

Island phacelia
(Phacelia insularis var. insularis)

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



Photo by: Dieter Wilken, Santa Barbara Botanical Garden

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

June 2008

5-YEAR REVIEW
Island phacelia
(Phacelia insularis var. insularis)

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5-YEAR REVIEW
Island phacelia
(*Phacelia insularis* var. *insularis*)

1.0 GENERAL INFORMATION

1.1. Reviewers

Lead Regional Office: Region 8, California and Nevada: Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning, 916-414-6464; and Jenness McBride, Fish and Wildlife Biologist, 916-414-6464

Lead Field Office: Ventura Fish and Wildlife Office: Della Snyder-Velto, Fish and Wildlife Biologist, 626-574-5254; and Connie Rutherford, Recovery Coordinator (Plants), 805-644-1766, ext. 306

1.2. Methodology used to complete the review:

This review was conducted by staff in the U.S. Fish and Wildlife Service (Service), Ventura Fish and Wildlife Office, Ventura, California. The review is based on the following: information available in current published and unpublished literature; discussions with other agency biologists; discussions with species experts; information available on the internet; and the Ventura Fish and Wildlife Office species files. An unpublished draft report by the University of California, Santa Barbara, and U.S. Geological Survey-Biological Resources Division-Western Ecological Research Center (USGS-BRD-WERC) was the primary source for information on current population trends, newly discovered populations, current threats, and current projects that are focused on species recovery. We received no information in response to our Federal Register (FR) notice initiating a request for information on this species.

1.3. Background:

1.3.1. FR Notice citation announcing initiation of this review:

The FR notice initiating this review was published on February 14, 2007 (72 FR 7064). This notice opened a 60-day request for information period, which closed on April 16, 2007. No information was received in response to the notice.

1.3.2. Listing history

Original Listing

FR notice: 62 FR 40954

Date listed: July 31, 1997

Entity listed: Subspecies (*Phacelia insularis* var. *insularis*)

Classification: Endangered

1.3.3. Associated rulemaking

None

1.3.4. Review History

Since the original listing in 1997, the recovery plan (Service 2000) has been the only written status review; however, the recovery plan did not re-evaluate the subspecies' listing status.

1.3.5. Species' Recovery Priority Number at start of 5-year review: 3. This number denotes a subspecies facing a high degree of threat and with a high recovery potential.

1.3.6. Recovery Plan or Outline

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

Date issued: September 26, 2000

Dates of previous revisions: None

2.0 REVIEW ANALYSIS

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

The Endangered Species Act (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.

2.2. Recovery Criteria

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

Yes
 No

2.2.2. Adequacy of recovery criteria.

2.2.2.1. 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

We think criteria in the recovery plan should be refined to focus more on long-term trends once additional information about the life history of the species and its response to recovery actions are better understood.

2.2.2.2. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and note any new information to consider regarding existing or new threats)?

Yes
 No

While the recovery criteria are not explicitly based on the five factors, those factors are generally addressed in the criteria.

2.2.3. 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 are not relevant to this species, please note that here.

Downlisting Criteria

The recovery plan that includes island phacelia contains generalized downlisting criteria for a suite of 13 species that occur on the northern Channel Islands. The following downlisting goal is to be applied to the herbaceous species covered in the plan:

Secure populations of a minimum of 2,000 individuals (addresses Listing Factors A, C, and E). Although not explicitly stated as such, we interpret this criterion to mean that populations should support a minimum target of 2,000 individuals as shown over a period of 15 years and includes a normal precipitation cycle (drought and wet years), similar to the specific downlisting criterion # 2 below. This criterion has not been met. Only one site has supported an above-ground population of 2,000 individuals over the past 9 years.

