# Notice of Petition

For action pursuant to Section 670.1, Title 14, California Code of Regulations and Division 3, Chapter 1.5, Article 2 of the California Fish and Game Code (Sections 2070 et seq.) relating to listing and delisting endangered and threatened species of plants and animals.

## I. SPECIES BEING PETITIONED

Small pincushion navarretia (*Navarretia myersii* ssp. *deminuta*)

## II. RECOMMENDED ACTION

Listing as endangered

This petition is to list the small pincushion navarretia (*Navarretia myersii* ssp. *deminuta*) as endangered pursuant to the California Endangered Species Act (California Fish and Game Code Sections 2050 et seq.: CESA). This petition demonstrates that the small pincushion navarretia is eligible for and warrants listing under CESA based on the factors specified in the statute and its implementing regulations. A species is an "endangered species" when it is "in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease" (California Fish and Game Code Section 2062).

The attached information supporting this petition provides sufficient information to demonstrate that the listing of small pincushion navarretia as an endangered species under CESA clearly may be warranted, i.e., the amount of information presented would lead a reasonable person to conclude that there is a substantial possibility that listing could occur.

I respectfully request the Department of Fish and Wildlife and the Fish and Game Commission make such recommendations and findings pursuant to their respective authorities (California Fish and Game Code Sections 2073.5 and 2074.2).

## III. AUTHOR OF PETITION

John C. Hunter, Ph.D.

I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Signature: 

Date: August 29, 2025

# Supporting Information for Small Pincushion Navarretia (*Navarretia myersii* ssp. *deminuta*) Petition to the California Fish and Game Commission

Prepared by John C. Hunter, Ph.D.

August 29, 2025

# Executive Summary

This document provides the scientific information required by California Fish and Game Code Section 2072.3 to demonstrate that adding small pincushion navarretia (*Navarretia myersii* subspecies [ssp.] *deminuta*) to the list of endangered species under the California Endangered Species Act (CESA) may be warranted.

**Population Trend.** Small pincushion navarretia is believed to have declined substantially and to have a downward trend because of loss and degradation of occupied habitat.

**Range.** The range of small pincushion navarretia encompasses < 1 square kilometer (<1 square mile) at 355 meters (1,165 feet) in elevation in Lake County.

**Distribution.** Small pincushion navarretia has only one documented occurrence (occupied site).

**Abundance.** At the one known occurrence of small pincushion navarretia, approximately 25,000 plants were observed in 1993. The area of occupied habitat can also be a useful indicator of and it is estimated to be less than 7.2 hectares (17.7 acres).[1]

**Life History.** Small pincushion navarretia is an annual herb in the Polemoniaceae (the phlox family).

**Kind of Habitat Necessary for Survival.** Small pincushion navarretia grows in vernal pools and swales.

**Factors Affecting the Ability to Survive and Reproduce (Threats).** The primary threats are from agricultural and developed land uses, invasive plants, and climate change.

**Degree and Immediacy of Threat.** Without protective measures, there is a moderate to high likelihood that small pincushion navarretia will be extirpated from much of its range or become extinct because:

- It is known from only a single occurrence.
- It is exposed to ongoing and increasing threats.
- The only known occurrence is unprotected leaving small pincushion navarretia more vulnerable to extinction caused by random and human-caused events (and by ongoing threats).

**Impact of Existing Management Efforts.** To date, management of small pincushion navarretia has been very limited. It has no legal protections that mandate contributions to its recovery or full mitigation of impacts, its only known occurrence has not been preserved and is not being formally monitored, and research has not been conducted on its ecology.

**Suggestions for Future Management.** Suggestions for future management include listing small pincushion navarretia as endangered under CESA and conserving its remaining occurrence. Thirteen suggestions are provided for future management actions. Many of these suggested actions are also described in the U.S. Fish and Wildlife Service's *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (2005), which included small pincushion navarretia as a species of concern.

**References** and a **detailed distribution map** are also provided.

[1] Estimate is the mapped area of the only known occurrence of small pincushion navarretia. This is an overestimate and that includes some areas f nonhabitat..

The scientific information in the following sections demonstrates that adding small pincushion navarretia (*Navarretia myersii* subspecies [ssp.] *deminuta*) to the list of endangered species under the California Endangered Species Act (CESA) may be warranted.

Based on much of the same information, NatureServe, in collaboration with the California Department of Fish and Wildlife (CDFW) and the California Native Plant Society (CNPS), has concluded that small pincushion navarretia is imperiled. Similarly, CNPS, in collaboration with CDFW, has concluded that it is rare or endangered and seriously threatened (CNPS 2025; CDFW 2024a).

