Island phacelia (*Phacelia insularis* var. *insularis*)

5-Year Review:
Evaluation and Summary

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

May 2025

5-YEAR REVIEW

Island phacelia (*Phacelia insularis* var. *insularis*)

GENERAL INFORMATION:

Species: *Phacelia insularis* Munz *var. insularis*
Date listed: July 31, 1997 (as *Phacelia insularis* ssp. *insularis)*
Federal Register (FR) citation: 62 FR 40954
Classification: Endangered
Critical Habitat Designation:
We have not designated critical habitat for island phacelia.
State Listing: Not listed by the State of California (CNDDB 2025b).

BACKGROUND:

Species overview:
Island phacelia (*Phacelia insularis* var. *insularis*) is an annual forb in the borage family (Boraginaceae; Walden et al. 2023). Synonyms include *Phacelia divaricata* var. *insularis*, *Phacelia curvipes* var. *insularis*, and *Phacelia insularis* subsp. *insularis*.

To distinguish the listed variety from other members of the genus, island phacelia plants are generally erect, 2–30 centimeters tall, with oblong to elliptic leaves that are entire to deeply lobed. Corollas are 6–12 millimeters (mm) wide and lavender to violet, with styles 5–6 mm long, and seeds 1–1.5 mm long. Flowering is March through April.

The plant is found on stabilized sand dunes at 50–200 meters elevation. It occurs in non-native annual grassland, usually in bare openings within the grass thatch.

The species occurs only on Santa Rosa Island and San Miguel Island in Santa Barbara County, California, each about 40 kilometers from the mainland. The islands are adjacent and separated by a channel about 6 kilometers wide. Santa Rosa Island is entirely owned by Channel Islands National Park (CINP), and San Miguel Island is owned by the U.S. Navy, but is managed by CINP. All the land is currently managed for natural resource conservation.

Both Santa Rosa Island and San Miguel Island were ranched beginning in the mid-1800s. At time of island phacelia listing in 1997, cattle, mule deer, elk, and horses were present on Santa Rosa Island; sheep and pigs had been previously removed (Service 2021 pp. 2-3). As of 2020, no non-native ungulate herbivores remain on Santa Rosa Island. San Miguel Island had non-native ungulate herbivores until the 1970s.

Most recent status review:
[Service] U.S. Fish and Wildlife Service. 2021. Island phacelia (*Phacelia insularis* var. *insularis*) 5-Year Review: Evaluation and Summary. U.S. Fish and Wildlife Service, Ventura Field Office, Ventura, California. 12 pp.

In our 2021 status review, we recommended no status change from endangered for island phacelia.

FR notice citation announcing this status review:
[Service] U.S. Fish and Wildlife Service. 2024. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 59 Pacific Southwest Species. Federal Register 89:83510-83514.

ASSESSMENT:

Information acquired since the last status review:
The U.S. Fish and Wildlife Service's (Service) Ventura Fish and Wildlife Office (VFWO) conducted this 5-year review. We announced the review through a Federal Register notice on October 16, 2024 (89 FR 83510). We did not receive any information from the public in response to our Federal Register notice. We conducted a literature search and a review of information in our files, and also contacted botanists at CINP, U.S. Geological Survey, Santa Barbara Botanic Garden (SBBG), California Institute of Environmental Studies, and other botanists to request any data or information we should consider in our review.

Island phacelia has updated information on distribution, abundance, and seed banking, and we discuss recreational impacts as a new threat.

Distribution and abundance:
Distribution: For the purposes of this 5-year review, we equate what have been called populations in previous documents to be the same as Element Occurrences (EOs) as defined by the California Natural Diversity Database (CNDDB). CNDDB defines an EO as a group of plants separated from the next group of conspecifics by at least ¼ mile (CNDDB 2018 entire). The EOs for island phacelia in CNDDB (2025) have not been updated since before the last 5-year review (Service 2021); CNDDB reports one EO on Santa Rosa Island and five on San Miguel Island. However, an additional historical record of island phacelia on San Miguel Island has been documented that can qualify as a sixth occurrence on that island. We include this record as "A" in Figure 1 and Table 1. The occurrence is vouchered by a 1966 Philbrick collection (s.n., SBBG175725), above W Simonton Cove at 325 feet elevation. We are not aware of any additional information about this occurrence.

