# Pacific Pocket Mouse
# (*Perognathus longimembris pacificus*)

# 5-Year Review:
# Summary and Evaluation

*Photograph of the Pacific Pocket Mouse and Habitat*
*Photo by Joanna Gilkeson/USFWS.*

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

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# 5-YEAR REVIEW

## Pacific Pocket Mouse
## *(Perognathus longimembris pacificus)*

## GENERAL INFORMATION

**Species:** Pacific Pocket Mouse (*Perognathus longimembris pacificus*), a mammal subspecies
**Date listed under the Endangered Species Act:** September 29, 1994 (Service 1994b); emergency listing on February 3, 1994 (Service 1994a)
**Federal Register Citation:** Service 1994b (59 FR 49752)
**Classification:** Endangered
**Recovery Plan:** Final (Service 1998)
**Recovery Priority Number**: 6C (subspecies with high degree of threat, low recovery potential, in conflict with development).
**Critical Habitat Designation:** No critical habitat has been designated for this species.

## BACKGROUND

Under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq*.), the U.S. Fish and Wildlife Service (Service), referred to as "we" in this document, maintain lists of endangered and threatened wildlife and plant species (referred to as the List) in the Code of Federal Regulations (CFR) at 50 CFR 17.11 (for wildlife) and 17.12 (for plants). Section 4(c)(2)(A) of the Act requires us to review each listed species' status at least once every 5 years.

**Most recent status review:** Service. 2020. Pacific pocket mouse (*Perognathus longimembris pacificus*) 5-year Review: Summary and Evaluation. Prepared by the Carlsbad Fish and Wildlife Office, Carlsbad, California. 34 pp.

We initiated a status review for the Pacific pocket mouse in 2018. The review was finalized on August 31, 2020, and recommended no change in listing status.

**Federal Register notice announcing this status review:** On October 16, 2024, we published a Federal Register notice announcing initiation of the 5-year review of this species, and the opening of a 60-day comment period to receive information (Service 2024, pp. 83510–83514).

**Species Overview and Habitat:** The Pacific pocket mouse is one of 15 or 16 currently recognized subspecies of the little pocket mouse (*Perognathus longimembris*) (Patton 2005, pp. 844–858; Williams *et al*. 1993, pp. 177–184; Hafner 2016, pp. 202–209)*;* a widespread species that is distributed throughout arid regions of the western United States extending into northern part of the Baja California peninsula and west central Sonora, Mexico (Williams *et al*. 1993, p. 178). Characterized as a small, burrowing rodent, the Pacific pocket mouse primarily feeds on seeds and is typically found in fine-grain sandy substrates, particularly in coastal strands, coastal dunes, river alluvium, and coastal sage scrub habitats within approximately 4 kilometers (2.5 miles) of the ocean in southern California (Service 2010, p. 2).

## ASSESSMENT

### Information Acquired Since the Last Status Review

This 5-year review was conducted by the Carlsbad Fish and Wildlife Office. Information for this review was solicited from the public and interested parties through a Federal Register notice announcing this review on October 16, 2024 (Service 2024, pp. 83510–83514). We received information from Marine Corps Base Camp Pendleton during this period with updated contact information for species data. We also contacted State and Federal partners and species experts to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files.

### Distribution

We have received updated survey and monitoring reports from the Marine Corps Base Camp Pendleton, Center for Natural Lands Management, and various species experts. The results confirm that the species continues to exist in three small, isolated populations at Santa Margarita, South San Mateo, and the Dana Point Headlands, consistent with the distribution outlined in our 2020 5-year status review (Service 2020, entire).

Populations continue to exhibit low estimated effective population sizes, which limits the subspecies' ability to persist in place or adapt spatially in response to changing environmental conditions. Therefore, the best chance for the subspecies' survival lies in effective management of the habitat and genetic health of each population.

### Threats

As described in our 2020 5-year status review, the primary threats to the Pacific pocket mouse includes habitat loss and degradation. While populations are known to fluctuate greatly from year to year and within a season, demographic history estimated from the genomes of wild mice suggest all of the populations have experienced population bottlenecks within the past 25-50 generations, and contemporary effective population sizes are extremely small for the Dana Point and South San Mateo populations, making them particularly vulnerable to continued genetic erosion and inbreeding depression. (Wilder *et al*. in press, p. 2). Loss of historical connectivity among the populations exacerbates the threat of the remaining populations to stochastic environmental and demographic factors as well as inbreeding depression.

