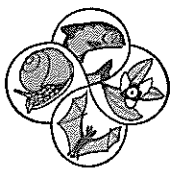

Species at Risk

Mohave ground squirrel (*Spermophilus mohavensis*) body mass: A comparison of live-trapped individuals, published literature, and unpublished museum specimens

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Abstract.
The Mohave ground squirrel (*Spermophilus mohavensis*) is a California endemic species and listed as Threatened under the California Endangered Species Act. Mohave ground squirrels are diurnally active from approximately mid-March to late July annually; entering aestivation once sufficient fat stores have been acquired. As a result of limited surface activity limited data are available on the basic natural history of this species. We live-trapped 20 Mohave ground squirrels during spring and summer 2006, in accordance with California Department of Fish and Game guidelines, in support of a California Department of Transportation highway improvement project. We recorded body mass of captured Mohave ground squirrel and compiled body masses from published literature and museum specimens (unpublished). Our research provides valuable natural history data for Mohave ground squirrel body mass from the Indian Well Valley, California.

Introduction

The Mohave ground squirrel (*Spermophilus mohavensis*), listed as a California Threatened species in 1971 (California Department of Fish and Game 1972), is endemic to the Mojave Desert (Best 1995). These squirrels enter aestivation in late summer and remain torpid (hibernate) through autumn and winter (Best 1995). Timing of aestivation/hibernation is dependent on sufficient fat stores (Morton et al. 1974; Yensen and Sherman 2003), which is directly related to body mass. Mohave ground squirrels must acquire sufficient fat stores during the active period (spring and summer) to survive aestivation and hibernation (Bartholomew and Hudson 1960).

The California Department of Fish and Game (CDFG) has established survey protocols for activities (e.g., housing developments and improvement projects) within the estimated species range to determine potential adverse affects that may result from project implementation. Persons conducting protocol surveys are required to report positive occurrences of Mohave ground squirrel to the California Natural Diversity Database (CNDDB).

Annually, numerous Mohave ground squirrel reports are generated across the species range, but many are not easily obtained, and many do not include body mass information (Brooks and Matchett 2002). Our goal is to 1) synthesize peer-reviewed literature and other sources of Mohave ground squirrel body mass data and 2) present Mohave ground squirrel body masses from the Indian Wells Valley to contribute to the limited available information on this species.

Materials and Methods

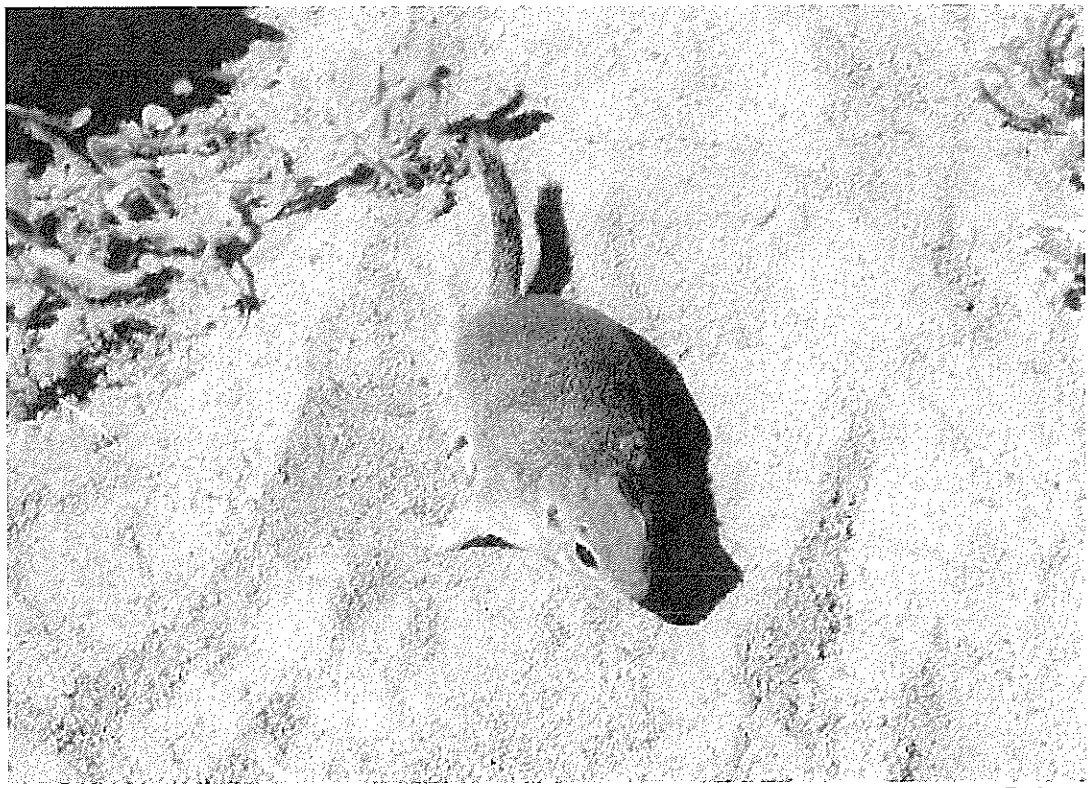
Our study in the Indian Wells Valley was conducted in response to a request by the California Department of Transportation (Caltrans) for CDFG Guideline surveys to determine the status of Mohave ground squirrels prior to the initiation of construction activities. The study was located within the Caltrans right-of-way and adjoining Bureau of Land Management lands on a 25.8-km segment of State Route 178, between Ridgecrest, California (Kern County) and Trona, California (San Bernardino County; Figure 1). The surveys were conducted in accordance with CDFG (2003) guidelines.