Downlisting criteria specific to island phacelia were also included as follows:

1) Discover or establish 10 populations per island (San Miguel Island and Santa Rosa Island) (addresses Listing Factors A, C, and E.) Only four populations are known at this time. Although surveys in historical and other suitable habitat have been conducted, additional populations have not been found and no reintroduced populations have been established on Santa Rosa Island. Therefore, this criterion has not been met. We believe this criterion may be possible on San Miguel Island because, although these plants have

* A) Present or threatened destruction, modification or curtailment of its habitat or range;
B) Overutilization 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.

very specific habitat requirements, there are several places on the island where suitable habitat conditions exist and the plant now occurs (McEachern, in litt. 2007a). However, this criterion is not appropriate with respect to the recovery of the species on Santa Rosa Island because suitable habitats appear to be extremely rare on the island. Suitable habitat may be available on Carrington Point; otherwise, suitable habitat on the island appears to be limited. Therefore, a more realistic goal would be to establish one additional population on Santa Rosa Island. Results of restoration field experiments over time would help establish whether or not the goal of one more population is feasible (McEachern, in litt. 2007a).

2) Maintain populations as stable or increasing with evidence of natural recruitment for a period of 15 years that includes the normal precipitation cycle (addresses Listing Factors A, C, and E). 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). Because the species has not been listed for a minimum of 15 years, this criterion has not been met. We believe this criterion is adequate and appropriate with respect to the recovery of the species.

Delisting Criteria

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 criteria specific to island phacelia comprise the following:

1) Discover or establish five additional populations per island (addresses Listing Factors A, C, and E). This criterion has not been met. We believe this criterion may be possible on San Miguel Island where three populations exist now but it is not realistic with respect to the recovery of the species on Santa Rosa Island for the same reasons described in downlisting criterion #1 above.

2) No decline after downlisting for 10 years (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.

2.3. Updated Information and Current Species Status

2.3.1. Biology and Habitat

Island phacelia is a decumbent (reclining), branched annual of the waterleaf (Hydrophyllaceae) family. It is a small-statured plant that develops a taproot (Levine et al. 2007). The short, hairy, and glandular stems grow to 15 centimeters (cm) (6

inches) high from a basal rosette of leaves. The small lavender to violet bell-shaped flowers are borne in cymes (loose clusters). Island phacelia can be distinguished from the other species of *Phacelia* on the islands based on the hastate (arrowhead) leaf shape.

Island phacelia germinates with the first major (> 1 inch (2.5 cm)) rains of its fall-through-spring growing season; peak flowering occurs in early March with plants senescing in late spring (Levine et al. 2007). We have no data on pollinators other than plants seem to be visited by a variety of generalist insects (McEachern in litt. 2007b).

- **Distribution**

Island phacelia is endemic to the California Channel Islands and, at the time of listing in 1997, a single population on Santa Rosa Island was the only known population of the species. By the time the recovery plan was published in 2000, island phacelia was known to occur in five localities: the one on Santa Rosa Island at Carrington Point and the four on San Miguel Island (see Santa Rosa Island and San Miguel Island maps, pp. 15-16). Both islands occur on lands managed by Channel Islands National Park (Park). The Santa Rosa Island population occupies about 15 acres (6 hectares (ha)) based on its maximum observed extent in 1998. The San Miguel Island populations range from about 0.02 to 0.86 acres (0.01 to 0.35 ha). These figures are from USGS surveys made in April and May, 1998, when the largest number of plants were observed (McEachern in litt. 2007b). Surveys since 1998 have not seen such extensive numbers of plants in those same areas; however, a seed bank likely still exists (McEachern in litt. 2007b).

On Santa Rosa Island, Clifton Smith first collected the species at Carrington Point in 1973 and Sarah Chaney found the species still extant at this location in 1994 (Service 2000). It is the only known population on Santa Rosa Island.

On San Miguel Island, the species was first collected by Ralph Hoffmann in 1930 and then again by Philip Munz in 1932. In 1978, four populations were found but only one was relocated in 1984 by Charles Drost on a bluff above Cuyler Harbor (Hochberg et al. 1979). Bill Halvorson documented four populations on San Miguel Island in 1988-1989 surveys. Four populations on San Miguel Island are known today.

