nomenclature have been made since the time of listing.

Genetics

No new studies concerning the genetics of this taxon have been conducted since the time of listing.

Species-specific Research and/or Grant-supported Activities

The United States Geological Survey (USGS) initiated a rare plant monitoring program on Santa Rosa Island in 1994 to describe population growth rates, and to understand the nature and severity of any threats to rare plant populations. Rare plant monitoring continues on Santa Rosa Island, and *Gilia tenuiflora* ssp. *hoffmannii* is one of the monitored plant taxa.

Gilia tenuiflora ssp. *hoffmannii* censuses dating back to 1994 provided the data for Levine et al. (2008) to study the effects of rainfall on the rare annual plant. This research has provided much of the information provided in the Factor E discussion below.

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

At the time of listing, *Gilia tenuiflora* ssp. *hoffmannii* was threatened by soil damage and habitat alteration resulting from decades of herbivory by sheep, horses, cattle, elk, and deer. In addition, a sandy service road that bisects the East Point population of the species was used, and continues to be used, by the National Park Service (NPS) and ranchers; however, the use of this road has decreased since the time of listing. The NPS constructed a fence to exclude cattle from a large portion of the East Point population; however, a considerable portion of the population was affected by increased trampling by cattle as a result of the fence placement. The fencing was subsequently removed. Sheep were removed from the island in 1901 and cattle were removed in 1998; however, horses, deer, and elk still inhabit Santa Rosa Island with the potential to occur in *Gilia tenuiflora* ssp. *hoffmannii* habitat.

Around the time *Gilia tenuiflora* ssp. *hoffmannii* was listed, several key events influenced changes in the management of Santa Rosa Island. These included a Cleanup or Abatement Order issued by the California Central Coast Regional Water Quality Board (1995) to correct cattle grazing and road-related water quality problems on the island; the issuance of a Conservation Strategy developed jointly by Channel Islands National Park (Park), USGS, and the Service (Coonan et al. 1996); and a lawsuit brought against Park that focused on the management of the cattle, deer, and elk herds (Environmental Defense Center (EDC) 1996). In the settlement agreement (EDC 1998), the Park agreed to reduce elk and deer numbers until complete removal in 2011. Cattle were removed during the summer of 1998. As a result of reductions in the number of nonnative animals on the island, there are some indications that landscape-level recovery is taking place. Monitoring has focused on specific elements of the landscape. For instance, degraded riparian systems on the island have responded positively to the removal of cattle (NPS 2004). In upland portions of the island, woody species, including the federally endangered Santa Rosa Island manzanita (*Arctostaphylos confertiflora*), are responding to lower levels of elk and deer browsing by developing new growth (Schreiner et al. 2006). While no monitoring has specifically focused on the response of *Gilia tenuiflora* ssp. *hoffmannii* to lower levels of nonnative species on the island, observations indicate that less disturbance of its habitat has occurred (McEachern in litt. 2009a).

When the recovery plan for *Gilia tenuiflora* ssp. *hoffmannii* was published, the threats that were identified in the original listing rule were still ongoing. In addition to the preexisting threats, the recovery plan identified competition from nonnative grasses and extinction from random naturally occurring events due to limited distribution as additional threats (see discussion under Factor E).

In response to the regulatory mechanisms and litigation noted previously, cattle have been removed from Santa Rosa Island and no longer pose a threat to *Gilia tenuiflora* ssp. *hoffmannii*.

The fencing constructed by the National Park Service to exclude cattle from the East Point population has been removed. While some horses remain on the island, no recruitment is taking place and the population is expected to remain stable (McEachern pers. comm. 2008). Deer and elk inhabit the island but will be removed by 2011 according to the terms and conditions of the above settlement agreement (EDC 1998). Deer and horses have been sighted within *Gilia tenuiflora* ssp. *hoffmannii* habitat (McEachern pers. comm. 2008).

Sea level rise, as a result of global climate change, has the potential to diminish the habitat of *Gilia tenuiflora* ssp. *hoffmannii* because of its proximity to the coastline. The impacts of climate change and sea level rise are further discussed in Factor E below.

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

Overutilization for commercial purposes was not known to be a factor in the 1997 final listing rule (62 FR 40954). Overutilization for any purpose does not appear to be a threat at this time.