NatureServe defines "Imperiled" (Global Conservation Status 2 [G2]) as being at high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors (NatureServe 2012a). NatureServe designates species as G2 based on a score calculated from variables whose values are determined in collaboration with CDFW and CNPS (NatureServe 2012b).

CNPS and CDFW define the rank of "rare or endangered" (California Rare Plant Rank [CRPR] 1B) as plant species which are rare, threatened, or endangered in California and elsewhere (CNPS 2024, CDFW 2024a). These plant species are rare throughout their range, with the majority, like small pincushion navarretia, also being endemic to California. Most of the plant species that are CRPR 1B have declined significantly over the last century. CNPS has concluded that a subset of CRPR 1B plant species (rank 1B.1) is "seriously threatened in California" (the highest level of threat) because over 80 percent of their occurrences are threatened or the species otherwise has a high degree and immediacy of threat (CNPS 2024). CNPS uses staff botanists and a committee of agency, academic, other professional, and amateur botanists to assign and periodically reevaluate these rankings in collaboration with CDFW. Please note that CDFW identifies all CRPR 1B species as taxa that may meet the requirements for CESA listing (CDFW 2024a).

To make their conclusions, CNPS and NatureServe use the best available scientific information regarding population trend, range, distribution, abundance, life history, habitat, threats, and management efforts, much of which CDFW has compiled in the California Natural Diversity Database (CNDDB) (CDFW 2024b).

To provide sufficient scientific information to support this petition, a summary of the relevant information compiled, maintained, and distributed by CDFW, CNPS, and NatureServe is provided below; this information is augmented by information from:

- Datasets developed and maintained by the California Consortium of Herbaria (CCH), California Governor's Office of Land Use and Climate Innovation, California Invasive Plant Council (Cal-IPC), GreenInfo Network (GIN), and Natural Resources Conservation Service (NRCS)
- Aerial imagery
- Scientific and other technical literature
- Scientists and other knowledgeable individuals

Information regarding each topic required by California Fish and Game Code Section 2072.3 is provided in a separate section below in the same order as in the code.

## A. Population Trend

Small pincushion navarretia has likely had a historically decreasing population trend because of loss and degradation of vernal pool landscapes including at the one site it is known to occupy (its one occurrence).[2] However, its current population trend is uncertain and may be decreasing or stable.

Small pincushion navarretia is only known from a single occupied site (occurrence) in the southern portion of a large vernal pool complex in Long Valley in Lake County. This valley extends from Middletown to low hills about 4–5 kilometers (2.5–3 miles) to the southeast. Throughout much of this valley, vernal pools and swales are visible in aerial imagery (Google Earth 2025).

This vernal pool landscape within Long Valley has been substantially altered (Google Earth 2025). These human-caused changes not only include conversion of natural lands to agricultural and developed land (e.g., roads, rural residences, irrigated pastures), but also the introduction of livestock and invasive plant species, and the alteration of hydrology (e.g., by the construction of impoundments and roads). One notable change is improvement of Callayomi Road, which bounds the occurrence to the southeast and occurs upgradient of the vernal pool complex occupied by small pincushion navarretia. In the early 1990s, around the time that small pincushion navarrettia was first observed, Callayomi Road appeared to be an unimproved dirt road. However, between 2004 and 2005, this road appears to have been significantly improved (i.e., graded and graveled) (Google Earth 2025), which likely reduced or removed overland and swale flows downgradient to the vernal pool complex which supports the only known occurrence of this species.

It is likely that small pincushion navarretia has been affected by these local changes. Furthermore, most vernal pool landscapes have undergone similar alterations and most have been eliminated entirely (Solomeshch et al. 2007). Therefore, undocumented occurrences, if any, also are likely to have been impacted.

Nonetheless, no recent monitoring of the site where small pincushion navarretia persists has been conducted, as this occurrence is on private property. Therefore, the current population trend is uncertain.

[2] An occurrence (also referred to as an element occurrence) is a specific location where a plant included in the CNDDB (a plant element) has been known to occur, and that has practical conservation value. In general, any location with an observation of the plant will be turned into an occurrence since the location a plant is found is also where reproduction and important life history events take place (CDFW 2020).

## B. Range

Small pincushion navarretia is a California endemic with a very small range in the Inner North Coast Ranges (Johnson 2013). Its range comprises approximately 1 square kilometer (<1 square mile) in Lake County at 355 meters (1,165 feet) of elevation (CDFW 2024b, CNPS 2025).[3][4]

As calculated, this range is comparable to the "extent of occurrence" (EOO) that is used by the International Union for the Conservation of Nature (IUCN) as an indicator of extinction risk (IUCN 2024, Bachman et al. 2011).[5] The rationale for using EOO as an indicator of extinction risk is that many human-caused threats and natural events are more likely to cause similar effects at sites that are closer together than those further apart.