- **Population abundance and trends**

Abundance

During surveys in 1998 on San Miguel Island, Katie Chess located a new population at the Green Mountain site, which was known from a 1962 Blakely collection (McEachern in litt. 2007b). Chess counted a total of 2,653 plants there. Three other previously known populations were also surveyed in 1998, with plant counts totaling 29, 30, and 234 plants each (McEachern in litt. 2007b).

Complete population censuses for Santa Rosa Island have not been accomplished. The best total plant count for the Carrington Point population is from March 1998 survey results; in that year, island phacelia had by far the greatest germination on record (McEachern in litt. 2007b). That same year, USGS mapped the population extent at about 15 acres (6 ha) and counted a total of 1,465 plants within the occupied area (McEachern in litt. 2007b).

Trends

For this review, we were able to obtain the preliminary results of an unpublished study undertaken jointly by the University of California, Santa Barbara, and the USGS-BRD-WERC that examines how three rare annual seed-banking plants endemic to the California Channel Islands respond to fluctuating environments (Levine et al. 2007). The study also examines how variation in plant density relates to population growth rates. Researchers monitored the population dynamics of three endemic plants, *Gilia tenuiflora ssp. hoffmannii*, *Malacothrix indecora*, and *Phacelia insularis* var. *insularis*, on Santa Rosa Island over five to twelve years, a time that included periods of severe drought and wet El Niño years.

To study the relationship between plant density and population growth, growth rates were projected over a three year period (the non-drought years from 2004 to 2006) (Levine et al. 2007). Population growth rate estimates and annual censusing for island phacelia were used to assess the relative endangerment of the species. The assessment of population decline was based on population models that incorporate seed germination and seed death rates in addition to above-ground counts (McEachern in litt. 2007b). Population growth rate projections for island phacelia indicate a negative population trend (Levine et al. 2007) (see Table 1 in the Appendix).

The study determined that the species' low germination rate and low survival rate after germination accounted for the negative population growth trend (Levine et al. 2007). Although many annual plants germinate only a small fraction of their seeds in any one year, a seed bank will persist if ungerminated seeds remain viable over time. However, in island phacelia, less than three percent of its seeds germinate annually. If seed germinability declines with seed age, then seed production may not offset seed mortality and the population will continue to decline.

The species' negative population growth rate, low germination rate, and low survival rate indicate that island phacelia is the most threatened of the three study species (Levine et al. 2007). There are no data available on population growth trends for the species on San Miguel Island.

- **Habitat conditions**

Island phacelia occurs on sandy soils of stabilized dunes. On Santa Rosa Island, this habitat is only found on the stabilized dune headlands of Carrington Point; on San

Miguel Island, suitable habitat is found on the sandy, stabilized slopes in several bluff sites and on the flanks of Green Mountain. Island phacelia grows in association with a lupine scrub (*Lupinus albifrons*)-grassland community (NPS 1998). This community supports patches of bush lupine interspersed with low-growing herbs and grasses, including saltgrass (*Distichlis spicata*) and alkali rye (*Leymus triticoides*). Sheep and cattle grazing facilitated the spread of non-native grasses, including slender wild oat (*Avena barbata*), ripgut brome (*Bromus diandrus*), and soft chess (*Bromus hordeaceus*) that now dominate the herbaceous layer in this community (NPS 1988, Service 2000). Island phacelia occurs in small clearings within an otherwise dense cover of ripgut brome (Levine et al. 2007). Habitat conditions on Santa Rosa Island show the effects of long-term grazing land use (McEachern et al. 1997). Soils are eroded and compacted, animal trails are evident, and root systems are exposed on the steep slopes from continuing ungulate use (McEachern et al. 1997).

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

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

At the time of listing in 1997, island phacelia was threatened by soil damage, competition with non-native grasses, and habitat alteration – all caused by historical sheep grazing, cattle grazing, and elk and deer browsing (62 FR 40954). Historically, large-scale habitat alteration caused by large numbers of non-native mammals on the islands resulted in significant loss of soils, as well as changes in the structure, composition, and richness of plant communities (Service 2000).

