CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Endangered Species Act

Petition Evaluation for Pacific Pocket Mouse (*Perognathus longimembris pacificus*)

Report to the Fish and Game Commission
July 2025

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LIST OF ABBREVIATIONS, ACRONYMS, AND TERMS

CDFW – California Department of Fish and Wildlife
CDPR – California Department of Parks and Recreation
CESA – California Endangered Species Act
CNDDB – California Natural Diversity Database
CNLM – Center for Natural Lands Management
Commission – California Fish and Game Commission
Department – California Department of Fish and Wildlife
ESA – Federal Endangered Species Act
HCP – Habitat Conservation Plan
MCBCP – Marine Corps Base Camp Pendleton
NCCP – Natural Community Conservation Plan
PAO – Proportion of Area Occupied
SSC – Species of Special Concern
spp. – Species (plural)
ssp. – Subspecies
USFWS – U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

This petition evaluation for Pacific pocket mouse (*Perognathus longimembris pacificus*) has been prepared by the California Department of Fish and Wildlife (Department) in response to the petition to list Pacific pocket mouse as threatened or endangered under the California Endangered Species Act (CESA) (petition). The purpose of this petition evaluation is to provide a recommendation to the Fish and Game Commission (Commission) on whether the petition provides sufficient information to indicate the petitioned action may be warranted.

The Pacific pocket mouse is a small rodent that occurs in coastal sage scrub habitats within 1.6 km (1 mi) of the coast and below 180 m (600 ft) in elevation in Orange County and San Diego County. The species historically ranged from Los Angeles County to the U.S.-Mexico border, but now only occurs at three isolated, disjunct localities in the city of Dana Point and on Marine Corps Base Camp Pendleton. Population abundance varies between localities and through time and seems to be related to environmental conditions and impacts from human development and land use.

The Department has determined that the petition addresses each of the required petition components listed in Fish and Game Code section 2072.3 and California Code of Regulations, title 14, section 670.1, subdivision (d)(1):

- Life history
- Range
- Distribution
- Detailed distribution map
- Kind of habitat necessary for survival
- Abundance
- Population trend
- Factors affecting the ability to survive and reproduce
- Degree and immediacy of threat
- Impact of existing management efforts
- Suggestions for future management
- Availability and sources of information

In completing its petition evaluation, the Department considered the information in the petition and other information the Department possesses. The Department has determined that there is sufficient scientific information to indicate that the petitioned action to list Pacific pocket mouse as threatened or endangered under CESA may be warranted. Therefore, the Department recommends that the Commission accept the petition for further consideration pursuant to CESA.

1 INTRODUCTION

1.1 Petition Evaluation Overview

This petition evaluation serves as the basis for the California Department of Fish and Wildlife's (Department) recommendation to the California Fish and Game Commission (Commission) on whether the petition to list Pacific pocket mouse (*Perognathus longimembris pacificus*) as threatened or endangered under the California Endangered Species Act (CESA) should be accepted and considered. The recommendation is based on the sufficiency of scientific information in the petition, as well as other relevant information possessed or received by the Department during the evaluation period.

A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant" (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

Once a petition is submitted to the Commission, the Department has 90 days (120 days with extension) to prepare a petition evaluation that evaluates each of the petition components and makes a recommendation to the Commission as to whether there is sufficient scientific information to indicate that the petitioned action to list the species under CESA may be warranted (Fish & G. Code, § 2073.5, subds. (a)-(b)). Once completed by the Department, the petition evaluation is delivered to the Commission and placed on the agenda for receipt at the next available meeting of the Commission. At that time, the petition evaluation will be made available to the public for a 30-day public comment period prior to the Commission taking any action on the petition. The Commission then considers the petition, the Department's petition evaluation, written comments received, and oral testimony to make a finding at the next available meeting of the Commission as to whether the petition provides "sufficient information to indicate that the petitioned action may be warranted" (Fish & G. Code, § 2074.2, subd. (e)(2)). The standard for accepting a petition for consideration and assessing sufficiency of information is addressed in *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597.

If the Commission determines that the petitioned action may be warranted, the species becomes a candidate for CESA listing and proceeds to the status review stage of the CESA listing process. The Department then prepares a peer-reviewed report that advises the Commission on whether the petitioned action is warranted, based upon the best

scientific information available (Fish & G. Code, § 2074.6). Finally, the Commission determines whether the petitioned action to list the species as threatened or endangered is warranted, based on the Department's status review and other information in the administrative record (Fish & G. Code, § 2075.5).

1.2 CESA Petition History

On March 25, 2025, the Center for Biological Diversity submitted a petition to the Commission to list Pacific pocket mouse as threatened or endangered under CESA. On April 4, 2025, the Commission referred the petition to the Department for evaluation. At its meeting on April 16–17, 2025, the Commission officially acknowledged receipt of the petition.

1.3 Federal Status

The Pacific pocket mouse was emergency listed under the federal Endangered Species Act (ESA) in February 1994 (USFWS 1994a). Upon expiration of the emergency rule, the species was listed as endangered under the ESA on September 29, 1994. In 1998, the U.S. Fish and Wildlife Service (USFWS) published a recovery plan for Pacific pocket mouse (USFWS 1998). No critical habitat has been designated for this species under the ESA.

1.4 Additional Species Status Designations

1.4.1 California Species of Special Concern

The Pacific pocket mouse is designated as a Species of Special Concern (SSC) by the Department. The Department has assigned the species a Global Rank of G5T2 and State Rank of S2, meaning the subspecies is considered imperiled and at high risk of extinction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors (CNDDB 2025)

1.4.2 NatureServe Conservation Status Ranks

The Pacific pocket mouse is ranked as T2 by NatureServe, a network of over 60 government and non-government organizations that uses a standardized approach to assess the conservation status of species. NatureServe describes the species as occurring in small, isolated populations and at risk from human activities and development (NatureServe 2025).

2 SPECIES DESCRIPTION AND TAXONOMY

CESA defines the "species" eligible for listing to include "species or subspecies" (Fish & G. Code, §§ 2062, 2067, 2068). Additionally, courts have held that the term "species or subspecies" includes "evolutionarily significant units" (*Central Coast Forest Assn. v. Fish & Game Com.* (2018) 18 Cal.App.5th 1191, 1236, citing *Cal. Forestry Assn.*, *infra*, 156 Cal.App.4th at pp. 1542, 1549).

