

## A new locality for the endangered *Microtus californicus* in Mexico, with clarification of the known distribution

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**ABSTRACT.**—We clarify misleading published information on the distribution of the endangered California vole (*Microtus californicus*) in Baja California, Mexico. We photo-document recent records for 2 of the 4 subspecies reported from Mexico and provide a map that includes several locations not previously published.

**RESUMEN.**—Aclaremos información confusa publicada sobre la distribución del ratón *Microtus californicus*, en peligro de extinción, en Baja California, México. Proporcionamos registros fotográficos recientes de dos de las cuatro subespecies reportadas en México y proporcionamos un mapa que incluye varias localidades no publicadas anteriormente.

The California vole or meadow mouse (*Microtus californicus*), a small fossorial rodent, is widespread in generally damp and grassy habitats in southwestern Oregon and much of California, and reaches the southern limits of its range in northwestern Baja California (Grinnell 1933, Hall 1981). The species often becomes numerous enough to form the primary source of prey for predatory birds and mammals and to be considered an agricultural pest (Byers 1985, Pearson 1985, Rose and Birney 1985).

Four subspecies of *Microtus californicus* have been attributed to Mexico, all from Baja California, with general distribution summaries for each provided by Huey (1964). Unfortunately, the subsequent seminal work by Hall (1981) misrepresented the Mexican range by omitting the species' coastal distribution from the border region to south of Ensenada. As a testament to that book's lasting influence, all subsequent authors appear to have followed Hall's mapping (e.g., Hoffmann and Koeppl 1985, Álvarez-Castañeda and Cortés-Calva 1999, Heske and Lidicker 1999, Bowers et al. 2004, Mellink and Luévano 2005, 2014, Reid 2006, Kays and Wilson 2009, Cudworth and Koprowski 2010, Cook 2017)

until the chain was broken by Guevara-Carrizales et al. (2016).

In addition to reaffirming the vole's distribution on the north coast of Baja California, Guevara-Carrizales et al. (2016) revealed 2 outlier locations not previously published: El Rayo in the Sierra de Juárez (but misplaced on their map) and Misión San Fernando at the far southeast edge of the range. Our update to their map (Fig. 1) includes 3 additional historical locations based on specimen data. Two are coastal: La Salina, May 1962, CSULB Mammals 3786 (museum names provided in the acknowledgments) and La Grulla, Cañón Las Animas (a community and former ranch and gun club, not to be confused with the meadow of the same name in the Sierra San Pedro Mártir, also a known *Microtus* locality), June 1925, SDNHM 5066, 5067. And one is at the east edge of the range between the Sierras de Juárez and San Pedro Mártir: Valle de la Trinidad, July 1927, SDNHM 6236, 6237, 6270, 6272.

To these historical locations we add one more: Planicie de Maneadero, south of Ensenada (31°46'40"N 116°36'14"W; Fig. 1). On 21 December 2013, RAE and GM found a fresh-dead vole there among rushes (*Juncus*

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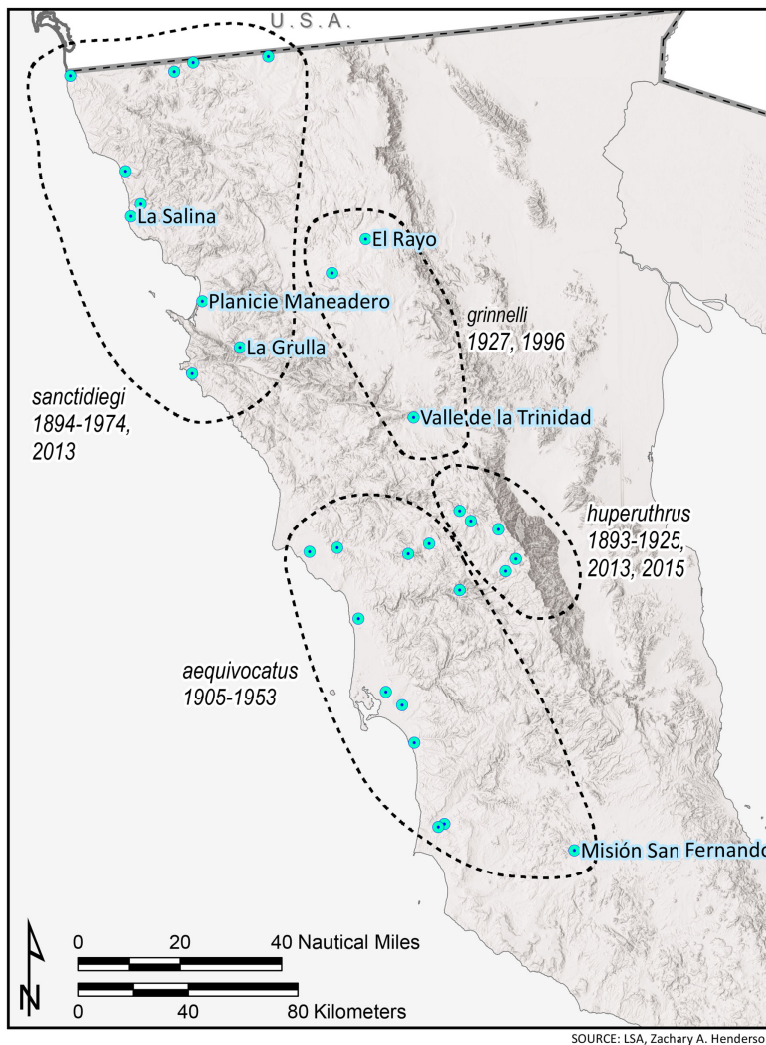