FACTOR C: Disease or Predation

At the time of listing, predation and habitat alteration resulting from cattle grazing and deer and elk browsing were considered a major threat to *Gilia tenuiflora* ssp. *hoffmannii* on Santa Rosa Island. In response to browsing, *Gilia* forms multiple side branches, and although a branched plant may produce a greater number of flowers, this does not necessarily increase the fecundity of the plant (Painter and Belsky 1993). Flowers produced later in the season out of synchrony with pollinator activity results in lower seed productivity (Painter in litt. 1997 as referenced in Service 1997). In the step-down narrative portion of the recovery plan, effective elimination of habitat damage from nonnative animals, particularly the deer and elk on Santa Rosa Island, was considered one of the most important management tasks needed for recovery of this species and other listed plant taxa (Service 2000).

Some progress has been made toward eliminating nonnative animals from Santa Rosa Island since the time of listing. We believe the removal of pigs by 1993, removal of cattle by 1998, and smaller populations of deer and elk since 1998 have reduced browsing pressure on *Gilia tenuiflora* ssp. *hoffmannii*. Although habitat conditions on Santa Rosa Island show the effects of long-term grazing, the USGS believes that at the landscape level, conditions are improving (McEachern in litt. 2007).

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

The inadequacy of regulatory mechanisms was considered a concern at the time of listing. Since the time of listing, there has been an increase in regulatory mechanisms supporting the conservation of *Gilia tenuiflora* ssp. *hoffmannii*. Although threats to *Gilia tenuiflora* ssp. *hoffmannii* populations from introduced animals have been reduced, the species remains vulnerable to extirpation due to the habitat degradation caused by elk and deer populations on Santa Rosa Island. Ranchers Vail and Vickers of Santa Barbara had owned the island since 1902 and used it for cattle ranching and as a private hunting reserve (Schoenherr et al. 1999). In 1980,

Congress passed legislation enabling the establishment of the Park, and included Santa Rosa Island (then privately owned) within its boundaries. This legislation also directed the NPS to complete a natural resources study within 2 years that would create an inventory of all terrestrial and marine species in the Park, indicating their population dynamics and probable trends in future numbers and welfare, and to recommend actions that should be adopted to better protect the natural resources of the Park. Because Santa Rosa Island was not acquired by NPS until 1986, it is not covered by the current general management plan (1985); however, that plan is now being revised. Instead, the natural resources of Santa Rosa Island, including rare plant species, are covered under the Resource Management Plan of Santa Rosa Island (NPS 1997).

The continuation of cattle grazing and deer and elk hunting by the former owners of the island has been permitted by the Park through the special use permit program on a 5-year renewable basis. Additional guidance and direction to manage Santa Rosa Island has come from a Conservation Strategy jointly developed by the Park, USGS, and the Service (Coonan et al. 1996). As a result of a lawsuit (see Factor A above), the Park agreed to a phased schedule to reduce the number of cattle, elk, and deer until complete removal in 2011. Therefore, we believe that regulatory mechanisms supporting the conservation of *Gilia tenuiflora* ssp. *hoffmannii* have increased since the time of listing.

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

Small population size

As noted in the recovery plan, *Gilia tenuiflora* ssp. *hoffmannii* is threatened by the risk of stochastic extinction due to small population size and limited distribution (Service 2000). The conservation biology literature commonly notes the vulnerability of taxa known from one or very few locations and/or from small and highly variable populations (e.g., Shaffer 1981, 1987; Primack 1998; Groom et al. 2006). In particular, the small size of each population makes it difficult for this species to persist while sustaining the impacts of soil damage and habitat alteration from nonnative species. The species remains vulnerable to extirpation due to its small population size, high inter-annual variability in plant numbers, and limited distribution.

Competition with nonnative species

Competition from nonnative grasses currently threatens the existence of *Gilia tenuiflora* ssp. *hoffmannii* and its habitat. An invasive annual grass, false brome (*Brachypodium distachyon*), was recently discovered within *Gilia tenuiflora* ssp. *hoffmannii* habitat on East Point on Santa Rosa Island. In early 2007, the NPS formally consulted with the Service (pursuant to section 7 of the Act) on a project to eradicate false brome from *Gilia tenuiflora* ssp. *hoffmannii* habitat. Both false brome and *Gilia tenuiflora* ssp. *hoffmannii* prefer open patches of habitat. The invasive grass has the potential to displace *Gilia* as it fills in the open areas of habitat. Because *Gilia* may only be growing in two or three locations, displacement and competition in this habitat could constitute a threat to the long-term persistence of the species. The false brome eradication effort continues at the time of this review. Despite the extensive eradication efforts, false brome continues to spread downwind (McEachern pers. comm 2008). However, during surveys

conducted in spring 2009, McEachern observed an overall decrease in false brome population size within *Gilia tenuiflora* ssp. *hoffmannii* habitat as a result of the eradication efforts (McEachern in litt. 2009b).

