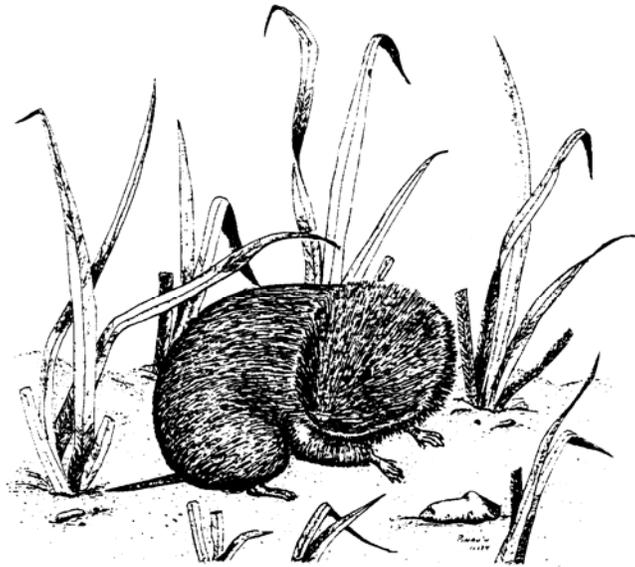


A STATUS REVIEW OF THE HUALAPAI MEXICAN VOLE IN NORTHWESTERN ARIZONA

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A STATUS REVIEW OF THE HUALAPAI MEXICAN VOLE IN NORTHWESTERN ARIZONA

INTRODUCTION

After an intensive field survey by Spicer et al. (1985), the Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*) (HMV) was listed by the U.S. Fish and Wildlife Service (USFWS) as endangered in 1987. The HMV is also included on the Arizona Game and Fish Department's (AGFD) list of **Threatened Native Wildlife in Arizona** (AGFD 1988), as endangered. A recovery plan (USFWS 1991) serves as a guideline for HMV management. Nevertheless, management agencies have expressed concern because monitoring efforts prior to this study failed to verify HMV activity in historical locations. As a result, matching funds were made available to AGFD through Section 6 of the Endangered Species Act, and recently, the AGFD heritage program, to determine the subspecies' distribution throughout its historical range in Mohave and Coconino counties, Arizona (Hoffmeister 1986).

The Hualapai Mexican vole is one of three subspecies of *Microtus mexicanus* found in Arizona and is primarily known from the Hualapai Mountains (Figure 1). A second population discovered in 1913 from Prospect Valley was recently examined and reclassified as *M. m. hualpaiensis* pending a larger sample size (Hoffmeister 1986). A third population of *M. mexicanus* was discovered in the Music Mountains in 1981 (Spicer et al. 1985). This population could be the same subspecies as is in the Hualapais, however, specimens have not yet been assigned a subspecific classification. Due to the small sample size and difficulty in classification of specimens from Prospect Valley and the Music Mountains, the status and range of the HMV has been in question since the last field evaluation by Spicer et al. (1985).

Our efforts for this ongoing study, which began in 1991, focused on verifying the continued existence of the HMV in the Hualapai Mountains and other historical locations, and collecting specimens of *M. mexicanus* from various mountain ranges near the Hualapais for genetic analyses and comparative material.

METHODS

Surveys were concentrated in the Hualapai Mountains, Music Mountains, and on the Hualapai Indian Reservation. These areas include all historical HMV locations reported in Hoffmeister (1986) and Spicer et al. (1985) (Appendix 1). The search image used for identifying potential vole habitat was first recognized from a December 1990 aerial survey of the Hualapai Mountains (Belitsky 1991). Areas in which Gambel oak and ponderosa pine were present, along with sufficient ground cover, became the focal point of our surveys.

After all known historically-occupied areas had been surveyed, the same survey techniques were applied to other areas with potential vole habitat. These areas were chosen on the basis of location within the suspected range of HMVs and vegetation cover similar to historical sites.