## C. Distribution

Small pincushion navarretia is known from only one occurrence (Occurrence 1) where it was documented in 1992 (CDFW 2024b). This site is a "nonspecific" occurrence, whose boundaries are not all precisely known. It is bounded to the southeast by Callayomi Road and to the north by Butts Canyon Road.

Small pincushion navarretia may be growing at few or possibly no additional, undocumented sites because it is restricted to a habitat of limited extent regionally and no additional occurrences have been documented during botanical surveys in the past 32 years. For example, small pincushion navarretia was not observed in vernal pools during botanical surveys for the 16,000-acre Guenoc Valley Mixed-Use Planned Development Project, which is located 3.2 kilometers (two miles) down Butts Canyon Road at the eastern end of Long Valley (Lake County Community Development Department 2024).

If any undocumented sites exist, they would likely be unprotected because most preserved sites have been surveyed for the species, and any undocumented sites would likely be exposed to similar threats because most remaining vernal pool habitat is exposed to these threats (U.S. Fish and Wildlife Service [USFWS] 2005).

The species' distribution is mapped in Section L, "Detailed Distribution Map."

[3] The extent of the species' range was calculated as the minimum convex polygon encompassing all occurrences documented in the CNDDB, including extirpated occurrences and occurrences with nonspecific locations.
[4] In 1997, an herbarium specimen labelled as small pincushion navarretia was collected in Butte County (CCH 2024). However, the identification is questionable (Johnson 2019).
[5] The IUCN consists of approximately 1,400 governmental and non-governmental organizations from more than 170 countries.

## D. Abundance

In 1992, approximately 25,000 small pincushion navarretia plants were observed at the species' only known occurrence (CDFW 2024b). No other observations of its abundance are reported in the CNDDB.

Because multi-year monitoring of small pincushion navarretia has not been conducted at this site, a rigorous estimate of its current abundance cannot be made. In general, however, the size of a plant population is difficult to estimate because of seasonal and interannual fluctuations in numbers, challenges in distinguishing one individual from another, and the vast size differences among individuals. For example, because it is an annual plant of vernal pools, whose variable hydrology determines habitat conditions, the abundance of small pincushion navarretia likely varies dramatically from year to year.

In contrast, the area of occupied habitat is less problematic to estimate and can be a useful indicator of abundance. The mapped area of CNDDB occurrences represents the maximum extent of occupied habitat because (1) it encompasses all occupied habitat that has been documented, and (2) only a portion of it is occupied. [6] The only site known to be occupied by small pincushion navarretia (Occurrence 1) is mapped as a "nonspecific" occurrence, whose boundaries are not precisely known. It has a mapped area of approximately 7 hectares (18 acres) (CDFW 2024b). Therefore, the total extent of habitat occupied by small pincushion navarretia would be less than 7 hectares (18 acres).

As calculated, area of occupied habitat is similar to "area of occupancy" (AOO) that is used by the IUCN as an indicator of extinction risk (IUCN 2024).[7] The rationale for using AOO as an indicator of extinction risk is that species occupying more or larger areas are less likely to have all occupied areas affected by a specific threat than a species occupying fewer, smaller areas. Also, there is a generally positive relationship between AOO and population size.

## E. Life History

This section provides the species' nomenclature, a description of its morphology, and a summary of available, relevant information on its reproduction and growth.

[6] There are both ecological and methodological reasons why the species does not occupy the entire mapped area of an occurrence. Species only occupy areas to which their seed disperse and that are suitable for germination, growth, and survival, and for rare species such areas may account for only a small portion of an "occupied" site. Also, in the CNDDB, even specific occurrences include areas of nonhabitat. For example, many specific occurrences are point locations buffered by 80 m (262 ft), and the resulting 2-hectare (5-acre) area is usually much larger than the area occupied by the species. Furthermore, occupied sites documented in the CNDDB often have not been visited by a botanist for more than 10 or 20 years (or even longer), and during that time interval, habitat loss may have occurred.

[7] IUCN guidelines are to calculate AOO using presence in cells of a grid of 4 kilometer$^2$ (1.5 mile$^2$) cells, which is a coarser scale than used here (IUCN 2024).

## Nomenclature and Taxonomy

The Jepson eFlora currently recognizes *Navarretia myersii* P.S. Allen & A.G. Day subsp. *deminuta* A.G. Day as the scientific name of small pincushion navarretia (Jepson Flora Project 2024).