On San Miguel Island, impacts from sheep and donkeys have resulted in soil loss and erosion of some areas down to the caliche layer and type-conversion of native shrublands to non-native annual grasslands (McEachern in litt. 2007b; Faulkner in litt. 2007).

Around the same time this and other island plant taxa were being 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 to correct cattle grazing and road-related water quality problems on the island; the issuance of a Conservation Strategy developed jointly by the Park, USGS, and the Service (Coonan et al. 1996); and a lawsuit brought against the 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 remove cattle by the end of 1998, and reduce elk and deer numbers until complete removal in 2011. As a result of reductions in the number of non-native 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 endangered Santa Rosa Island manzanita (*Arctostaphylos confertiflora*) is responding to lower levels of elk and deer browse by putting on new growth (Schreiner et al. 2006). While no monitoring has specifically focused on the response of island phacelia to lower levels of nonnative animal species on the island, a ranch road that cuts through the population is no longer used during the plant's growing season, and observations indicate that less disturbance of its habitat has occurred (McEachern, pers. comm. 2007).

2.3.2.2. Overutilization for commercial, recreational, scientific, or educational purposes:

At the time of listing, this was not known to be a factor threatening island phacelia and is not one at present.

2.3.2.3. Disease or predation:

At the time of listing, disease was not known to be a threat to island phacelia, and is not one at present. Predation and habitat alteration resulting from cattle grazing and deer and elk browsing were considered a major threat to island phacelia on San Miguel and Santa Rosa Islands. In the step-down narrative portion of the recovery plan, effective elimination of habitat damage from non-native animals, particularly the deer and elk on Santa Rosa Island, was considered one of the most important management tasks required for recovery of listed plants (Service 2000).

Some progress has been made toward eliminating non-native 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 island phacelia. Although habitat conditions on Santa Rosa Island and San Miguel Island show the effects of long-term grazing, the USGS believes that at the landscape level, conditions are improving (McEachern in litt. 2007b). In fact, browsing by an animal is rarely seen, although predation does occur from mice that are known to harvest the fruits (McEachern in litt. 2007b).

2.3.2.4. Inadequacy of existing regulatory mechanisms:

The inadequacy of regulatory mechanisms was considered a concern at the time of listing and is still of concern now. Although threats to the Santa Rosa Island population from introduced animals have been reduced, the species remains vulnerable to extirpation due to impacts from elk and deer hunting that may continue into the future. 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 Channel Islands National Park, and included Santa Rosa Island (then privately owned) within its

boundaries. This legislation also directed the National Park Service (NPS) to complete a natural resources study within two years that would supply an inventory of all terrestrial and marine species in Channel Islands National 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.

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 island phacelia have increased since the time of listing.

In 2006, U.S. Representative Duncan Hunter introduced a provision into the annual defense policy bill that would allow disabled veterans to continue hunting elk on the island past 2011 (Santa Maria Times 2006). The Department of Interior interpretation of the Hunter legislation is that it does not change the responsibility of Vail and Vickers under the Settlement Agreement to begin drawing down the deer and elk populations in 2008 and to remove all of their animals from the island by the end of 2011 (Faulkner in litt. 2007). It is uncertain when differences between the existing mandates and the new legislation will be resolved.

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

Small population size

At the time of listing, island phacelia was threatened by the risk of stochastic extinction due to small population size and limited distribution (62 FR 40954). 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 2006; 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 non-native species. The species remains vulnerable to extirpation due to its small population size, high inter-annual variability in plant numbers, limited distribution, and low survival rate.

Competition with non-native species

Invasion of habitats by non-native annual grasses, especially ripgut brome, continues to impact the species, particularly germination. Non-native annual grasses and the litter they produce also appear to inhibit successful establishment of phacelia seedlings in field experiments (McEachern in litt. 2007b, Levine et al. 2007).

Climate change

Island phacelia 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. 2007). This 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. (2007) suggest that the persistence of many rare species depends on how populations respond to climate change in their current locations.