2.1 Species Description

The petition describes the Pacific pocket mouse as a small rodent, with a body mass between 7–9 grams, with a total body length (head to tail) of 131 mm (109-152 mm, USFWS 2025), and a head-tail and body length ratio between 1.03–1.40. Like other pocket mice, the species has fur-lined external cheek pouches. The species lacks hair spines or bristles. The body pelage of Pacific pocket mice is brown and bicolored, buffy dorsally and light brown to whitish ventrally, with a bicolored tail. Additionally, individuals usually show two small, light-colored patches of fur at the base of the ear.

2.2 Species Taxonomy

The petition describes the taxonomy of the Pacific pocket mouse as a rodent belonging to the family Heteromyidae, genus *Perognathus*, species *longimembris*, and subspecies *pacificus*. The petition also notes that the Pacific pocket mouse was originally described as a unique species (*Perognathus pacificus*) and was reclassified as two subspecies of *P. longimembris* (ssp. *pacificus* and ssp. *cantwelli*) in 1932. The two subspecies were later combined into one subspecies (*P. longimembris pacificus*), and all extant populations are currently recognized as *P. longimembris pacificus*.

2.3 Population Structure and Genetics

2.3.1 Population structure

The petition does not provide data on population structure for Pacific pocket mouse. The petition does provide information on changes in population abundances and occupancy, and this information is discussed below in the Abundance and Population Trend section. Population structure information from the late 1990s is available in the federal Recovery Plan (USFWS 1998) and states that data from one population suggests that the population was dominated by juveniles at that time. Furthermore, the sex ratios at two populations were 1.1M:1F and 0.8M:1F, respectively (USFWS 1998). The petition does note on page 39 that high variability in age and sex ratios may increase extinction probabilities in species with small population sizes.

2.3.2 Genetics

On page 39 of the petition, the petitioners cite a report (Wilder et al., *in prep*.) that indicates a significant loss of genetic variation within all populations, with one population (Dana Point Preserve) exhibiting a greater loss in genetic variation than the other two populations. Additionally, on page 9, the petition notes fixed genetic differences between populations, with one population (Dana Point) having a diploid (2n) chromosome number of 58, while the other two populations (Santa Margarita and South San Mateo) having a 2n chromosome number of 56.

2.4 Similar Taxa

The petition describes that the Pacific pocket mouse is one of 16 recognized subspecies of little pocket mouse (*P. l*o*ngimembris*) and that another subspecies (Los Angeles pocket mouse [*P. longimembris brevinasus*]) also occurs within the region (cismontane southern California), but that it can be distinguished from Pacific pocket mouse through the "length of the tail, hind foot, and skull, and the small size of skull sutures."

3 SUMMARY OF PETITION COMPONENTS

Pursuant to Fish and Game Code section 2072.3 and California Code of Regulations, title 14, section 670.1, subdivision (d)(1), the Department evaluated whether the petition contained information on each of the following petition components:

- Life history
- Range
- Distribution
- Detailed distribution map
- Kind of habitat necessary for survival
- Abundance
- Population trend
- Factors affecting the ability to survive and reproduce
- Degree and immediacy of threat
- Impact of existing management efforts
- Suggestions for future management
- Availability and sources of information

The Department did not receive new information from the public during the petition evaluation period (Fish & G. Code, § 2073.4). Pursuant to Fish and Game Code section 2073.5, the Department evaluated the petition to determine whether there is, or is not, sufficient information to indicate that the petitioned action may be warranted. A summary of the relevant information from the petition for each of the petition

components is presented below. In some instances, the Department has grouped similar components together and renamed components to create a more cohesive and readable document.

3.1 Life History

This section summarizes the information in the petition regarding the species' life history (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The petition describes the life history of Pacific pocket mouse on pages 2–3 and pages 6–9, providing information on the species' life cycle, reproductive biology, sociality, home range, activity patterns, burrowing behavior, and diet. The following is a summary of the information presented.

The petition states that the average lifespan of a Pacific pocket mouse in the wild is approximately one year, but may be as high as 3–5 years, and that individuals may live up to 10 years in captivity. Mean annual survivorship of Pacific pocket mice is approximately 17% but varies seasonally with resource availability and environmental conditions. Females have short peak estrus periods, as short as one hour, and typically have one litter per year. In years of high resource availability, females may have up to two litters but may delay or forego breeding during years of low resource availability. A female's gestation period is approximately three weeks and females produce 2–8 pups per litter, with pups being weaned after 30 days. Pacific pocket mice reach sexual maturity in 2–5 months and female pups may reproduce in their first year of life.

The petition discusses that the Pacific pocket mouse is a solitary and non-social species. The species is typically the smallest rodent within its ecological community and appears to avoid larger rodent species. Additionally, females have been observed exhibiting aggressive behavior toward males in captivity.

The petition describes the estimated average home range of the Pacific pocket mouse to be 170 m^2 (roughly equal to a 13 m diameter circle). Generally, males have larger home ranges than females, with home range size varying likely due to biological (breeding timing, population density, demography) and ecological (resource availability) factors. The average linear distance moved in a single night is between 10–30 m (based on trap events); however, some individuals have been documented to travel >150 m in a single night, coinciding with a shift in use area. The petition notes limited adult and juvenile dispersal distances, but some individuals have been observed dispersing over long distances.

The petition states that the Pacific pocket mouse exhibits winter and summer torpor to reduce energy expenditure in response to environmental conditions and resource stress. Torpor may begin in June and last through November, with timing varying depending

on conditions. During torpor, mice may remain dormant except to feed on cached seeds. Individuals may emerge from torpor in early spring when resources are available. During the active season, the species is mainly nocturnal but may be active aboveground during dawn and dusk hours, with individuals spending much of the daylight hours in belowground burrow systems.

The petition states that Pacific pocket mouse burrow systems range from 1–12 inches in depth. The species uses burrows and tunnels for birthing and nesting, protection from predators, food caches, and protection from environmental extremes (e.g., heat or cold). Burrow locations are dependent on habitat characteristics (see section 3.3 Habitat, below).

The petition states that the Pacific pocket mouse is considered granivorous and specializes on seeds from grasses and forbs. The species has an apparent preference for seeds from forbs, perennial herbs, and native bunch grasses compared to those from perennial shrubs and other grasses. The species may also occasionally feed on green vegetation and insects. Similar to some other heteromyid rodents (e.g., kangaroo rats, *Dipodomys* spp.), the species obtains metabolic water from seeds.

3.2 Range and Distribution

This section summarizes the information in the petition regarding the species' range and distribution and provides a detailed distribution map (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)). A species' range for the purposes of CESA and this petition evaluation is the species' range within California (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal.App.4th 1535, 1551). Range describes the general geographical area in which a species occurs. Distribution describes the actual sites where individuals and populations of the species occur within the species' range.