## Species Description

Small pincushion navarretia is in the Polemoniaceae (the phlox family). Below is a description of its morphology based on the treatment of the taxa in the Jepson eFlora (Johnson 2013) and its original description (Day 1995).

- Habit—small pincushion navarretia is a prostrate annual herb.
- Stem—the stems are less than 2 cm (0.8 inches) in length, with few or no branches. The stem can be glabrous (smooth) or puberulent (covered with minute, soft hairs), with the hairs being recurved (bent backward).
- Leaf—the leaves are generally spreading from the base of the central flower head and measure 4 to 8 cm (1.6–3.1) in length. The leaves are pinnately lobed, with a linear axis and a membrane-winged base. The lobes are few and are generally concentrated in the lower half of the leaf. The lobes are linear in shape.
- Inflorescence—the inflorescence is typically solitary, sessile (without a noticeable stalk), or borne on a prostrate peduncle (flower stalk). The inflorescence is 1 to 2 cm (0.4–0.8 inches) wide. The outer bracts are leaf-like and larger than the flower head, with lobes near the base and few to no lobes above the middle. The basal wings of the outer bracts are hairy. The inner bracts are smaller than the flower head, with ciliate (fringed with hairs) basal wings. The flowers are sessile and occur in groups of 5 to 60.
- Flower—the calyx tube and lobes are equal in length, with five long-hairy calyx lobes that are gland-dotted below and tapered but glabrous (smooth) above. The calyx membranes are truncate (ending abruptly) and ciliate. The corolla is 1.2 to 1.4 cm (0.5–0.6 inches) long, with the tube being 1 to 1.2 times the length of the calyx. The corolla is blue, with a thread-like tube and a cup-shaped throat. The corolla has 5 lobes that are 0.25 to 0.3 cm (0.08–0.12 inches) long, linear to narrowly ovate in shape. There are five stamens, which are exserted (extending beyond the corolla), as is the style. The stigmas are small and divided into two lobes.
- Fruit—the fruit is an indehiscent capsule.
- Seed—the seeds are brown and gelatinous when wet. Each fruit contains 4 to 6 seeds.

## Similar Species

*Navarretia meyersii* ssp. *meyersii* (pincushion navarretia) and *N. prostrata* (prostrate navarretia) are the most similar taxa to small pincushion navarretia, but both are morphologically distinct and geographically isolated from small pincushion navarretia. Pincushion navarretia, which occurs in the eastern Central Valley has a 1.7–2.1 cm (0.67–0.83 inch) long corolla (the fused petals), white flower, and yellow pollen, whereas small pincushion navarretia has a 1.2–1.3-cm (0.47–0.51-inch)

long corolla, blue flower, and white pollen (Day 1995). Prostrate navarretia, which occurs in southern and west central California, can have white or blue flowers and white pollen, but the length of its corolla is only 0.6–0.9 cm (Day 1995).

### Reproduction and Growth

As noted above, small pincushion navarretia is an annual herb. It blooms during April–May (CNPS 2025). Its pollen-to-ovule ratio indicates that it is a predominantly to obligately outcrossing species (Spencer and Reiseberg 1998). The predominant pollinators are not known. The inflorescence containing the mature fruits (capsules) does not readily shatter, and the capsules do not open until the seeds inside them become wet and their surface layer expands, which breaks open the capsule (Spencer and Reiseberg 1998). Dispersal mechanisms for the gelatinous seeds are not known but may include gravity, water, and animals. The species' seeds germinate readily after experiencing cold, wet, low light conditions (Spencer and Reiseberg 1998).

## F. Kind of Habitat Necessary for Survival

Vernal pools and swales provide habitat for small pincushion navarretia (CCH 2024, CNPS 2025, CDFW 2024b). The species is known from a single vernal pool complex in a landscape of vernal pools and swales in Long Valley, Lake County. Most of this landscape is underlain by a terrace soil (Mocho Variant Loam) or a basin soil (Maxwell Clay Loam) with various hillslope soils at the transition to the surrounding hills (NRCS 2025, University of California Davis et al. no Date). The occurrence of small pincushion navarretia is underlain by Mocho Variant Loam. In that site's vernal pools and swales, it grows in sparse, shorter vegetation lower in the pools. Examples of species recorded as co-occurring in these pools and swales are toad rush (*Juncus bufonius*), maroonspot calicoflower (*Downingia concolor*), woolly-marbles (*Psilocarphus* species), and Jepson's button-celery (*Eryngium aristulatum*). The surrounding grassland is dominated by nonnative, invasive, annual grasses including Mediterranean barley (*Hordeum marinum*), medusahead (*Elymus caput-medusae*), soft chess (*Bromus hordeaceus*), and rye grass (*Festuca perennis*).