2.4 Synthesis

At the time of listing, one population of island phacelia was known; currently there are five known populations – one on Santa Rosa Island and four on San Miguel Island. The primary threats to island phacelia at the time of listing were the ongoing damage to soils, competition with non-native grasses, and habitat alteration resulting from browsing cattle, pigs, deer and elk. Since that time, pigs and cattle have been removed and deer and elk populations have been reduced in size on Santa Rosa Island.

Island phacelia has demonstrated a negative population growth trend overall on Santa Rosa Island over the past 5 years because of low germination and low survival rates. In the recent study on three endemic plants on Santa Rosa Island, the population growth rate estimates and annual censusing for island phacelia suggest it is declining and is the most endangered of the three study plants. There is no information on population growth trends for the populations on San Miguel Island.

We believe that island phacelia 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 non-native animals have been removed or reduced in numbers on Santa Rosa Island, the effects of habitat alteration still remain and may continue if elk and deer hunting is allowed past 2011. It may take several decades of natural and assisted restoration to provide the microhabitat conditions that will once again support populations of island phacelia and other endemic species (McEachern 2004). Secondly, all populations remain vulnerable to extirpation due to low numbers of individuals, low numbers of populations, and low reproductive success in the field. There is only one small population on Santa Rosa Island that occupies approximately 15 acres and the four populations on San Miguel Island are also small, each occupying less than one acre. Therefore, the species continues to be endangered and no change in status is recommended.

3.0 RESULTS

3.1. 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

X No change is needed

3.2. New Recovery Priority Number: 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.

3.3 Listing and Reclassification Priority Number, if reclassification is recommended:

N/A

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

1. The USGS-BRD 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-BRD to refine the generalized downlisting criteria to take into consideration new information. Attaining the recovery objective of securing several populations containing a minimum of 2,000 plants each is unrealistic for this species.
3. The Service should work cooperatively with NPS and USGS-BRD to refine delisting criteria to emphasize long-term population growth trends rather than short-term gains or declines.
4. The USGS-BRD and NPS should investigate the community-level factors that influence population abundance, distribution, and demographic trends.