The petition describes the historical range and distribution of Pacific pocket mouse on pages 2 and 10–12. The petition states that the species' historical range likely occurred within suitable habitat (see section 3.3 Habitat, below) located <180 m (600 ft) in elevation and within 4 km of the coast (with most records within 1.6 km of the coast), between Los Angeles County and the border with Mexico. The species has been documented from nine (9) general localities, including three (3) in Los Angeles County (Marina del Rey/El Segundo, Clifton, and Wilmington), two (2) in Orange County (San Joaquin Hills and Dana Point Headlands), and four (4) in San Diego County (San Onofre, Santa Margarita River, Los Peñasquitos Lagoon, and the lower Tijuana River). The petition highlights that six (6) of these historical localities, including the type locality (lower Tijuana River), have been extirpated due to coastal development and habitat loss. The petition provides a historical range map (**Figure 1a**) depicting general localities where Pacific pocket mouse has been recorded historically; this map was

attributed to thesis work conducted by Godfrey (2018). The species was thought to be extinct in the 1970s until it was discovered near the historical Dana Point Headlands locality in 1993. Additional populations were subsequently re-discovered at localities in San Diego County (see below).

The petition describes the contemporary range and distribution of Pacific pocket mouse on pages 1 and 10–16. The petition notes that the contemporary range of the species now occurs from southern Orange County to northern San Diego County and is estimated to occur on less than 300 ha (740 ac) of habitat. The contemporary distribution of the species is constrained to three localities. In Orange County, the species occurs on the Dana Point Preserve (in vicinity to the historical Dana Point Headlands locality), which is managed by the Center for Natural Lands Management (CNLM) as a nature preserve and conservation open space. The species is also intermittently detected within the adjacent Hilltop Park in Dana Point. In San Diego County, the species occurs at two localities on lands managed by Marine Corps Base Camp Pendleton (MCBCP): Santa Margarita (in vicinity to the historical Santa Margarita River locality and includes the Oscar One and Edson training areas) and South San Mateo (in proximity to the historical San Onofre locality). The petition notes that the South San Mateo locality had an adjacent subpopulation of Pacific pocket mice (North San Mateo) until 2003, but that locality is likely now extirpated. The petition describes that "despite more than 150 surveys within their historic range, no additional" Pacific pocket mouse populations have been detected. The petition provides a map depicting the location of the three contemporary Pacific pocket mouse localities (**Figure 1b**). On page 21, the petition provides a table (***Table 1***) which lists the area of habitat at each locality as 885 ha, 105 ha, and 12 ha for the Santa Margarita, South San Mateo, and Dana Point Preserve, respectively. The petition notes that these localities are isolated from one another and no dispersal occurs between them; as such, each is a separate population rather than part of a functioning metapopulation (page 39). The petition also mentions a locality in Orange County (unspecified location) where captive-reared Pacific pocket mice have been released, but the petitioners do not consider it a current locality as they do not believe the population is established or self-sustaining. Not noted in the petition was a second site located on MCBCP where releases began in 2024, but this is also likely not an established population (E. Gray, CDFW, pers. comm).

Table 1. Estimated area occupied (ha) and proportion of area occupied (PAO) for each known population with Santa Margarita also broken out into the individual sampling areas (Oscar One and Edson). Source: Brehme et al. 2022; CNLM 2024. This table was provided in the Petition as Table 4.

	Santa Margarita (885 ha)		*Santa Magarita sub-areas*				South San Mateo (105 ha)		Dana Point (12 ha)	
			Oscar One (411 ha)		*Edson (474 ha)*					
Year	Area occupied	PAO	Area occupied	PAO	Area occupied	PAO	Area occupied	PAO	Area occupied	PAO
2012	169.4	0.19	39.3	0.10	130.1	0.27	20.2	0.19	4.0	0.54
2013	212.4	0.24	45.0	0.11	167.4	0.35	20.6	0.20	3.7	0.51
2014	259.9	0.29	67.8	0.16	189.1	0.40	27.7	0.26	5.8	0.81
2015	281.1	0.32	28.0	0.07	253.1	0.53	38.2	0.36	--	--
2016	291.3	0.33	9.7	0.02	281.6	0.59	43.8	0.42	5.3	0.71
2017	167.0	0.19	22.2	0.05	145.0	0.31	41.1	0.39	0.6	0.08
2018	179.6	0.20	37.4	0.03	142.2	0.30	43.6	0.41	1.8	0.24
2019	92.8	0.10	22.6	0.05	70.2	0.15	24.9	0.24	1.1	0.14
2020	137.8	0.16	68.6	0.17	69.2	0.15	40.1	0.38	3.7	0.46
2021	76.9	0.09	48.5	0.12	28.4	0.06	33.9	0.32	7.4	0.95
2022	122.9	0.14	65.5	0.16	57.4	0.12	41.8	0.40	6.4	0.82