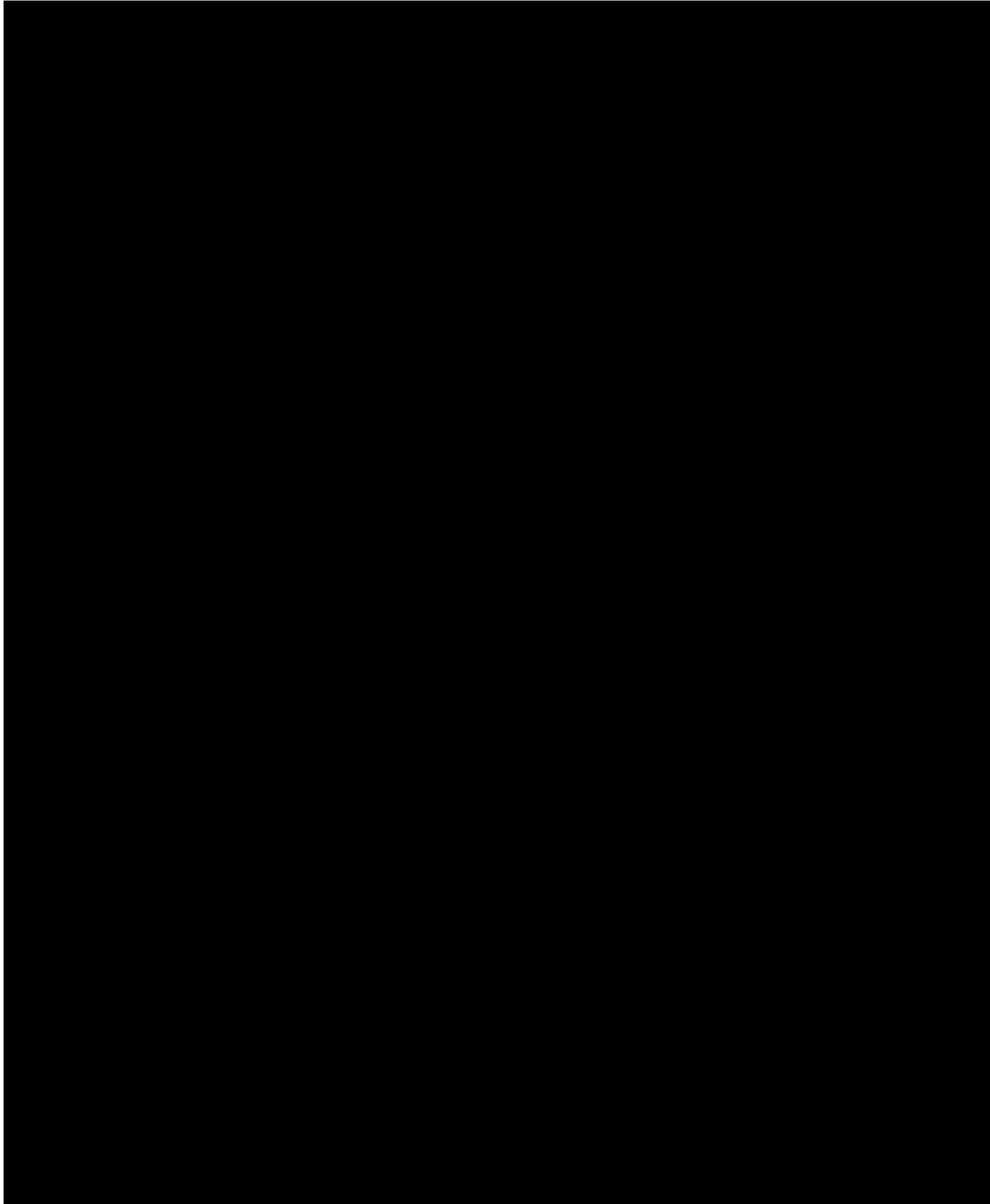


Figure
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Range
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mexicanus in Arizona (Adapted from Hoffmeister 1986).

When new vole locations were discovered, specimens were collected for genetic analyses to help determine range boundaries of possible HMVs outside the Hualapai Mountains. Ground searches were conducted on Navajo, Pine, Trinity, Round, and Mingus Mountain. Big Chino Wash, Aubrey Cliffs, and the Bradshaw, Sierra Prieta, Santa Maria, Juniper, Aquarius, Cottonwood, and Cerbat Mountains were also surveyed. Helicopter flights of the Hualapai Indian Reservation, Aquarius, Music, and Cerbat Mountains were conducted to help identify potential vole habitat. As a follow up to aerial surveys, horse and mule pack trips were concentrated in remote locations of the Hualapai, Aquarius, and Cerbat Mountains.

When potential habitat sites were found, they were examined for vole sign which includes runways, scat, grass cuttings, and burrow entrances. Runways are tunnel-like paths that average 34.4 mm in width (Spicer et al. 1985) and are the most distinctive vole sign. If active sign was observed, Sherman live traps (7.6 x 8.9 x 22.9 cm) were placed in runways and checked every three to five hours. Traps were baited with rolled oats mixed with peanut butter and polyester batting was added to prevent hypothermia of trapped animals. Information collected at each capture site included legal location, habitat description, species, sex, weight, and lengths of right hind foot, right ear, tail, and total body.

Interviews of knowledgeable people from Bureau of Land Management (BLM), Mohave County Parks Department, Prescott National Forest, Hualapai Tribe, Navajo Nation, and AGFD helped to identify potential vole habitat and occupied areas, grazing activity, land ownership, human impacts, and other management history pertinent to this review.