As part of our survey, we recorded the body mass, age, and sex for each Mohave ground squirrel captured. We then reviewed Mohave ground squirrel CNDDB occurrence data for records from 2002–2007 and peer-reviewed Mohave ground squirrel publications to obtain specific body mass information. Finally, we contacted eight natural history museums to obtain Mohave ground squirrel body masses for specimens contained in their collections.

Results and Discussion

We captured 20 Mohave ground squirrels at six of our 10 sampling grids from 21 March to 7 July 2006. Nine were adults (1 male and 8 female) and 16 were juveniles (12 male and 4 female). We recaptured seven individual Mohave ground squirrels (3 adult females, 3 juvenile females, and 1 juvenile male) and did not include the body mass of recaptured individuals in our analysis. The results of our trapping effort are shown in Table 1 and include the date of capture and age, sex, and body mass of each captured individual.

Our literature review for the Mohave ground squirrel under the current genus and former genus (*Citellus*) resulted in 16 publications including the original species description (Merriam 1889) and the American Society of Mammalogists species account (Best 1995). Of the 16 peer-reviewed publications, only three reported body masses (Table 2). Pengelley (1966) conducted



Mojave ground squirrel. Photo credit: Charles J. Randel, III

a study on four species of *Citellus*, including the Mohave ground squirrel. Individual squirrels weighed approximately 4-5g at birth and approximately 195 g 100 days post-birth. Best (1995) reported in years with high winter precipitation and high primary production pre-aestivating individual's body mass in Inyo County was 200–275 g, with some individuals up to 300 g. Jameson and Peeters (2004) offer only a range of 85-130 g for the Mohave ground squirrel. Our review of CNDDB Mohave ground squirrel records from 2002–2007 did not result in any reported body masses.

The results of the query of museum collections resulted in a total of 79 Mohave ground squirrels specimens. However, only 13 specimens included body mass information (Table 3).

Current limited scientific understanding of the basic natural history of the Mohave ground squirrel could be supplemented by more intensive reporting by persons conducting Mohave ground squirrel surveys. Our goal was to summarize the current available body mass data from CNDDB records, literature, museum specimens, and recent survey data for the purpose of increasing the existing information on this species.

Acknowledgments

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Table 1. Mohave Ground Squirrel Body Mass from Live-trapping, Indian Wells Valley, California (2006).