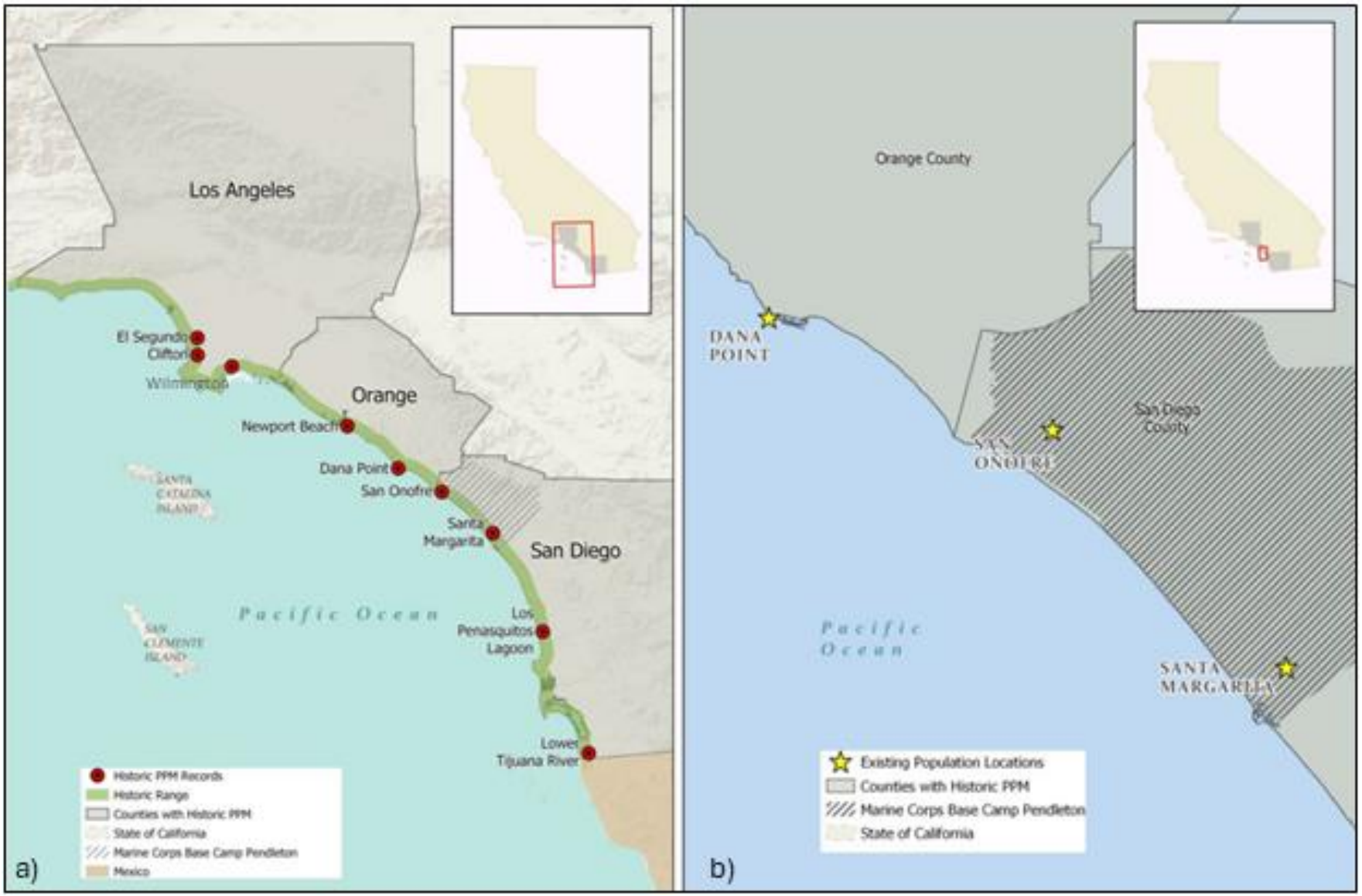

Figure 1. Map depicting the historical range and distribution of the Pacific pocket mouse (1a); Map depicting the contemporary range and distribution of the Pacific pocket mouse (1b). Credit: Godfrey 2018. This map was included in the Petition as Figure 1.

3.3 Habitat

This section summarizes the information in the petition regarding the kind of habitat necessary for species survival (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The petition discusses the habitat of the Pacific pocket mouse in the "Habitat" section on pages 5–6 and within the "Behavior" section on page 8.

The petition states that Pacific pocket mice "are associated with fine grain, sandy or gravelly substrates in coastal strand, coastal dunes, river alluvium, and coastal sage scrub habitats." The petition also mentions that loose or friable soils seem to be an important habitat characteristic necessary for Pacific pocket mice, due to their burrowing and dustbathing requirements. While the species historically used multiple habitat types (e.g., dune habitats), the extant populations of Pacific pocket mice now occur mainly in coastal sage scrub habitats, although other habitat types (sage scrub-grassland ecotone, low density non-native grasslands, areas of bare ground) are used at lower frequency. Within sage scrub habitats, the species is associated with relatively open vegetated areas, with areas of moderate to high bare ground and forb cover being preferred. Areas with moderate to high non-native grass cover are considered lower quality habitat for the species. As described earlier (Section 3.1 Life History), native forbs, perennial herbs, and native bunch grasses are important forage species for Pacific pocket mice, and habitats which contain these species may be associated with higher quality habitat.

3.4 Abundance and Population Trend

This section summarizes the information in the petition regarding the species' abundance and population trend (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The petition discusses the abundance and population trends of the Pacific pocket mouse on pages 15–22. The petition does not describe the historical status of the species but discusses its contemporary status. The petition notes that the Pacific pocket mouse has relatively small populations which exhibit annual variability. The petition addresses each locality separately due to differences in monitoring methods and efforts.

3.4.1 Dana Point Preserve

The petition notes that the Dana Point Preserve locality has the smallest Pacific pocket mouse population of the three localities. This locality has been monitored through annual live-trapping (**Table 2**) and/or track-tube monitoring (detection of Pacific pocket mouse using track presence, **Figure 2**) since it was acquired by CNLM in 2008.

Prior to 2008, the locality was surveyed sporadically. The petition cites that the lowest number of captures of Pacific pocket mouse occurred in 2001 (n = 4), but that captures increased after CNLM commenced habitat management activities in 2005. The number of annual live-captures has been variable, with a peak in 2009 (n=82), very few captures in 2017 (n=6) and 2019 (n=2), and 77 captures in 2020. The petition states that these findings are reflected by a similar pattern in habitat use (**Figure 3**). The petitioner attributes the increase in captures in 2020 to a COVID-19-related closure of the preserve to the public, and a decrease in the proportion of area occupied (PAO) in 2022 (**Table 3**) with an increase in public visitation. The petitioner highlights that management agencies (the Department and USFWS) have noted that regardless of the cause of fluctuations in the species' population, monitoring efforts show that the population remains vulnerable to extinction.