Climate change

Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field et al. 1999, Cayan et al. 2005, Intergovernmental Panel on Climate Change 2007). However, predictions of climatic conditions for smaller sub-regions such as California remain uncertain. It is unknown at this time if climate change in California will result in a warmer trend with localized drying, higher precipitation events, or other effects. While we recognize that climate change is an important issue with potential effects to listed species and their habitats, we lack adequate information to make accurate predictions regarding its effects to particular species at this time.

Gilia tenuiflora ssp. *hoffmannii* may be particularly threatened by climate change because its geographic distribution is so narrow and its current range is unlikely to overlap regions that would be climatically favorable in the future (Levine et al. 2008). This potential threat is particularly acute for species on islands because they are unable to disperse to more favorable habitat as the environment changes. Because of this, Levine et al. (2008) suggests that the persistence of many rare species depends on how populations respond to climate change in their current locations.

Sea level rise as a result of climate change has the potential to adversely affect *Gilia tenuiflora* ssp. *hoffmannii* and its habitat. An increase in the rate of sea level rise has been predicted for the coast of California (California Coastal Commission (CCC) 2001, California Climate Change Center 2006). In particular, ocean bluffs along the coast will be subject to greater and more frequent wave attack, resulting in erosion and shoreline retreat (CCC 2001). *Gilia tenuiflora* ssp. *hoffmannii* populations are found at 25 ft (8 m) in elevation at East Point, 60 ft (18 m) in elevation at Carrington Point, and between 10 ft (3 m) and 140 ft (43 m) in elevation at Skunk Point on Santa Rosa Island (CNDDDB 2009, Rindlaub 1994). The extent to which such events are caused by climate change and the extent to which it could affect *Gilia tenuiflora* ssp. *hoffmannii* are unknown at this time.

In addition, *Gilia tenuiflora* ssp. *hoffmannii* may also be threatened by climate change because of its germination cues. According to the study conducted by Levine et al. (2008), *Gilia tenuiflora* ssp. *hoffmannii* exhibited the highest germination rates in the years of the coldest germination-inducing storms. During the five year study, the five day average low temperature after the first major rain (>2.5 cm) ranged from 5.7 to 12.8 degrees centigrade. The plant has modest to high annual survival of ungerminated seeds, and years with relatively cold first rains and non-drought conditions may result in higher plant abundances. The effects of climate change on environmental cues may strongly influence the persistence of this species (Levine et al. 2008). For example, if a general warming trend occurs that reduces the frequency of cool first rains of the season, population growth rates could decline (McEachern 2008).

III. RECOVERY CRITERIA

Recovery plans provide guidance to the Service, States, and other partners and interested parties on ways to minimize threats to listed species, and on criteria that may be used to determine when recovery goals are achieved. There are many paths to accomplishing the recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, we may determine that, over all, the threats have been minimized sufficiently, and the species is robust enough, to downlist or delist the species. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on progress that has been made toward recovery since the species was listed (or since the most recent 5-year review) by eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated.

In the recovery plan, general delisting criteria for the suite of 13 covered plants involves increasing the number of populations either through surveying historical sites and potential habitat within the historical range to locate currently unknown populations, or repatriating or introducing several additional populations of the species. Delisting and downlisting criteria specific to *Gilia tenuiflora* ssp. *hoffmannii* comprise the following:

Downlisting Criterion

Establish 10 populations on Santa Rosa Island that are stable or increasing for a period of 15 years that includes the normal precipitation cycle. A precipitation cycle includes periods of drought and wet years, with annual rainfall starting at 100 to 135 percent of average, dropping below 65 percent of average, and returning to at least average (Service 2000). This criterion addresses Listing Factors A, C, and E. This criterion has not been met for several reasons, one of which is because the species was listed less than 15 years ago.

We believe this criterion is not realistic with respect to the recovery of the species. Historical collections have only been made at three locations, which suggests that the taxon was probably not much more widespread than its current distribution. This may be due in part to its restriction to old, stabilized sand dune habitats, which are rare on the island. Therefore, a more realistic goal would be to conserve the existing populations and establish two to three additional populations in new sites on Santa Rosa Island (McEachern in litt. 2009a). The Carrington Point population should also be reestablished if it is determined to be extirpated. Results of restoration field experiments over time would help establish whether or not the goal of three additional populations is feasible.

Delisting Criteria

- 1) Discover or establish five additional populations.
This criterion addresses Listing Factors A, C, and E. This criterion has not been met.

We believe this criterion is not realistic with respect to the recovery of the species on Santa Rosa Island for the same reasons described in downlisting criterion above.

- 2) No decline after downlisting for 10 years.
This criterion addresses Listing Factors A, C, and E. This criterion has not been met.