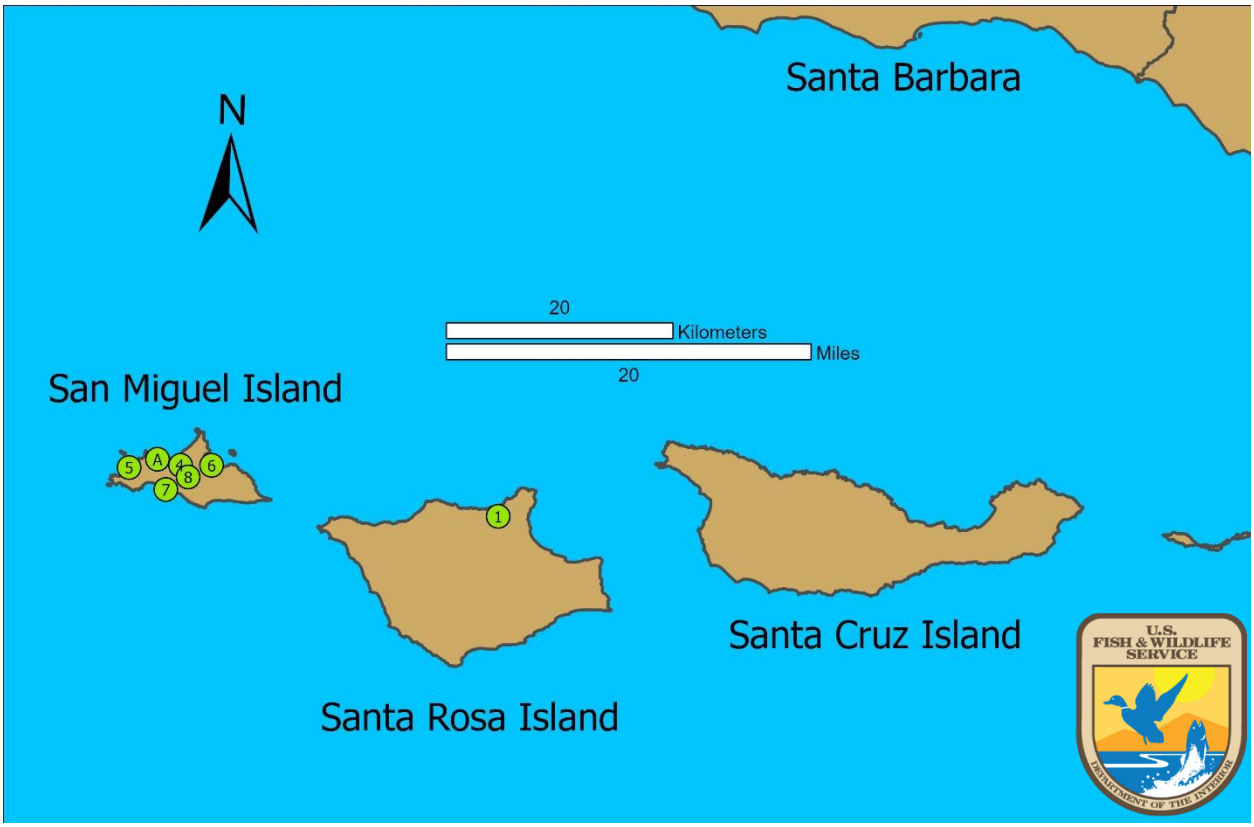

Figure 1. Distribution of island phacelia on San Miguel and Santa Rosa islands (CNDDD 2025, Service 2021, CCH2 2025). Labels correspond to CNDDB EO # in Table 1.

Table 1. Island phacelia Element Occurrences (EOs) in the California Natural Diversity Database (CNDDB), with historical (CNDDB 2025a) and more recent (McEachern 2021, McEachern and Bednar 2019, McEachern et al. 2022, McEachern and Gados 2024, Parrino 2020) plant abundance. In general, abundance is not comprehensive for an entire occurrence in a given year. Note that EO 2 and EO 3 have been collapsed into other EOs.