## G. Factors Affecting the Ability to Survive and Reproduce (Threats)

This section describes the factors (threats) resulting from human actions that have been, or likely will be, substantially reducing the survival and reproduction of small pincushion navarretia, primarily by degrading or eliminating occupied habitat.[8] The primary threats are conversion of habitat to agricultural or developed uses, climate change, and the spread of invasive species. Each of these threats is described in a separate section below.

[8] Numerous factors affect the ability of a plant to reproduce, grow, and survive, including interactions with pollinators, dispersal agents, seed predators, diseases, herbivores, and fungal symbiotes; availability of habitats with suitable conditions and sufficient resources; and events such as fires that can cause mortality but also provide opportunities for establishment and growth. This section focuses on those factors resulting from human actions that have been, or likely will be, substantially reducing reproduction and survival.

## Agricultural and Developed Land Uses

Expansion of agricultural and developed land uses not only directly eliminates habitat but also fragments and increases threats to the remaining habitat. In fact, many types of threats listed in the CNDDB are caused primarily by nearby agricultural and developed land uses (e.g., biocides, erosion/runoff, and off-road vehicle (ORV) damage). Occurrences fragmented by (and those near) agricultural and developed land uses are likely being impacted through any of several mechanisms (Collinge 2009, Honnay et al. 2005, Aquilar et al. 2019, Hansen et al. 2005, Ramalho et al. 2014).

To date, agricultural and developed land uses have impacted a considerable portion of the vernal pool landscape of Long Valley, where small pincushion navarretia has been observed growing in one small area (approximately 7.2 hectares [17.7 acres]). The valley is crossed by several roads and subdivided into several dozen parcels most of which are zoned rural residential (Lake County Community Development Department 2025, California Governor's Office of Land Use and Climate Innovation 2025). There are structures on more than a third of these parcels scattered throughout the valley. There also are some graded features (such as impoundments).

The small pincushion navarretia occurrence is mapped on two parcels. More than two-thirds of the occurrence is on an approximately 42-acre parcel that is undeveloped but bordered by two roads, and the remaining portion is on an approximately 16-acre parcel with several structures. Both parcels are zoned rural residential (Lake County Community Development Department 2025, California Governor's Office of Land Use and Climate Innovation 2025). Five of the ten surrounding parcels have been developed (with low density development).

One notable change that likely has affected vernal pools at this site is the improvement of Callayomi Road. This road bounds the occurrence to the southeast and is upgradient from the vernal pool complex occupied by small pincushion navarettia. In the early 1990s, Callayomi Road appeared to be an unimproved dirt road (Google Earth 2025). However, between 2004 and 2005, this road appears to have been significantly improved (i.e., graded and graveled), which likely reduced or removed overland and swale flows downgradient to the occupied vernal pools.

Review of available aerial imagery from 1993 to 2023 indicates that agricultural and developed land uses have increased slowly (Google Earth 2025). However, construction of the nearby Guenoc Valley Mixed-Use Planned Development Project could increase the rate of change. This project would be located approximately 3.2 kilometers (two miles) from the small navarretia occurrence. It would construct up to 400 hotel rooms, 450 resort residential units, 1,400 residential estates, and 500 workforce co-housing units (Lake County Community Development Department 2024). The resulting dramatic increase in residents, visitors, and workers in this sparsely settled area would increase the likelihood that the remaining undeveloped parcels in Long Valley, including the one containing most of the small pincushion navarretia occurrence, would be developed in the foreseeable future.

## Climate Change

Climate change directly and indirectly threatens small pincushion navarretia by altering growing conditions, water availability, and frequency and intensity of disturbances, and by altering

interactions of the plant with pollinators, dispersers, fungal symbionts, seed predators, herbivores, and competitors.[9] These consequences of climate change may also magnify the impacts of other threats.

The magnitude of climate change impacts on small pincushion navarretia is uncertain but may be substantial, particularly because of the species' limited range, rarity, habitat specificity, and distribution in relatively small and isolated areas that will be exposed to dramatic changes. The vulnerability of small pincushion navarretia to climate change has not been directly assessed.[10] However, vernal pool habitats, including those occupied by small pincushion navarretia, are inherently sensitive to temperature and the timing and amount of precipitation (Pyke 2004, 2005). Also, in an analysis of California's endemics, Loarie et al. (2008) predicted that, under some scenarios, climate change will considerably reduce the number of endemic plant species growing in what is currently the range of small pincushion navarretia.