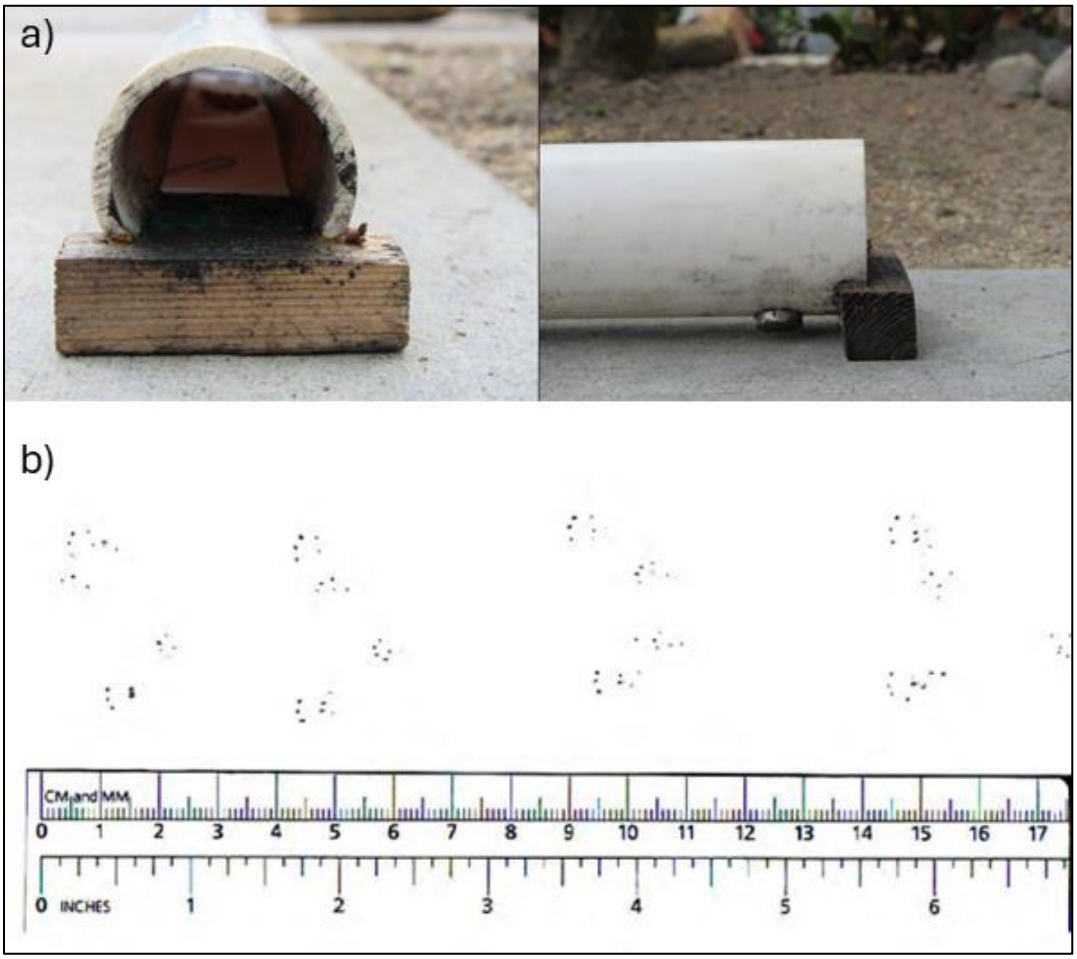

Figure 2. Image of track-tube monitoring method (a) and example Pacific pocket mouse tracks from a track-tube (b). Source: Brehme et al. 2019.

Figure 3. Total area in hectares (ha) estimated to be occupied by Pacific pocket mouse for each population from 2012 to 2022. Data sourced from Brehem et al. 2023 and CNLM 2024. This graph was included in the Petition as Figure 2.

Table 2. Results from all live-trap Pacific pocket mouse monitoring events at the Dana Point Preserve since CNLM acquisition, 2008–2020. Source: Merrill et al. 2023. This table was provided in the Petition as Table 1.

Month(s) and Year of Trapping Events	Level of Effort (trap nights)	Trapping Results (unique individuals)
May–June 2008	3280	30
May 2009[1]	2770	82
May 2012	3330	57
May 2017	2286	6
June 2019	792	2
June 2020[2]	1254	77

[1] The trail was opened to public access in December 2009.
[2] The trail was closed to public access in March 2020.

Table 3. Pacific pocket mouse track-tube monitoring data from the Data Point Preserve, 2017–2024. This table was provided in the Petition as Table 2.

Track-tube Monitoring Year	Estimated Proportion of Area Occupied
2017	0.08
2018	0.24
2019	0.14
2020	0.46
2021	0.95
2022	0.81
2023	0.78
2024	0.56

3.4.2 South San Mateo

This locality has been monitored through systematic annual track-tube monitoring and live-trapping by the U.S. Geological Survey (USGS) since 2012. The petition describes the average PAO of Pacific pocket mice at South San Mateo as 34 ha (32% of available habitat). The petition notes a decline in PAO and habitat-use in 2019 (**Figure 3**) associated with poor resource availability the previous season, and a decline in PAO from 2020 to 2021, with little documented reproduction and no recruitment.

3.4.3 Santa Margarita

Similar to South San Mateo, this locality has also been monitored through annual track-tube monitoring and live-trapping by USGS since 2012. The petition notes that this locality has the largest Pacific pocket mouse population of the three extant localities. This population occurs on two training grounds (Oscar One, Edson Range), which are monitored separately; however, the petitioner states they should be treated as one population. The petitioner provides details of each area separately but summarizes that the combined population experienced a significant population increase (based on PAO and total area occupied analysis) between 2012–2016, with a peak of >23,000 individuals, followed by a decrease in abundance 2017–2019 (**Figure 3**). The petition relates these changes in population with environmental conditions, non-native grass presence, and potentially invasive fire ants. The petition highlights a recent population viability analysis for the locality (GSRC and SDZWA 2022), which showed a 100% chance of extirpation at this locality within 100 years (assuming starting population size <3,100 individuals).

3.5 Threats

This section summarizes the information in the petition regarding the factors affecting the ability of the species to survive and reproduce, and the degree and immediacy of threats (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The petition discusses threats to the Pacific pocket mouse in the section titled "Factors Affecting the Ability of the Species to Survive and Reproduce," on pages 1–3 and 23–42.

The petition discusses four (4) main types of threats:

1. Habitat availability
    a. Habitat modification and destruction
    b. Non-native vegetation and habitat succession
    c. Habitat management
    d. Land use and human activity
2. Small population size
3. Climate change
4. Disease, predation, and competition

3.5.1 Habitat availability

The petition states that availability of habitat within the Pacific pocket mouse range is limited and extant populations are isolated from one another. Habitat fragmentation may continue to limit population size and dispersal, making populations susceptible to stochastic events and inbreeding effects and may help drive declines in habitat quality via edge effects. The petition cites the USFWS Recovery Plan (USFWS 1998), suggesting that habitat modification and destruction via coastal development and land-use was a causative agent of the extirpation of historical Pacific pocket mouse populations and details how negative effects may continue in the future. Erosion is a specific risk factor for the Dana Point population, exemplified by the fact that portions of some neighboring parcels have collapsed from the bluff. The petition also describes how the introduction of non-native grasses threatens habitat quality for Pacific pocket mouse by hindering Pacific pocket mouse movements and having negative impacts on forage plant species. The abundance of non-native grasses has been shown to be a strong negative predictor of Pacific pocket mouse occupancy and colonization and positive predictor of extirpation. Similarly, the petition describes the negative effects of habitat succession on the species' habitat, with increases in shrub cover negatively impacting more beneficial forage species and environmental conditions necessary (e.g., decreased bare ground) for Pacific pocket mice. Additionally, habitat management activities, such as fire management or managing habitat for other sensitive species (e.g., managing for higher

shrub cover for California gnatcatcher [*Polioptila californica californica*] at the Dana Point Preserve) may negatively affect Pacific pocket mouse populations.