5.0 REFERENCES

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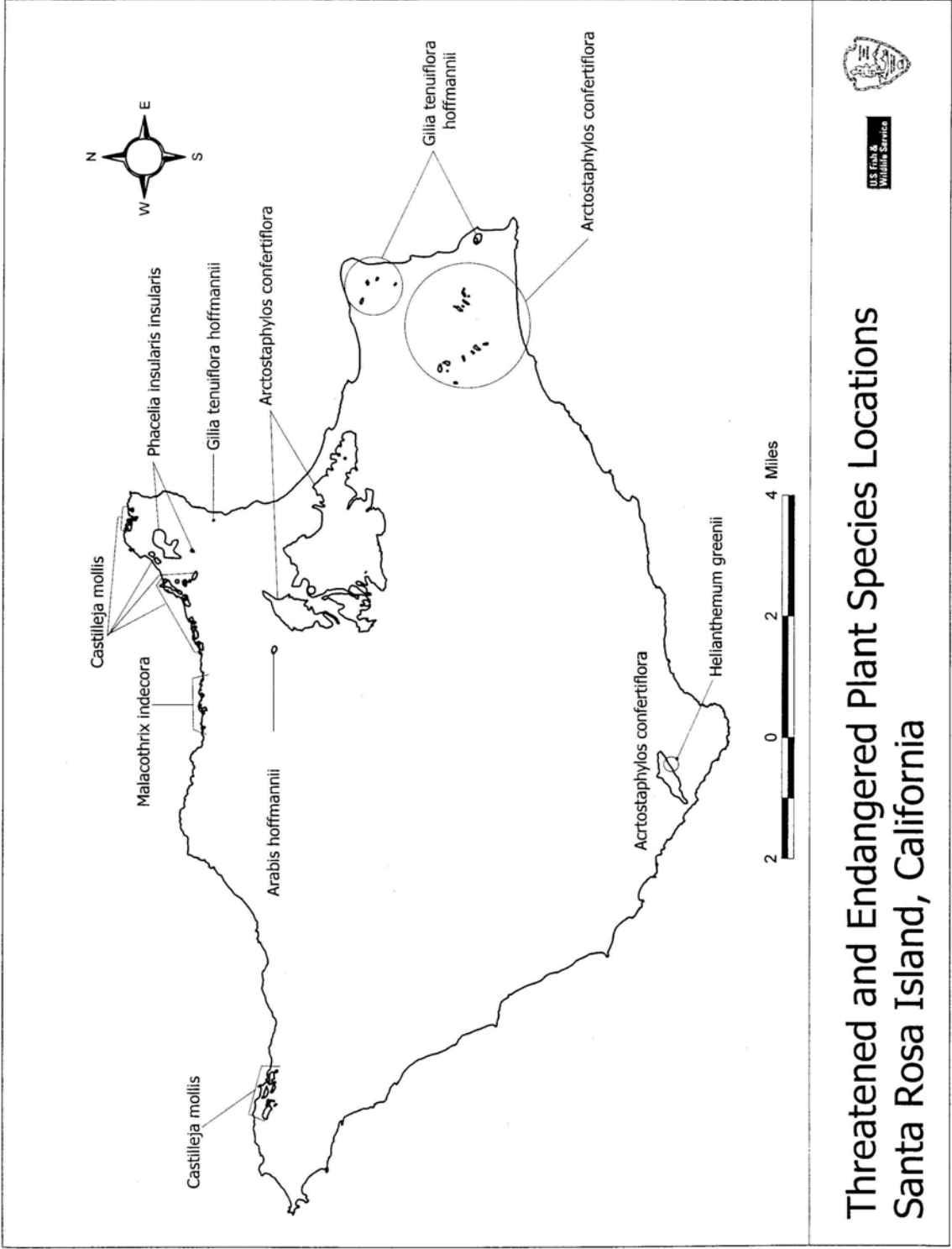
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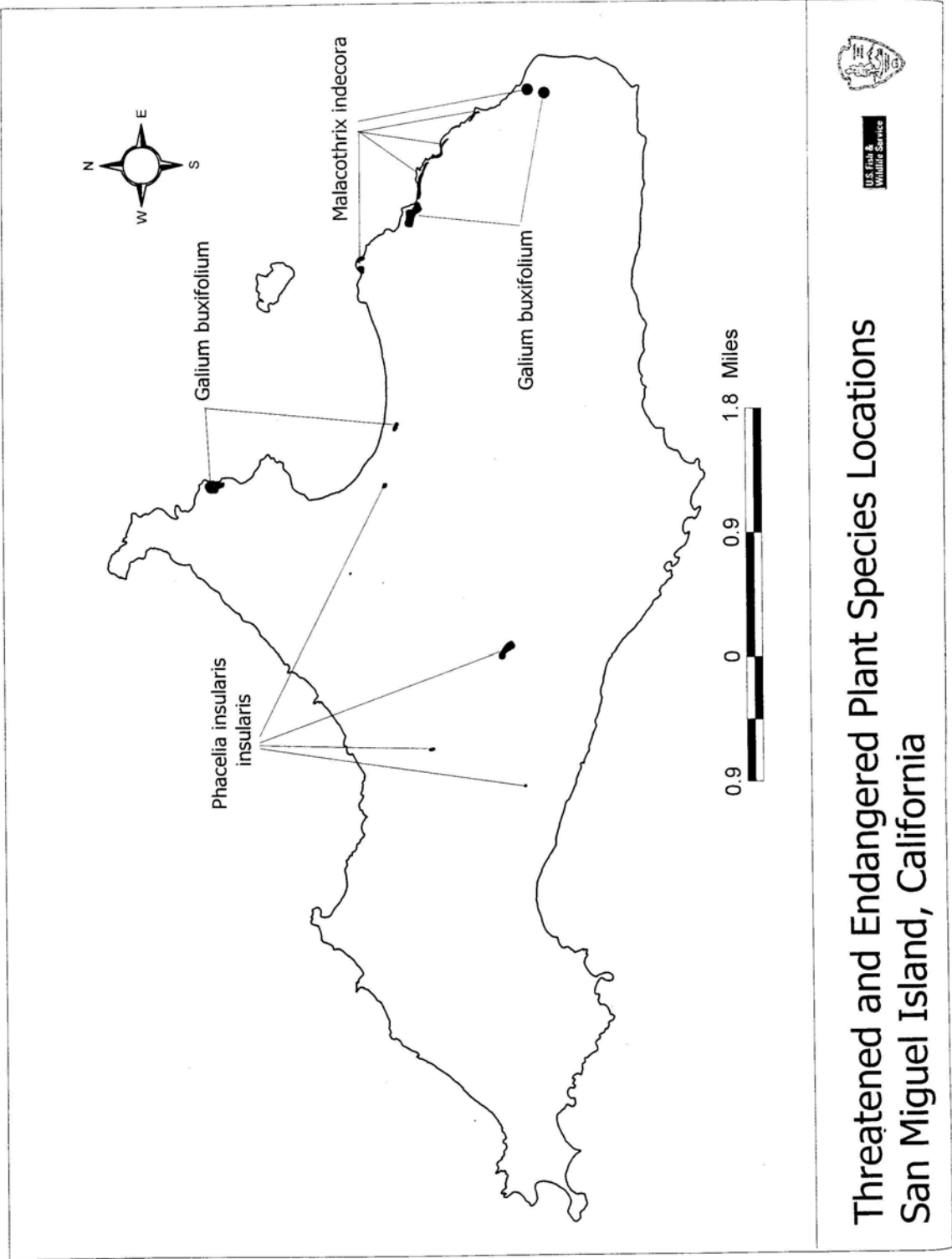
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- McEachern, K. Electronic mail dated July 26, 2007a. Senior Plant Ecologist, USGS-BRD-WERC, Channel Islands Field Station, Ventura, California.
- McEachern, K. Electronic mail with comments dated August 28, 2007b. Senior Plant Ecologist, USGS-BRD-WERC, Channel Islands Field Station, Ventura, California.