## Invasive Species

In the CNDDB occurrence notes, invasive plant species are not identified as a threat to small pincushion navarretia (CDFW 2024b). However, invasive species may be a significant threat currently or in the foreseeable future. First, invasive grasses, such as rye grass, already co-occur with small pincushion navarretia (CCH 2024, CDFW 2024b). Second, dozens of invasive species that substantially impact ecosystem processes and vegetation are spreading in the range of small pincushion navarretia in the vegetation types that provide its habitat (Cal-IPC 2025).[11] Of particular concern is low manna grass (*Glyceria declinata*), which has become abundant in Central Valley vernal pools and is present in the region (Gerlach et al. 2009).

Invasive grasses are widespread and abundant in vernal pool landscapes, including at the small pincushion navarretia occurrence. Their impact on the abundance and diversity of vernal pool species is substantial. The impact of invasive grasses is greater where livestock grazing has ceased (Marty 2005, Micheals et al. 2022), and livestock grazing often ceases when landscapes become fragmented by agricultural and developed land uses, as has been happening in Long Valley where the only occurrence of small pincushion navarretia has been documented.

Not only could infestations of these invasive species extirpate small pincushion navarretia from its only known site by their direct effects on conditions or resources, but also by reducing its population size and thus making small pincushion navarretia more vulnerable to extirpation from other causes (Seabloom et al. 2006, Gilbert and Levine 2013).

[9] The CNDDB does not include climate change in its standardized list of types of threats, and therefore, in the CNDDB, climate change is not identified as a threat to any species.
[10] "Vulnerability" to climate change is a product of exposure and sensitivity to changes in climate.
[11] Based on the number of invasive plants with a "high" or "moderate" impact rating in the Cal-IPC Invasive Plant Inventory (Cal-IPC 2025) whose range includes the same Jepson subregion(s) where small pincushion navarretia occurs and affect vegetation types that may provide habitat for it.

## H. Degree and Immediacy of Threat

Without additional management actions, there is a moderate to high likelihood that small pincushion navarretia will be extirpated from much of its range or become extinct because:

- It is known from only a single occurrence.
- It is exposed to ongoing and increasing threats.
- The only known occurrence is unprotected leaving small pincushion navarretia more vulnerable to random and human-caused events and threats that are ongoing and increasing.

Below, these three reasons are described further.

### Small Number and Size of Occupied Sites

Species existing at small numbers of sites that are small in area and have few individuals are more vulnerable to extinction than species with more extensive distributions and larger population sizes. The smaller the number of occupied sites the greater the consequences for the species of site-specific random events or human actions. Also, occupied sites that are smaller in area and have fewer individuals are more vulnerable to extirpation by random events and human actions (e.g., Matthies et al. 2004, Vörös et al. 2025).

As described previously, small pincushion navarretia has a restricted distribution with only one documented occurrence that occupies approximately 7.2 hectares (17.7 acres). Therefore, small pincushion navarretia is highly vulnerable to extinction from site-specific random events and human actions.

### Ongoing and Increasing Threats

As described in the preceding section, the only known occurrence of small pincushion navarretia is exposed to ongoing and increasing threats. Its occurrence is mapped on two parcels, one of which is already developed at a low density (Google Earth 2025). These parcels are zoned rural residential and bordered by two roads (California Governor's Office of Land Use and Climate Innovation 2025, Google Earth 2025). The surrounding vernal pool landscape has become fragmented by roads and scattered development (Google Earth 2025), degrading the remaining natural vegetation through multiple mechanisms. In addition to the threats of habitat degradation or loss from incompatible management or development, the occurrence is vulnerable to climate change and invasive species have already spread onto the site. Furthermore, the threats of invasive species and climate change are likely to increase.

### Lack of Protection and Management

The known occurrence of small pincushion navarretia is unprotected (GIN 2024a, b). At unprotected sites, ongoing threats are rarely addressed and management actions to conserve species are rarely implemented. Consequently, because it is unprotected, the only known occurrence of small pincushion navarretia is more vulnerable to the random and human-caused events and ongoing threats described above, which could result in the species' extinction.

# I. Impact of Existing Management Efforts

To date, management of small pincushion navarretia has been very limited, has not sufficiently addressed the threats described in Section G, "Factors Affecting the Ability to Survive and Reproduce (Threats)," and consequently has not resulted in significant conservation of the species. Below, this management is summarized by general type of action: legal protection, preservation and seed banking, management and monitoring, restoration, and surveys and research.