The petition identifies land-use and land activities as threats to Pacific pocket mouse and breaks land-use into five (5) subcategories:

Development and Project Construction – The petition describes habitat degradation and loss via human land and housing development as the largest historical cause of the species' decline. The petition describes development as a specific threat near the Dana Point Preserve, with continued and future potential habitat destruction and degradation through edge effects (e.g., noise and light pollution, domestic animals). The petition relates habitat degradation within the Dana Point Preserve to influences from nearby development and use of the established and unofficial hiking trails within the preserve.

For the populations on MCBCP, the petition describes that several development projects have occurred within Pacific pocket mouse-occupied and potential habitat areas. The petition notes that there are planned future development projects within or adjacent to occupied areas. In addition to development, maintenance activities of developed areas are expected to have negative impacts on habitat and direct take of individuals.

The petition notes that, for all populations, development and construction can create barriers to dispersal from occupied areas into nearby potential habitat patches.

Military activities – The petition notes that populations of Pacific pocket mouse are threatened by direct (habitat loss and degradation) and indirect (artificial lighting, noise, vibrations, soil compaction, habitat trampling, rodenticide use, predator attractants, shifts in space use into low quality habitat, shifts in daily activity pattern, non-native plant effects) effects of military activities within mouse habitat. The specific military activities described in the petition include "land navigation, troop movement, live firing ranges, bivouac sites, dirt roads and trails and associated facilities." The petition discusses military activities as a primary threat to the Santa Margarita population, where approximately 17,000 troops train annually on 134.8 ha of potential Pacific pocket mouse habitat. Military activities are a smaller impact for the South San Mateo population, with the area having limited off-road use by the military. The petition also relates military activities to Pacific pocket mouse subpopulation decline and extirpation in specific areas (south of Macs Road) on MCBCP. The petition notes that USFWS has conducted Section 7 consultations for these activities, but threats to the species from military activities remain.

Fire and Fire Management Practices – The petition notes that fire and fire management practices (prescribed burns and firebreak maintenance) can cause direct negative harm to individuals and indirect harm to Pacific pocket mouse habitats. Inadequate fire frequency, timing, and severity can negatively impact habitats through

habitat succession. Too infrequent fire (natural and/or prescribed fires) may shift vegetation communities toward shrub dominated communities unsuitable for Pacific pocket mice. Alternatively, too frequent fires may shift vegetation from sage scrub habitats toward grassland habitats and increase non-native vegetation cover unsuitable for Pacific pocket mice. Additionally, fire management activities such as the creation and maintenance of fire breaks through disking is a practice used by MCBCP and California Department of Parks and Recreation (CDPR; San Onofre State Beach), including within Pacific pocket mouse habitat. This disking can crush burrows, directly harm individuals, and displace individuals from habitat. Pacific pocket mice can recolonize disked areas; however, it is unclear whether repeated disking may deter mice from recolonization. The petition also relates habitat degradation within the extirpated North San Mateo population to CDPR's practice of adding mulch to fire breaks (to reduce plant cover) and an increase in invasive Argentine ants.

Road and Utility Maintenance – The petition cites a Biological Opinion which allows for incidental take of 1–3 Pacific pocket mice on MCBCP during road maintenance and suggests this as a risk to individuals annually. Additionally, a 2012 emergency road project resulted in grading an estimated 0.34 ha of habitat within the South San Mateo population and is suggested to have resulted in the take of 7 or more individual mice. Subsequently, a permanent composite road has been established in the habitat. The petition also discusses that MCBCP has been resurfacing dirt roads within Pacific pocket mouse habitat and that such activities may exasperate habitat fragmentation and create barriers to dispersal.

Recreation Activities and Unauthorized Habitat Disturbance – The petition elucidates the potential consequences of recreation and habitat disturbance on Pacific pocket mouse habitat and behaviors. The petition lists altered habitat use, extirpation from suitable habitat, shifts in space use into low quality habitat, shifts in daily activity patterns, altered predator interactions and avoidance behavior, and habitat fragmentation as potential threats of recreation activities. Specific threats include trampling of burrows; damaging forage plant resources, nesting locations, and shelter; changes in predator dynamics; impacts to reproduction; and vibrations impacting belowground activity (e.g., torpor, rearing young). The petition highlights that even small disruptions in the species biology can have detrimental effects on the population due to the short peak estrus period of females.

There may be specific effects of recreation within the Dana Point Preserve, which is managed as an open space with public access. The petition cites a report (Merrill et al. 2023) which showed that 15.6–89.5% of the reserve may be impacted by recreation on the developed trail in the reserve, depending on how far from the trail effects may reach. The petition provides a map from the report (**Figure 4**) depicting the area of the Dana Point Preserve potentially impacted by trail use. The petition also lists recreation-related

risks (increased invasive species, off-trail hiking and biking, dogs off leash) and nearby development (rodenticide use, artificial lighting, noise, and disease transmission) as potential threats to the species at the preserve. The petition hypothesizes that recreation has negative impacts on Pacific pocket mouse abundance due to the observation of an increased mouse population when the park was closed or had reduced visitation hours in 2020–2021 and reduced mouse abundances beginning in 2022, when visitation hours and visitation rates increased. Additionally, recreational use of the trail has been attributed to the death of one (1) individual mouse.

The petition notes that the populations on MCBCP receive fewer impacts from recreation than the Dana Point Persevere, but residents may use existing roads and trails which may impact Pacific pocket mouse populations and habitats. The petition hypothesizes that the extirpated North San Mateo population was impacted by recreation activities on nearby recreation areas and trails.