Although we believe the intent of this criterion is appropriate, we think it should be refined to focus on long-term trends, rather than a short-term, absolute decline, once additional information about the life history of the species and the species' response to recovery actions are better understood.

Factor B is not relevant to this species. Factor D is relevant but is not addressed in the recovery criteria.

IV. SYNTHESIS

At the time of listing, three populations of *Gilia tenuiflora* ssp. *hoffmannii* were known on Santa Rosa Island; currently there are two known populations - one at East Point and one at Skunk Point. The Carrington Point population has not been extensively surveyed in recent years. The primary threats to *Gilia tenuiflora* ssp. *hoffmannii* at the time of listing included the ongoing damage to soils and habitat alteration resulting from browsing cattle, pigs, deer, and elk, and the sandy service road used by the NPS and ranchers that bisected the East Point population. Since that time, pigs and cattle have been removed and deer and elk populations have been reduced in size but still adversely impact *Gilia tenuiflora* ssp. *hoffmannii* and its habitat. As discussed in Factors A and D above, the settlement agreement with the NPS requires the complete removal of deer and elk by 2011. While no monitoring has specifically focused on the response of *Gilia* to decreased numbers of nonnatives, observations indicate that less disturbance of habitat has occurred. The NPS initially constructed a fence to exclude cattle from a portion of the largest East Point population at the time of listing; however, a considerable portion of the population was affected by increased trampling by cattle as a result of the fence placement. The fencing has been removed. Vehicle traffic has also decreased along the sandy service road since the time of listing.

Gilia tenuiflora ssp. *hoffmannii* populations exhibit large inter-annual fluctuations. While the East Point and Skunk Point populations appear to be relatively stable since the time of listing according to monitoring and observations, the status of the Carrington Point population is unknown. The monitoring effort conducted for the East Point population demonstrated a positive population growth trend overall during the period of 2004 to 2006 that was analyzed by Levine et al. (2008; McEachern 2008). Plots monitored on East Point in 2008 fall within the same range of plant density recorded for previous years. The Skunk Point population has not

been extensively surveyed recently; however, observations suggest that it occupies generally the same area as it did during the time of listing.

We believe that *Gilia tenuiflora* ssp. *hoffmannii* still meets the definition of an endangered species (a species that is threatened with extinction throughout all or a significant portion of its range). This is an appropriate designation for several reasons. First, although nonnative animals have been removed or reduced in numbers on Santa Rosa Island, the effects of habitat alteration still remain. In addition, the presence of invasive false brome poses a threat to the species that was not present before. It may take several decades of natural and assisted restoration to provide the microhabitat conditions that will once again support populations of *Gilia tenuiflora* ssp. *hoffmannii*. Secondly, the species remains vulnerable to extirpation due to low numbers of individuals, low numbers of populations, and small aerial extent of the populations. Of the two known populations of *Gilia tenuiflora* ssp. *hoffmannii*, the East point population occupies approximately 37.6 acres (15 ha) and the Skunk Point population is about half that size (Falkner and Chaney 2007). Therefore, the species continues to be endangered and no change in status is recommended.

V. RESULTS

Recommended Listing Action:

- Downlist to Threatened
- Uplist to Endangered
- Delist (indicate reason for delisting according to 50 CFR 424.11):
 - Extinction*
 - Recovery*
 - Original data for classification in error*
- No Change

New Recovery Priority Number and Brief Rationale: 6. This recovery priority number reflects a subspecies facing a high degree of threat and low recovery potential due to its small population size, high inter-annual variability in plant numbers, limited distribution, and low survival rate. We believe this is more accurate than the former recovery priority number of 3, which reflected a subspecies facing a high degree of threat but with high recovery potential. We believe the recovery potential of the species is lower because of the threats posed by the invasive false brome, the high inter-annual variability in plant numbers, the historically limited distribution, and the possible threats of climate change.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

1. The USGS and NPS should seek additional funding to continue field surveys and monitoring, demographic monitoring, population viability analyses, and further investigations into recovery projects.