## Legal Protection

Small pincushion navarretia has no legal protections that mandate avoidance of impacts, full mitigation of impacts, consultations with regulatory agencies, or contributions to the species' recovery. It is not listed under CESA or the federal Endangered Species Act. It also is not covered by any natural community conservation plans (NCCPs) or habitat conservation plans (HCPs).

However, because CDFW has designated small pincushion navarretia a CRPR 1B.1 species, it should be treated as a special-status species during environmental review under the California Environmental Quality Act (CEQA) (i.e., as a species that may meet the requirements for CESA listing [CDFW 2024a]). Although CEQA requires lead agencies to adopt feasible avoidance, minimization, and mitigation measures to reduce impacts of nonexempt projects, it does not require that impacts on special-status species be avoided, fully mitigated, or even reduced to a less-than-significant level (if impacts are considered significant and unavoidable).

## Preservation and Seed Banking

The only known occurrence of small pincushion navarretia has not been preserved (GIN 2024a, b).

Seeds of small pincushion navarretia have not been collected and placed in long-term storage at a seed-banking facility (CNPS 2025).

## Management and Monitoring

No formal monitoring of the one known occurrence of small pincushion navarretia is being conducted.[12]

## Restoration

Efforts have not been made to restore or create habitat occupied by small pincushion navarretia.[13]

## Surveys and Research

Surveys of the one known occurrence of pincushion navarretia, which is on private property, have not been reported to the CNDDB since 1998 (CDFW 2024b, CNPS 2025). Furthermore, range-wide surveys of potential habitat have not been conducted to determine if small pincushion navarretia occupies any additional, undocumented sites. However, some botanical surveys of areas with

[12] Based on a review of publicly available information.
[13] Based on a review of publicly available information.

potential habitat have been conducted (e.g., for the 16,000-acre Guenoc Valley Mixed-Use Planned Development Project).

Research has not been conducted on the species' genetic diversity, pollination, dispersal, establishment, growth, mortality, interactions with other species, population dynamics, habitat requirements, or other aspects of its ecology.[14] Consequently, understanding of the species' ecology is based primarily on observations by botanists and understanding of the ecology of related and similar species.

## J. Suggestions for Future Management

Successful conservation of small pincushion navarretia requires additional legal protection, preservation and seed banking, management and monitoring, restoration, and surveys and research. Many of these actions are described in USFWS' *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005), which included small pincushion navarretia as a species of concern, and suggestions for each of these general types of management actions are provided below.

### Legal Protection

- List the species under CESA and prepare a recovery plan pursuant to California Fish and Game Code Section 2079.1.
- Include small pincushion navarretia as a focal species in any regional conservation investment strategy (RCIS) and as a covered species in any NCCP that includes its range.

### Preservation and Seed Banking

- Preserve the known occurrence in perpetuity.
- Collect seed and place it in long-term storage at a seed-banking facility associated with the Center for Plant Conservation.

### Management and Monitoring

- Develop and implement a site-specific management plan for ensuring the long-term viability of small pincushion navarretia. This plan should include practices for monitoring, criteria for evaluating management, and potential management actions.
- Manage the known occurrence to prevent spread of invasive species and to eradicate existing infestations.
- Implement grazing practices that are compatible with or contribute to persistence of small pincushion navarretia.

[14] Based on a review of publicly available information.

- Establish a memorandum of understanding (MOU) with Lake County Department of Public Works regarding road maintenance activities potentially affecting occupied habitat.
- Coordinate and share information among organizations working to conserve small pincushion navarretia, including CDFW and CNPS.

### Restoration

- Restore occupied habitat that has been degraded by past impacts.
- Establish additional populations at sites with suitable habitat, with a preference given to sites that will be provided with long-term protection and targeted monitoring and management of the species.

### Surveys and Research

- Conduct surveys to improve data on abundance, and search potentially suitable habitat for additional, undocumented populations of small pincushion navarretia.
- Investigate the species' reproduction, population ecology, and habitat requirements to inform conservation and management (e.g., important pollinators, seedbank dynamics).

## K. Availability and Sources of Information

This document is based on available sources of information (i.e., publications and publicly distributed data) and communications with experts. This section provides a reference for each of these sources of information.

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## L. Detailed Distribution Map

Figure 2 provides a detailed map of the distribution of small pincushion navarretia that displays:

- The locations where the species has been documented, labelled with its CNDDB occurrence number
- Natural, agricultural, and developed land cover

Please note that the species may occur at unknown, undocumented sites that are not displayed on this map.