Fig. 1. Distribution of the California vole (*Microtus californicus*) in Baja California (modified from Guevara-Carrizales et al. 2016), showing approximate subspecies limits as suggested in the literature. Collection dates (years) are shown for each subspecies. Ongoing studies by Alan Harper, Anny Peralta-García and others have resulted in the discovery of additional occupied sites soon to be published.

sp.) in a wet area (Fig. 2). Follow-up live-trapping by RAE and EM (250 trap-nights over 2 nights, 17–19 February 2014) failed to produce any additional voles. Species captured at that time included the western harvest mouse (*Reithrodontomys megalotis*;  $n = 15$ ), North American deer mouse (*Peromyscus maniculatus*;  $n = 1$ ), and the nonnative house mouse (*Mus musculus*;  $n = 1$ ). Most of the site was subsequently cleared for expansion of an off-road vehicle track associated with the Estero Beach Resort, although some potentially suitable habitat remains nearby. The subspecies *M. c. sanc-*

*tidiegi* had not been reported in the field since 1974 (vic. La Misión; Guevara-Carrizales et al. 2016; Fig. 1).

Prior to “rediscoveries” in 2013 (Guevara-Carrizales et al. 2016; this report) and 2015 (Harper et al. 2016), the California vole had not been specifically reported in Mexico since 1974 (Guevara-Carrizales et al. 2016), except for one animal live-captured and released at the type locality of *M. c. grinnelli* (Sangre de Cristo) in 1996 (Harper et al. 2016; Fig. 3). Based on the paucity of recent records and fears of possible extirpations of all (Ceballos



Fig. 2. California vole (*Microtus californicus*) found dead on the Planicie de Maneadero, south of Ensenada, Baja California, 21 December 2013. Photograph by Gerardo Marrón.



Fig. 3. California vole (*Microtus californicus*) captured at Sangre de Cristo, Baja California (type locality of the subspecies *M. c. grinnelli*), 15 August 1996. Photograph by Jaime Luévano.

and Navarro 1991, Cudworth and Koprowski 2010) or portions (Heske and Lidicker 1999) of the Mexican populations of the California vole, the species was listed as endangered (SEMARNAT 2010). Guevara-Carrizales et al. (2016) and Harper et al. (2016) discussed various threats to vole populations in Mexico,

especially heavy grazing in the Sierra San Pedro Mártir. The twin threats of increasing human demand for water and expected drier regional conditions resulting from climate change are especially severe for the vole and many other freshwater-related species at the southern ends of their ranges in northwestern Baja California. Representative vertebrate species include the arroyo toad (*Anaxyrus californicus*), California red-legged frog (*Rana draytonii*), western spadefoot (*Spea hammondi*), western pond turtle (*Actinemys marmorata*), two-striped gartersnake (*Thamnophis hammondi*), and Tricolored Blackbird (*Agelaius tricolor*). Diligent conservation efforts for these species are desperately needed.

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University, Long Beach (CSULB); Field Museum of Natural History (FMNH); Natural History Museum of Los Angeles County (LACM); Museum of Comparative Zoology, Harvard University (MCZ); Museum of Vertebrate Zoology, University of California, Berkeley (MVZ); James R. Slater Museum of Natural History, University of Puget Sound (PSM); University of California, Los Angeles (UCLA); University of Michigan Museum of Zoology (UMMZ); and the U.S. National Museum (USNM). Mexican specimens of *Microtus californicus* are also housed at the San Diego Natural History Museum (SDNHM) and the Universidad Autónoma de Baja California at Ensenada (CVUABC). Comments from 2 anonymous reviewers improved the text.

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