Current land use activities that could have population level impacts include recreation and military training. Habitat degradation from the invasion of nonnative grasses stems from historical and current land use practices and represents one of the largest threats to the pocket mouse. Inbreeding depression is also a threat to the Dana Point and South San Mateo populations. Climate change is likely to cause more flooding and wet winters, which can cause population fluctuations, as well as droughts that will likely have impacts on the subspecies in the future. While disease, predation, and competition have the potential to impact populations, the magnitude of these threats is currently believed to be relatively low.

The viability of the Pacific pocket mouse is most restricted by dramatic losses of habitat and populations and loss of connectivity across its historical range, resulting in retention of just three small, isolated, and genetically depauperate populations. Isolation of the remaining extant populations provides no opportunity for genetic transfer among them, leaving them at risk of developing inbreeding depression (loss of fitness from mating of closely related individuals), and erosion of genetic variation needed to adapt to changing conditions. Inbreeding depression exacerbates the inherent higher risk of small populations to random stochastic and unforeseen catastrophic events, by limiting the ability of the small population to compensate for population losses. Research indicates the Dana Point and South San Mateo populations are already suffering from inbreeding depression and have undergone losses of genetic variation during the past several decades (Wilder *et al*. 2024; in prep). Historically, more expansive habitat and connectivity among populations would have allowed populations to better withstand normal population fluctuations and allow depressed populations to recover via immigration from neighboring populations. However, ecological processes such as fires and floods that once helped maintain suitable open coastal vegetation communities for the pocket mouse have been impaired at the extant sites by surrounding urbanization and land uses, and continued habitat loss from development and urbanization will further isolate and limit opportunities for recovery via improved connectivity and population creation.

The Conservation Breeding and Reintroduction Program at the San Diego Zoo Wildlife Alliance has been successful at producing mice for augmentations and reintroductions and serves as an insurance population in the case of catastrophic impacts to the individual populations. Starting in 2016, animals produced by the breeding program have been released on an annual basis at Laguna Coast, with the goal of creating a fourth wild population. While the released animals have exhibited good short-term survivorship and reproduction following their release, this population is not yet self-sustaining due to poor overwinter survivorship, particularly during years of high rainfall. Three additional translocation efforts include one in 2024 at Wire Mountain, one planned for 2026 at North San Mateo, and one in the early planning stages within the Laguna Laurel parcel at Laguna Coast Wilderness Park. These efforts should help to inform which factors influence successful translocations. Continued funding of this program is needed for additional translocation efforts and to support genetic management efforts in the future.

## CONCLUSION

The Pacific pocket mouse currently exists as three small, isolated populations that have low resiliency relative to historical conditions. Management of each population is needed in the future to ensure suitable habitat is available and accessible, and populations are genetically diverse enough and large enough to withstand years when weather patterns or other factors result in population declines. With only three extant populations, current population redundancy is greatly reduced from historical levels. The adaptive capacity of the subspecies is believed to be low based on low estimated effective population sizes of the extant populations and the fragmented nature of available habitat, which limit the subspecies' ability to persist in place or shift in space in response to changing environmental conditions.

After reviewing the best available scientific information, we conclude that Pacific pocket mouse remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species in our 2020 5-year review remains an accurate reflection of the species current status.

## RECOMMENDATIONS FOR FUTURE ACTIONS

Since listing, efforts have been made to conserve habitat in the three remaining populations (Santa Margarita, South San Mateo, and the Dana Point Headlands) and to implement a captive breeding program for potential population augmentation and reestablishment. Recognizing that habitat fragmentation and small population sizes pose significant challenges, it is critical to preserve the remaining genetic diversity, and work to increase, genetic diversity of these populations in the future. Continued collaboration with partners is essential to ensure the sustainability of these populations and their suitable habitat. These recommendations will help support the recovery of the Pacific pocket mouse:

1. Finalize and implement the draft genetic management plan to ensure genetic diversity preservation.

2. Assess the status of the conservation breeding program and determine the direction for continued implementation in the future.

3. Collaborate with the City of Dana Point, and the Center for Natural Lands Management, to study and effectively regulate the impact of public access on Pacific pocket mouse at the Dana Point Preserve.

4. Identify additional suitable receiver sites and secure necessary permissions for Pacific pocket mouse translocations to expand the current distribution and enhance species viability.

5. Monitor and adaptively manage Pacific pocket mouse at the current sites where reintroductions have been performed to ensure viability of the subspecies in the future.

6. Continue to monitor the status of the extant Pacific pocket mouse occurrences and manage habitat suitability at occupied sites.

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**FIELD OFFICE APPROVAL**

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