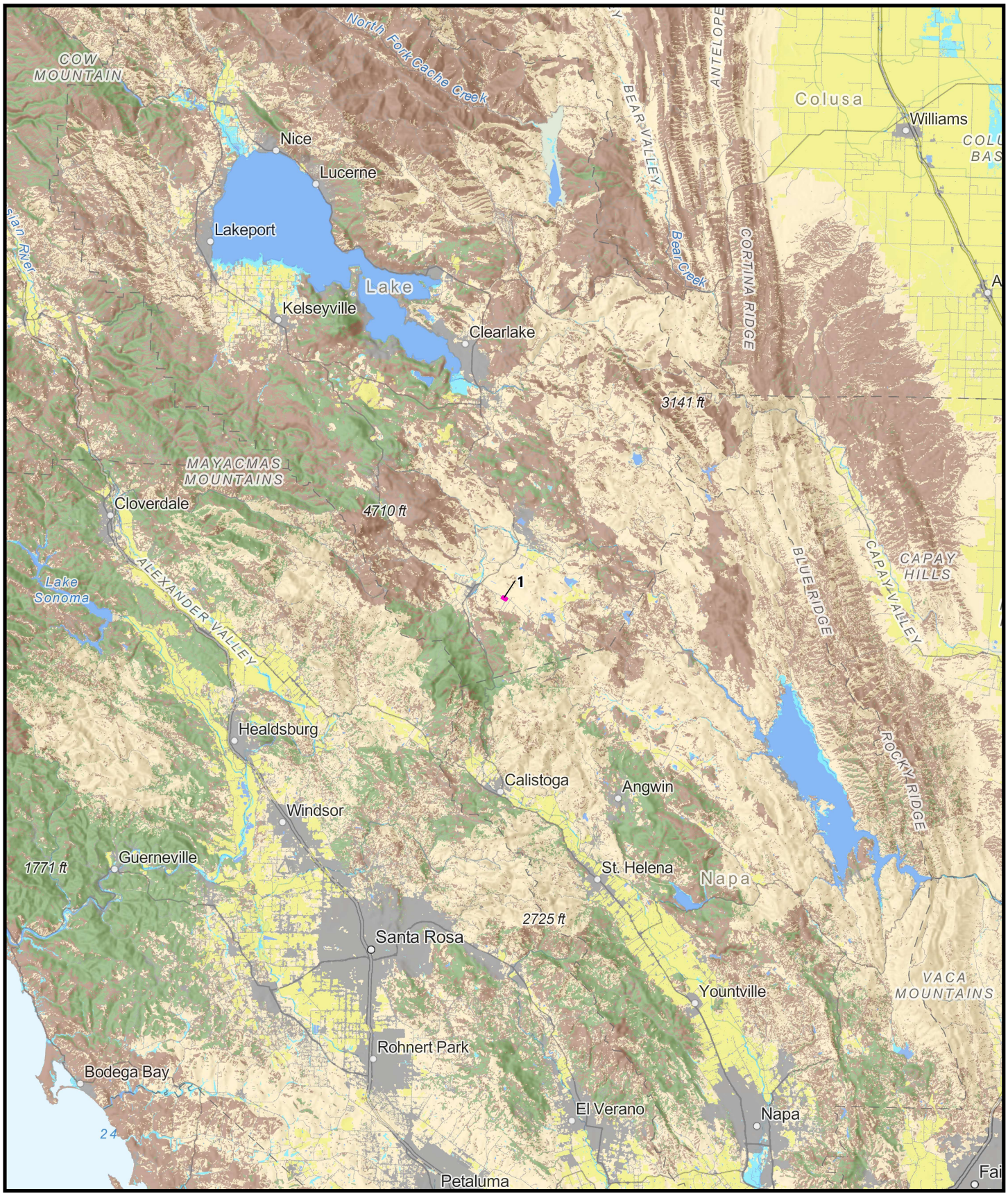


**Figure 2**
***Navarretia myersii* ssp. *deminuta***

## Abbreviations and Acronyms

| | |
|---|---|
| AOO | area of occupancy |
| Cal-IPC | California Invasive Plant Council |
| CCH | California Consortium of Herbaria |
| CDFW | California Department of Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| cm | centimeters |
| CNDDB | California Natural Diversity Database |
| CNPS | California Native Plant Society |
| CRPR | California Rare Plant Rank |
| EOO | extent of occurrence |
| G1 | Global Conservation Status Rank 1, Critically Imperiled |
| GIN | GreenInfo Network |
| HCP | habitat conservation plan |
| IUCN | International Union for the Conservation of Nature |
| MOU | memorandum of understanding |
| NCCP | natural community conservation plan |
| NRCS | Natural Resources Conservation Service |
| ORV | off-road vehicle |
| RCIS | regional conservation investment strategy |
| ssp. | subspecies |
| USFWS | U.S. Fish and Wildlife Service |