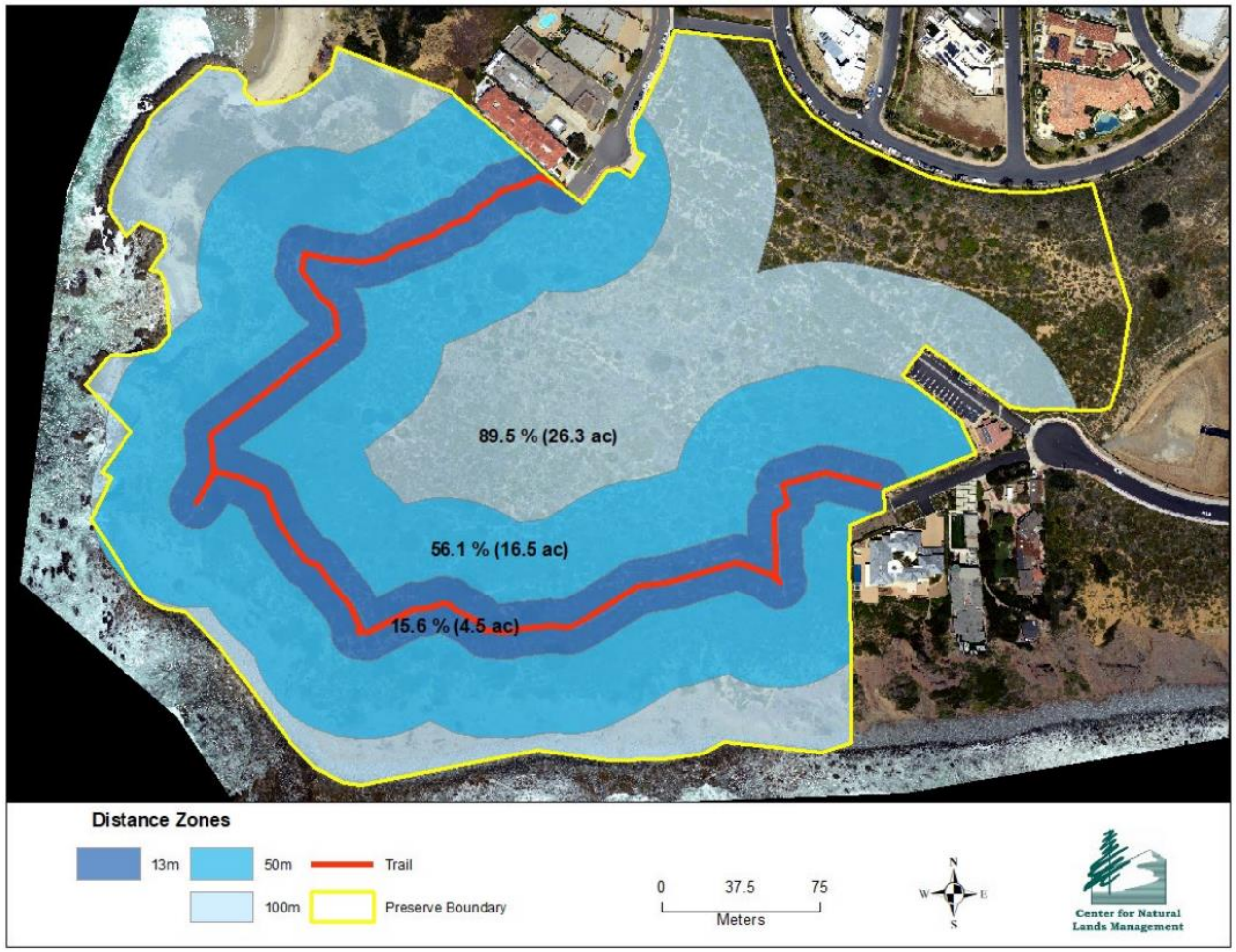

Figure 4. Zones of varying distance (13 m, 50 m, 100 m) from the trail at the Dana Point Preserve. Values show proportion (%) and area (acres) of the Preserve covered by each zone. Source: Merrill et al. 2023. This map was included in the petition as Figure 4.

3.5.2 Small Population Size

The petition notes that each extant population is small and isolated and does not act as part of a larger metapopulation. Additionally, the petition cites a genetic analysis (Wilder et al., *in prep*.) which shows that each population has a small effective population size (Dana Point [Ne = 14.9], South San Mateo [Ne = 20.5], Santa Margarita [Ne = 36.5]) and has recently lost genetic variation, and the Dana Point population may already be showing deleterious genetic effects of a small population. Each population is susceptible to extirpation due to stochastic events, inbreeding, variability in age and sex ratios, other natural events such as disease, or anthropogenic causes. Since populations are isolated, there is no potential for natural recolonization following extirpation.

3.5.3 Climate Change

According to the petition, climate change is expected to produce prolonged droughts, variation in rainfall timing and quantity, and increase annual temperatures within the range of the Pacific pocket mouse. These effects are projected to lead to a >50% decline in habitat suitability of sage scrub-associated species. The petition states that variability in precipitation and influences on forage quality and fire frequency also make it difficult to predict how Pacific pocket mouse will be affected by climate change. An increase in precipitation or extreme weather may cause Pacific pocket mouse populations to delay or forego breeding, resulting in reduced recruitment. Increases in rainfall may benefit some forage species but may also reduce bare ground cover within Pacific pocket mouse habitats, spoil food caches, and increase energetic demands during torpor. Alternatively, periods of drought may be beneficial to the species as seen from an increase in PAO during a 5-year drought.

3.5.4 Disease, Predation, and Competition

The petition notes that the impact of disease on Pacific pocket mouse populations is unknown, but that intracellular coccidia parasites, which have led to fitness declines and death in other mouse species, have been detected in the South San Mateo population.

The petition states that non-native red fox and domestic cats were recognized predator threats to the Pacific pocket mouse at the time of listing (USFWS 1994b) and since then, five (5) additional potential predators which may threaten the species have been identified: opossum, raccoon, raven, crow, and Argentine ants (USFWS 2020). Domestic cats may be especially important due to the proximity of Pacific pocket mouse populations to human development and the impacts of cats on native wildlife. The petition also notes that red fox abundance is high within the species' range, and they are known to prey upon other mouse species. The petition discusses nonnative Argentine

ants and fire ants as a threat to the species because ants have been documented killing Pacific pocket mice in live-traps and could potentially kill young in burrows.

The petition states that Pacific pocket mouse is generally the smallest and least dominant species in its rodent community and appears to actively avoid larger rodent species. The petition also states that Pacific pocket mouse competes for seed resources with other rodent species and harvester ants and Argentine ants.

3.6 Existing Management

This section summarizes the information in the petition regarding the impact of existing management efforts on the species (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The petition discusses the impact of existing management efforts on the Pacific pocket mouse in the section titled "The Inadequacy of Existing Regulatory Mechanisms and Impact of Existing Management Efforts" on pages 43–55.

The petition describes the current regulatory mechanisms that may provide protections for the Pacific pocket mouse, including its status as an endangered species under the federal Endangered Species Act (ESA); biological opinions between USFWS and MCBCP; consideration of the effects of Federal agency actions under the National Environmental Policy Act and Section 7 consultation under the ESA; natural resource management through the Department of the Navy; protection through provisions of the Clean Water Act; designation as a Species of Special Concern by the California Department of Fish and Wildlife; designation as a Species of Greatest Conservation Need under California's State Wildlife Action Plan; land and development and management guidance under the California Coastal Act; designation of the Dana Point Preserve as "conservation open space"; and the California Environmental Quality Act.