Date	Age	Sex	Body Mass (g)
3/21/06	A	F	183
3/24/06	A	F	178
3/24/06	A	F	213
4/7/06	A	F	183
4/17/06	A	F	163
4/19/06	A	F	205
5/3/06	A	M	220
5/4/06	A	F	240
5/5/06	J	M	75
5/19/06	A	F	232
5/21/06	J	F	67
5/22/06	J	M	86
5/22/06	J	M	85
5/23/06	J	M	127
6/29/06	J	F	100
7/6/06	J	F	122
7/6/06	J	M	106
7/6/06	J	M	107
7/7/06	J	F	115
7/12/06	J	F	131

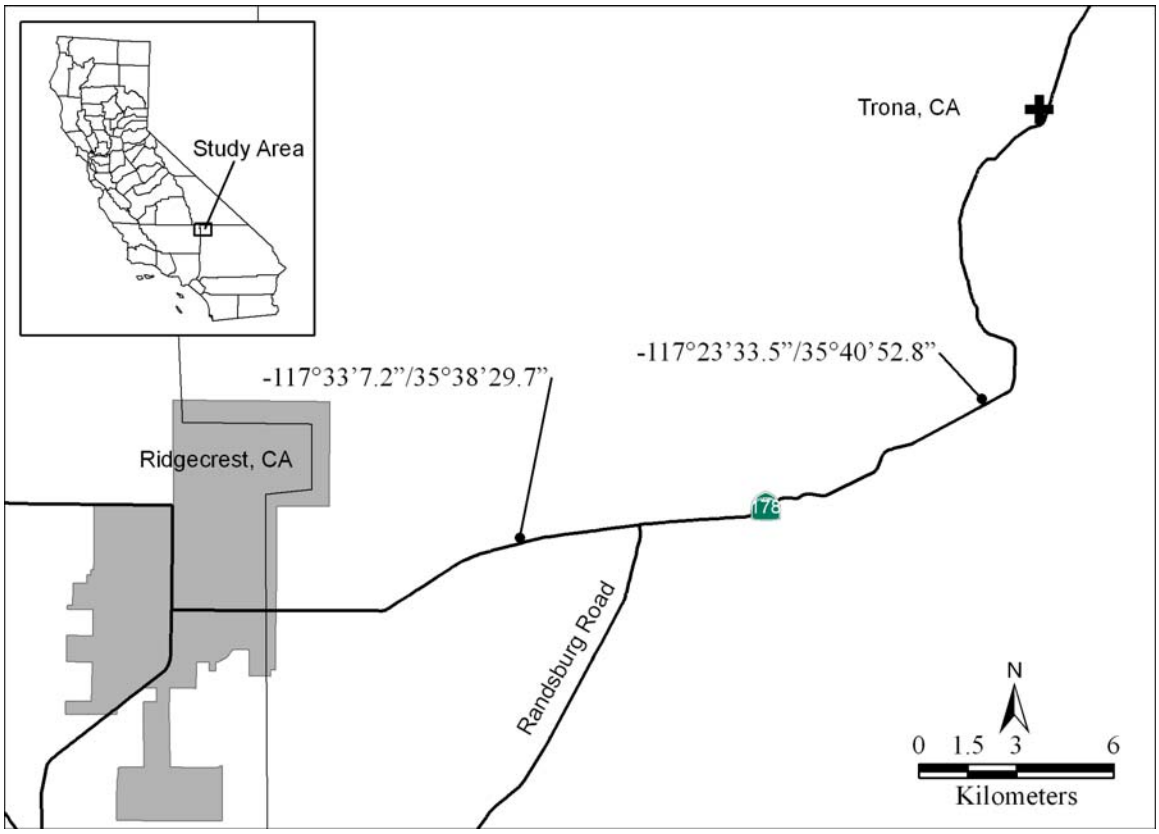
Table 2. Mohave Ground Squirrel Body Mass from Previously Published Literature.

Source of Data	**Body Mass (g)**
Pengelley 1966	4-5 (birth)
Pengelley 1966	195 (100 days post-birth)
Best 1995	200-275, up to 300
Jameson and Peeters 2004	85-130

Table 3. Mohave Ground Squirrel Body Mass from Unpublished Museum Specimens.

Location Captured	**Body Mass (g)**
California City	132.5
Randsburg	115
Oro Grande	130
Oro Grande	212
Oro Grande	285
Oro Grande	167
Oro Grande	192
Oro Grande	235
Red Mountain	248
Kramer Junction	160
Kramer Junction	120
Kramer Junction	115
Kramer Junction	100

Figure 1. Location of Mohave Ground Squirrel Study Area, Indian Wells Valley, California.


Study Area
Trona, CA
-117°23'33.5"/35°40'52.8"
-117°33'7.2"/35°38'29.7"
Ridgecrest, CA
178
Randsburg Road
N
0 1.5 3 6
Kilometers