CNDDB EO #	island	location	year	source	# of plants
1	Santa Rosa	Carrington Point	1994	CNDDB 2025a	35
1	Santa Rosa	Carrington Point	1998	CNDDB 2025a	1465
1	Santa Rosa	Carrington Point	1999	CNDDB 2025a	33
1	Santa Rosa	Carrington Point	2001	CNDDB 2025a	771
1	Santa Rosa	Carrington Point	2002	CNDDB 2025a	16
1	Santa Rosa	Carrington Point	2003	McEachern 2021	448
1	Santa Rosa	Carrington Point	2004	McEachern 2021	370
1	Santa Rosa	Carrington Point	2005	McEachern 2021	38
1	Santa Rosa	Carrington Point	2006	McEachern 2021	2
1	Santa Rosa	Carrington Point	2007	McEachern 2021	34
1	Santa Rosa	Carrington Point	2008	McEachern 2021	440
1	Santa Rosa	Carrington Point	2010	McEachern 2021	1102
1	Santa Rosa	Carrington Point	2011	McEachern 2021	6

CNDDB EO #	island	location	year	source	# of plants
1	Santa Rosa	Carrington Point	2012	McEachern 2021	1627
1	Santa Rosa	Carrington Point	2013	McEachern 2021	73
1	Santa Rosa	Carrington Point	2014	McEachern 2021	178
1	Santa Rosa	Carrington Point	2015	McEachern 2021	615
1	Santa Rosa	Carrington Point	2016	McEachern 2021	1495
1	Santa Rosa	Carrington Point	2017	McEachern 2021	4796
1	Santa Rosa	Carrington Point	2018	McEachern 2021	149
1	Santa Rosa	Carrington Point	2019	McEachern and Bednar 2019, McEachern 2021	~3058-~3112
1	Santa Rosa	Carrington Point	2020	McEachern 2021	785
1	Santa Rosa	Carrington Point	2021	McEachern 2021	359
1	Santa Rosa	Carrington Point	2022	McEachern et al. 2022	unreported
1	Santa Rosa	Carrington Point	2023	McEachern and Gados 2024	>300
4	San Miguel	NW Green Mountain	1962	CNDDB 2025a	unrecorded
4	San Miguel	NW Green Mountain	1998	CNDDB 2025a	30
5	San Miguel	below Mammoth Springs	1978	CNDDB 2025a	unrecorded
6	San Miguel	Cuyler Harbor Bluffs	1968	CNDDB 2025a	unrecorded
6	San Miguel	Cuyler Harbor Bluffs	1995	CNDDB 2025a	unrecorded
6	San Miguel	Cuyler Harbor Bluffs	1998	CNDDB 2025a	234
6	San Miguel	Cuyler Harbor Bluffs	2001	CNDDB 2025a	154
6	San Miguel	Cuyler Harbor Bluffs	2002	CNDDB 2025a	4
6	San Miguel	Cuyler Harbor Bluffs	2015	McEachern and Bednar 2019	unrecorded
6	San Miguel	Cuyler Harbor Bluffs	2019	McEachern and Bednar 2019	0
6	San Miguel	Cuyler Harbor Bluffs	2020	Parrino 2020	80
7	San Miguel	SW slopes Green Mtn.	1998	CNDDB 2025a	29
7	San Miguel	SW slopes Green Mtn.	2019	McEachern and Bednar 2019	79
8	San Miguel	SE slopes Green Mtn.	1962	CNDDB 2025a	unrecorded
8	San Miguel	SE slopes Green Mtn.	1998	CNDDB 2025a	2653
8	San Miguel	SE slopes Green Mtn.	2001	CNDDB 2025a	3212
8	San Miguel	SE slopes Green Mtn.	2002	CNDDB 2025a	493
8	San Miguel	SE slopes Green Mtn.	2019	McEachern and Bednar 2019	727
8	San Miguel	SE slopes Green Mtn.	2020	Parrino 2020	271
8	San Miguel	SE slopes Green Mtn.	2023	McEachern and Gados 2024	>~72

CNDDB EO #	island	location	year	source	# of plants
A	San Miguel	Above W Simonton Cove, 325 feet	1966	CCH2 2025	unrecorded

Abundance: It is difficult to determine trends in the abundance of island phacelia because we lack range-wide surveys, and surveys do not necessarily occur annually, have used different or unspecified methods, or focused on only parts of an occurrence (Table 2). However, as described in the previous 5-year review (Service 2021 pp. 5-6) some patterns are seen within the single occurrence on Santa Rosa Island, EO #1 at Carrington Point, where four defined plots have been monitored almost annually from 2003 to 2021. In a majority of years, the plots show similar patterns, with all four having either relatively high or relatively low numbers of plants (Service 2021 pp. 5-6). In general, the number of plants is not correlated with total rainfall, but germination may be a response to low temperatures at the first major rainfall event (Levin et al. 2008 pp. 798-804).