PERSONAL COMMUNICATIONS CITED

- McEachern, Kathryn. Senior Plant Ecologist, USGS-BRD-WERC, Channel Islands Field Station, Ventura, California. Phone conversation with Connie Rutherford, U.S. Fish and Wildlife Service, Ventura, California. September 25, 2007.



Threatened and Endangered Plant Species Locations Santa Rosa Island, California



**Threatened and Endangered Plant Species Locations
San Miguel Island, California**

Table 1: *Phacelia insularis* var. *insularis* counts on San Miguel and Santa Rosa Islands, USGS, 1994-2002 (Unpublished data from McEachern in litt. 2007b)

San Miguel Sites		acres	hectares	1998	2001	2002		
Bluff above Cuyler Harbor		0.29	0.12	234	154	4		
Green Mountain E/SE slopes		0.86	0.35	2653	3212	493		
1/4 mi NW of N tip Green Mtn		0.02	0.01	30	not visited	not visited		
SW end of island between Green Mtn & Tyler Bight		na	na	29	not visited	not visited		
Santa Rosa Island total counts at Carrington Point								
		acres	hectares	1994	1998	1999	2001	2002
Swale				5	78	30	161	16
Crest				30	1387	3	610	0
*Total Carrington Point population		14.9	6.03	35	1465	33	771	16
*does not include "north of road" site - found later								
2003-2006 counted in plots only, never > 500 total in pots								

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of
Island phacelia (*Phacelia insularis* var. *insularis*)

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, if applicable: N/A

Review Conducted By: Della Snyder-Velto

FIELD OFFICE APPROVAL:

Field Supervisor, Fish and Wildlife Service

Approve Diane K. Nolan Date 7/2/08

REGIONAL OFFICE APPROVAL:

Regional Director, Fish and Wildlife Service

Approve Robert M. Hayes Date 7/10/08

Acting