The petition also describes the current management efforts for Pacific pocket mouse, including the federal Recovery Plan; one (1) joint federal Habitat Conservation Plan (HCP)/state Natural Community Conservation Plan (NCCP); the Marine Corps Pendleton Integrated Natural Resource Management Plan; San Diego Gas & Electric NCCP; the MCBCP Pacific pocket mouse Management Plan; and Dana Point Preserve Draft Habitat Management Plan (however, the Draft Habitat Management Plan has not been fully implemented due to litigation with the City of Dana Point). Though not mentioned in the petition, the Department is aware that Pacific pocket mouse is also covered under the San Diego Multiple Habitat Conservation Program. The petition notes that other management efforts include the Pacific pocket mouse Working Group and a captive breeding and reintroduction program led by the San Diego Zoo Institute for Conservation Research, which includes crossbreeding populations to improve genetic diversity.

According to the petition, existing regulatory protections and management actions are insufficient to manage the species, as evidenced by the species becoming more endangered since it was listed and seen in the loss of the North Mateo Creek locality, increasing threats at other localities, and failure to establish new populations. The petition states that, while there is a federal Recovery Plan for the species with a predicted reclassification date in 2023, none of the down-listing or de-listing benchmarks for the species have been achieved. The petitioners also argue that previous justifications relied on by USFWS to not designate critical habitat are no longer relevant and additional protections under CESA are needed. The petitioners also argue that current regulatory mechanisms (e.g., Section 7 consultation) are not protecting the species as originally designed, which is indicated by continued "unauthorized impacts" to the species on MCBCP. According to the petition, even though MCBCP has committed to the Pacific pocket mouse Management Plan, implementation of the Plan is constrained by funding. The petition states that designation as an SSC by the Department has not provided significant protection for the species. Additionally, the petition notes that the Pacific pocket mouse is a covered species on an HCP/NCCP (County of Orange Central and Coastal Subregion HCP/NCCP), but the petitioners know of no funds specifically dedicated for the species in implementation of the NCCP. However, the Department has information that the NCCP has used funds for a variety of Pacific pocket mouse conservation measures including surveys, captive breeding, reintroductions, habitat restoration, and other efforts. Finally, the petition notes that while the captive breeding program has been successful in producing enough individuals to attempt reintroductions, the goal of establishing three new populations has not been achieved after seven years of reintroduction attempts and there is not an established self-sustaining population in the wild. The petition argues that these "inadequacies" of regulation mechanisms and management highlight that protections as a CESA-listed species are necessary for the species' survival.

3.7 Future Management

This section summarizes the information in the petition regarding suggestions for future management (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The petition makes suggests for future management in the section entitles "Recommendations" on pages 55–56.

The petition recommends eight (8) management and recovery actions for Pacific pocket mouse:

1. Prepare a recovery plan under CESA.
2. CDPR should develop and implement species-focused management plans for state park units within the species' range.

3. CDPR should seek to acquire habitat to establish new parks or natural reserves to protect and restore Pacific pocket mouse habitat and expand and connect existing properties to protect and restore the species' habitat.
4. The Department should expand cooperation with relevant federal agencies to protect Pacific pocket mouse habitat on federal lands.
5. The Department and USFWS should expand cooperation with state and federal agencies and public entities to implement agreements for Pacific pocket mouse introductions.
6. The Department should make recommendations to the City of Dana Point regarding sustainable public access at the Dana Point Preserve.
7. The Department should make recommendations to the City of Dana Point regarding improvements in its management and monitoring of the Pacific pocket mouse on its property adjacent to the Dana Point Preserve.
8. The Department should seek a transfer of the Conservation Easement for the Dana Point Preserve for the long-term benefit and management of the Pacific pocket mouse.

3.8 Availability and Sources of Information

This section summarizes the information in the petition regarding availability and sources of information (Fish & G. Code, § 2072.3; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)).

The petition cites an extensive list of sources on pages 57–71. The Department referenced additional literature when developing this petition evaluation (see Literature Cited section).

4 OTHER RELEVANT INFORMATION AVAILABLE TO THE DEPARTMENT

Pursuant to Fish and Game Code section 2073.5, the Department also evaluates petitions in relation to other relevant information the Department possesses or receives.

The Department possesses information related to the petitioned species that was not mentioned or cited in the petition. Time constraints do not allow for a comprehensive review of all information available at the petition evaluation stage of the CESA process; however, the Department evaluated readily available information and expertise.

Additional sources reviewed by the Department include:

- USFWS Recovery Plan for Pacific Pocket Mouse (USFWS 1998).

- 2024 USGS permit report summarizing survey efforts and results on MCBCP in 2024 (USGS 2024).
- Summary of mouse survey efforts on the Dana Point Preserve (2020–2024; CNLM 2025).
- Information relating to captive reared mouse release locations.
- Information related to NCCP and HCP and Pacific pocket mouse

To the extent the Department was able to review additional information in its possession as it relates to the petition, the Department concluded that none of the additional information constitutes countervailing information that wholly undercuts the conclusions in the petition at this juncture in the listing process. If the Commission accepts the petition for consideration, all reasonable attempts will be made by the Department to notify affected and interested parties and to solicit data and comments on the petitioned action (Fish & G. Code, § 2074.4). At that time, the Department will commence a review of the status of the species and produce a written peer-reviewed report, based upon the best scientific information available to the Department, which indicates whether the petitioned action is warranted (Fish & G. Code, § 2074.6).

5 SUFFICIENCY OF SCIENTIFIC INFORMATION AND RECOMMENDATION TO THE COMMISSION

The Department evaluated the petition components set forth in Fish and Game Code section 2072.3 and California Code of Regulations, title 14, section 670.1, subdivision (d)(1) for sufficiency of information pursuant to Fish and Game Code section 2073.5. Based upon the information contained in the petition and other relevant information, the Department determined there is sufficient information to indicate that the petitioned action may be warranted (Fish & G. Code § 2073.5). Therefore, the Department recommends the Commission accept the petition for further consideration under CESA. If the Commission accepts the petition for further consideration, the Department will commence a review of the status of the species at that time pursuant to Fish and Game Code section 2074.6 and California Code of Regulations, title 14, section 670.1, subdivision (f).

ACKNOWLEDGEMENTS

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PERSONAL COMMUNICATIONS

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