Seed banking:
Conservation seed banking as reported in the California Plant Rescue (CaPR) online database has not changed since the last 5-year review (Table 3; CaPR 2025, Service 2021). However, we are aware of additional collections, both from Santa Rosa (in 2021, 2022, and 2023) and San Miguel (in 2023) (Table 3, Schneider and Carson 2022, Schneider 2024, Schneider and Hernandez 2024), all of which are housed at the Santa Barbara Botanic Garden, a Center for Plant Conservation approved facility. As in the 2021 5-year review, San Miguel Island occurrences are underrepresented both in space and time.

Table 3. Island phacelia seed conservation seed banking. All collections are housed at the Santa Barbara Botanic Garden. CNDDB = California Natural Diversity Database, EO = Element Occurrence.

CNDDB EO #	collection date	location description	by maternal line, bulked, or unknown	# maternal lines	# seeds	Source
1	5/8/2004	Santa Rosa Island	maternal line	1	unknown	CaPR 2025
1	4/2/2017	Santa Rosa Island, Crest and North of Road study plots	maternal line	37	unknown	McEachern 2018
1	4/14/2017	North of Road study plot	maternal line	37	unknown	McEachern 2028
1	4/6/2019	Santa Rosa Island, Carrington Point, ridges and swales N of long-term monitoring area	maternal line	10	484	CaPR 2025
1	4/21/2019	Santa Rosa Island, Carrington point, North of Road	maternal line	45	1425	CaPR 2025
1	4/20/2021	Santa Rosa Island	bulked	na	58	Schneider 2024

CNDDB EO #	collection date	location description	by maternal line, bulked, or unknown	# maternal lines	# seeds	Source
1	3/17/2022	Santa Rosa Island, demog. plot 1-9 at Carrington Point	maternal line	9	306	Schneider and Carson 2022, Schneider 2024
1	5/28/2022	Santa Rosa Island, Carrington Point	maternal line	47	590	Schneider and Carson 2022, Schneider 2024
1	5/26/2023	Santa Rosa Island, Carrington Pt. North of road.	maternal line	32	382	CaPR 2025
7	4/14/2019	San Miguel Island, Jackass flats area.	maternal line	51	1711	CaPR 2025
8	4/15/2019	San Miguel Island	maternal line	19	522	CaPR 2025
8	4/16/2023	San Miguel Island, Green Mtn SE	maternal line	6	unreported	Schneider 2024
8	4/16/2023	San Miguel Island, Green Mtn SE	maternal line	11	unreported	Schneider 2024
unknown	unknown	unknown	unknown	unknown	100	CaPR 2025

Seeds have also been bulked and stored for future restoration use by SBBG, with almost 35,000 seeds from 43 maternal lines produced in the nursery from 2021–2024 (Schneider and Hernandez 2024 pp.7-8). Germination rates ranged from 2–16%, and are considered low (Schneider 2024 p. 3), and are similar to previously observed experimental field germination rates (5%, Levine et al. 2011 p. 2243). A controlled-environment seed germination study to identify factors that promote increased germination is warranted; however wild seed production is so low that this has not yet been attempted (Schneider 2024 p. 3).

Threats:

At the time of its 1997 listing, island phacelia was known only from Santa Rosa Island, and had not been reported from San Miguel Island for 12 years (Service 1997 p. 4092). Threats to the species at listing were specifically identified for plants on Santa Rosa Island, but also apply to San Miguel Island. At listing, we identified the following threats to island phacelia: soil damage by non-native ungulates, habitat alteration caused by cattle grazing and elk and deer browsing, competition with non-native annual grasses, extinction from random naturally occurring events due to a limited distribution, and decreased reproductive vigor because of small population sizes. In the 2008 5-year review, we added climate change effects as a threat, and in the 2021 5-year review, we added the threat of non-native ripgut grass (*Bromus diandrus*) thatch accumulation preventing successful completion of island phacelia life cycle, and the threat of the increasing population of the non-native forb *Malva multiflora*.

The major direct threat to island phacelia, non-native ungulates, is gone, but indirect effects of these herbivores remain, especially in the conversion of the vegetation to non-native grassland. The current importance of ongoing threats is summarized below, and we consider an additional threat of impacts from increased recreational use.