2. The Service should work cooperatively with NPS and USGS to refine the generalized downlisting criteria to take into consideration new information. Attaining the recovery criteria outlined in the recovery plan is unrealistic for this species.
3. The Service should work cooperatively with NPS and USGS to refine delisting criteria to emphasize long-term population growth trends rather than short-term gains or declines in the species.
4. The USGS and NPS should investigate the community-level factors that influence population abundance, distribution, and demographic trends of the species.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW

Gilia tenuiflora ssp. hoffmannii (Hoffmann's slender-flowered gilia)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No Change Needed

Appropriate Listing/Reclassification Priority Number: 6

Review Conducted By: Colleen Mehlberg

FIELD OFFICE APPROVAL:

Field Supervisor, U.S. Fish and Wildlife Service

Approve Diane K. Niles Date 7/14/09

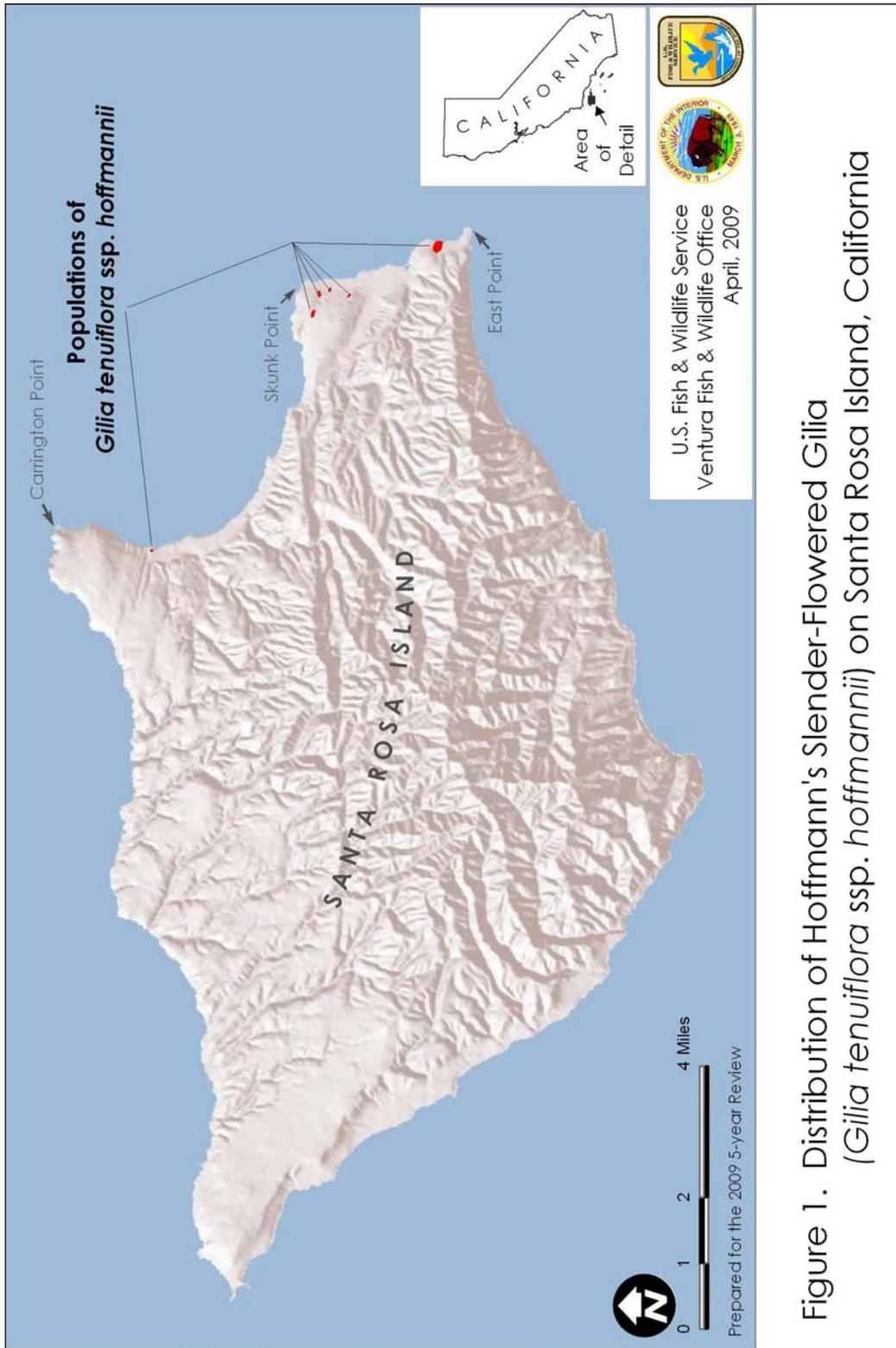


Figure 1. Distribution of Hoffmann's Slender-Flowered Gilia (*Gilia tenuiflora* ssp. *hoffmannii*) on Santa Rosa Island, California

Figure 1: Distribution of *Gilia tenuiflora* spp. *hoffmannii* on Santa Rosa Island, California



Figure 2: Distribution of False Brome within Hoffmann’s slender-flowered gilia population (Faulkner and Chaney 2007).