Soil damage: With the complete removal of non-native ungulates from Santa Rosa and San Miguel Islands, there has been passive vegetation recovery similar to that of neighboring Santa Cruz Island (Beltran et al. 2014 entire), and there is little current indication of ongoing soil erosion in areas where island phacelia occurs. This threat has largely been minimized.

Habitat alteration caused by cattle grazing and elk and deer browsing: It is likely that the high abundance of ripgut grass, an important competitor of island phacelia at Carrington Point, is an effect of long-term herbivory by non-native ungulates. The vegetation at the island phacelia occurrences on San Miguel Island is undescribed, but is likely similar. The lingering indirect effects of residual habitat alteration from non-native ungulates remain a threat.

Competition with non-native grasses: Habitat alteration from past non-native ungulate herbivory that has resulted in an increased cover of the non-native ripgut grass (*Bromus diandrus*). Island phacelia responds negatively to the competitive effects of ripgut grass (Levine et al. 2010 pp. 134-139), which is the most common component of the vegetation at the Santa Rosa Island Carrington Point occurrence (Handley et al. 2013 p. 212), and the most common competitor of island phacelia. The relationship between the two species on San Miguel Island is unknown, but is likely similar. The threat of competition with non-native grasses remains.

Extinction from random naturally occurring events due to limited distribution: There are six known occurrences of island phacelia on San Miguel Island and one occurrence on Santa Rosa Island. Because island phacelia is limited in distribution and little is known about abundance of the species across its range, the threat of extinction from random natural events remains.

Decreased reproductive vigor because of small population sizes: Both above-ground and soil seed bank population sizes are unknown for island phacelia. At long term monitoring plots, island phacelia shows wide variation in abundance between years, with generally small numbers of reproductive plants. Experimental field germination rates at Carrington Point have been low, below 5% (Levine et al. 2011 p. 2243), and the natural number of seeds in the soil seed bank is unknown. For annual plants in variable environments, seeds in the soil can have variable and often small annual germination rates, but can remain viable in the soil for years (Pake and Venable 1996 pp. 1431-1434). Given that actual population sizes of island phacelia are unknown, and may be small, the threat of decreased reproductive vigor because of small population sizes likely remains.

Changes in precipitation and temperature: Climate change was described as a threat to island phacelia in the 2008 5-year review, and was discussed in the 2021 5-year review (Service 2021 p. 8). Changes in climate could threaten island phacelia in two ways. First, as habitat shifts with climate change, island phacelia might not be able to disperse to suitable habitat (Levine et al. 2008 p. 796). Second, the proper combination of rainfall and temperature (and other environmental cues) for germination could occur less frequently or not at all, decreasing germination of island phacelia and causing declines in abundance and possible extirpations (Levine et al. 2008 pp. 800-805; Levine et al. 2011 pp. 2241-2246). Expected climate change for the geographic region of the islands predicts both rising annual temperatures (Langridge 2018 pp. 13-15) and more episodic rainfall (Langridge 2018 pp. 16-17).

Another prediction with increasing annual temperature is an increasing dominance of vegetation by non-native annual grasses (Sandel and Dangremond 2012 entire). If ripgut grass cover increases further, both competitive effects of the grass plants and suppressing effects of its thatch (see below) are likely to increasingly negatively impact island phacelia.

Thatch: In the 2021 5-year review (Service 2021 p. 9), the accumulation of thatch (dead plants from previous years) of ripgut grass was recognized as a threat to island phacelia because it can physically suppress seedling establishment. Ripgut grass is the primary cover at Carrington Point on Santa Rosa Island (Handley et al. 2013 p. 212), and thatch accumulation can be deeper than 20 centimeters (Service 2021 p. 9). Island phacelia is primarily found in the relatively uncommon unvegetated gaps within the dense ripgut grass grassland (Levine et al. 2010 p. 132). The accumulation of thatch of ripgut grass can physically suppress native forbs to almost complete exclusion (Molinari and D'Antonio 2020 entire).

Non-native* Malva multiflora *at Carrington Point: The increasing density of the non-native forb *Malva multiflora* (previously called *Malva psuedolavatera* and *Lavatera cretica*) at Carrington Point has been recognized as a possible competitive threat to the native vegetation in which island phacelia occurs (K. McEachern, pers. comm. to K. Niessen, April 8, 2025). There have been efforts to control *Malva* numbers (NPS 2024 p. 41), and this will continue into the near future, partially supported by VFWO funding.

Impacts of increased visitor use: Visitor use of CINP is predicted to increase as the regional population and tourism increases (NPS 2015 p. 298). CINP recognizes that increasing visitor use can have negative impacts on island phacelia on Santa Rosa and San Miguel islands (NPS 2024 pp. 71-72) by both direct trampling and the spread of invasive non-native plants, and the park is planning measures to avoid and minimize impacts.

Evaluation of Recovery Criteria:
We list recovery criteria in the Recovery Plan (Service 2000 pp. 67-68).

Downlisting criteria for *Phacelia insularis* var. *insularis*

1. *Discover or establish 10 populations per island (San Miguel and Santa Rosa)*
   There is one natural population of the species on Santa Rosa Island and six populations on San Miguel Island. No new populations have been established. This criterion is partially met.
2. *Maintain stable populations for a period of 15 years that includes the normal precipitation cycle.*
   The population on Santa Rosa Island changes dramatically in abundance from year to year, as is often typical of annual plants, where the bulk of individuals are likely in the soil seed bank. Available data do not show a stable population across 15 years. Populations have not been monitored on San Miguel Island. It is likely, especially with climate change, that 15 years is not enough to evaluate trends in abundance. This criterion has not been met.
3. *Seed stored in CPC cooperating facilities.*
   There are seeds in CPC (Center for Plant Conservation) cooperating conservation seed banks, but it is not comprehensive across the species range or across years. This criterion is partially met.

4. *Seed germination and propagation techniques understood.*
   Seed germination has been studied in the field (Levine et al. 2008, 2010, 2011), and in the nursery (Schneider 2024), with studies finding relatively low germination rates. After successful germination, nursery cultivation and seed bulking have also been successful. Our previous 2021 status review considered this criterion as met, but we update this to partially met because it is not understood why germination rates are relatively low.
5. *Successful outplanting techniques developed.*
   Field planting of seeds in an experimental setting has been successful (Levine et al. 2008, 2010, 2011). This criterion has been met.
6. *Life history research conducted.*
   Levine et al. (2008, 2010, 2011) focused on life history aspects of the species. This criterion has been met.
7. *Weed management plan developed and implemented.*
   CINP does not have a weed management plan, and the non-native forb *Malva multiflora* is considered to be a threat to the species on Santa Rosa Island. This criterion has not been met.
8. *If declining, determine cause and reverse trend.*
   Data are not available to evaluate trends in abundance and if the species is declining, especially in the seed bank, although a continued decline is suspected on Santa Rosa Island. This criterion has not been met.

Delisting criteria for *Phacelia insularis* var. *insularis*

1. *Discover or establish five additional populations per island.*
   This criterion has not been met.
2. *No decline after downlisting for 10 years.*
   This criterion is not currently applicable.
3. *All potential habitat surveyed.*
   Surveys have not been conducted frequently enough on both islands to cover all potential habitat in space and time. This criterion has not been met.

Conclusion:

After reviewing the best available scientific information, and the evaluation of threats affecting the species under the factors in 4(a)(1) of the Endangered Species Act, and analysis of the status of the species, we conclude that island phacelia remains an endangered species. Survey and monitoring data have not been collected widely or regularly enough to evaluate the trajectory of the species.

RECOMMENDATIONS FOR FUTURE ACTIONS:

The following list carries over recommendations from the previous 5-year review (Service 2021), and adds an additional one (Recommendation 5).

1. Continue monitoring the Santa Rosa Island occurrence of island phacelia and establish regular surveys on both Santa Rosa and San Miguel Islands to document changes in distribution and abundance.

2. Better define suitable germination and growth microhabitat for island phacelia, especially in relationship to non-native grass *Bromus diandrus* competition and thatch accumulation, and if needed determine how to manage *Bromus diandrus*.

3. Determine efficient methods to reduce *Bromus diandrus* thatch without harming island phacelia seeds or plants.

4. Control non-native *Malva multiflora* in the Carrington Point area on Santa Rosa Island.

5. Monitor the effects of increased backcountry visitor use on island phacelia, and on the possible increase of non-native plants that could negatively affect the island phacelia.

6. Improve the completeness of coverage of island phacelia in conservation seed banks, with more occurrences over more years.

Supervisor, Ventura Fish and Wildlife Office

Approved CATHERINE DARST Digitally signed by CATHERINE DARST Date: 2025.06.02 09:45:42 -07'00'

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