RESULTS

Trapping

Field work during the 1993-1994 field season was conducted from 6 July 1993 to 30 June 1994. The localities and dates where *M. mexicanus* were captured or its sign observed are shown in Table 1. Thirty voles were identified during surveys. Twenty were captured in 1987 trap nights and ten were observed at various locations during our trapping effort. Twelve of the total captured were submitted to the Museum of Southwestern Biology (MSB), University of New Mexico for genetic analyses and comparative material.

In 210 trap nights, ten HMVs were identified in two new locations of the Hualapai Mountains. These locations include Ridge Road, an area along the road leading to Wild Cow Campground, and Jeep Spring 2. Three voles were live-trapped and released unharmed at their capture sites, and seven voles were observed in runways but not trapped.

In 1777 trap nights, twenty *M. mexicanus* were identified from four areas outside the Hualapai Mountains. On the Hualapai Indian Reservation, two voles were live-trapped and released unharmed at their capture sites. On Mingus Mountain, ten voles were identified. Three were live-trapped and released unharmed at their capture sites, and seven were collected as voucher specimens. On Navajo Mountain, one vole was collected as a voucher specimen. In the Chino Valley area, which includes Round Mtn., Trinity Mtn., and Big Chino Wash, seven voles were identified. Four were collected as voucher specimens and three were observed.

Table 1. Localities and dates for captures and observations of <i>Microtus mexicanus</i> in Arizona. MSB=Museum of Southwestern Biology, University of New Mexico.				
LOCATION	ELEV IN METERS	DATE	EVIDENCE	# OF VOLES
Hualapai Mountains				
[REDACTED]				
Hualapai Indian Reservation				
[REDACTED]				
Mingus Mountain				
[REDACTED]				
Navajo Mountain				

LOCATION	ELEV IN METERS	DATE	EVIDENCE	# OF VOLES
Chino Valley				

During the 1992-1993 field season, 98 voles were identified in 2473 trap nights. Forty of the total captured were submitted to the MSB for genetic analyses. Thirty-three HVMs were captured and/or observed in 895 trap nights from eleven areas of the Hualapai Mountains. Three of these areas are in the vicinity of known historical locations including Timber Wash, Flag

Mine, and Camp Levi Levi. Eight newly discovered locations where voles were verified are Antelope Wash, Cedar Wash, Frees Wash, Jeep Spring, Moss Wash, Pine Peak East, Wabayuma Peak, and South Hayden Trail. Twenty-four voles were live-trapped and released unharmed at their capture sites, three trap mortalities occurred, and six were observed in runways but not trapped.

Sixty-five *M. mexicanus* were identified in 1578 trap nights from five areas outside the Hualapai Mountains. In the Bradshaw Mountains, 22 voles were identified. Nine were live-trapped and released unharmed at their capture sites, nine were collected as voucher specimens, and four trap mortalities occurred. In the Sierra Prieta Mountains, three voles were collected as voucher specimens. In the Santa Maria Mountains, 19 voles were identified. Five were live-trapped and released unharmed at their capture sites, 12 were collected as voucher specimens, and two were observed. On the Hualapai Indian Reservation, eight voles were identified. Seven were live-trapped and released unharmed at their capture sites, and one was observed. At the Aubrey Cliffs, 13 voles were identified. Four were live-trapped and released unharmed at their capture sites, four trap mortalities occurred, and five were collected as voucher specimens (only three were submitted for analyses, two were lost).

Twenty-eight voles were identified in 577 trap nights during the 1991 field season. Five of the total captured were submitted to the MSB for genetic analyses. In the Hualapai Mountains, 18 voles were live-trapped and released unharmed at their capture sites, one was observed but not trapped, and one trap mortality occurred. In the Music Mountains, two were live-trapped and released unharmed and two were collected as voucher specimens. On the Hualapai Indian Reservation, two were live-trapped and released unharmed and two trap mortalities occurred.

Total trapping efforts (1433 trap nights) from 13 May 1991 to 30 June 1994 identified 63 voles in the Hualapai Mountains (Appendix 2). These results prove that HVMs are extant and more widely distributed throughout the Hualapais than previously thought (Figure 2). Individuals of several age classes were captured, suggesting a reproducing population persists in several locations within the subspecies' range. Figure 3 shows the trapping effort outside the Hualapais which identified 93 voles in 3604 trap nights (Appendix 3). A total of 55 *M. mexicanus* have been submitted to the MSB for genetic analyses and comparative material.

Other mammals captured in *M. mexicanus* runways include brush mice (*Peromyscus boylii*), deer mice (*Peromyscus maniculatus*), Western harvest mice (*Reithrodontomys megalotis*), cliff chipmunks (*Eutamias dorsalis*), and white-throated wood rats (*Neotoma albigula*).

Aerial Surveys

In December 1990, a survey involving 3.0 hours of helicopter charter over the Hualapai Mountains identified potential vole habitat in six remote locations (Belitsky 1991). Only three locations were ground searched and successful in occupying voles. In May 1992, a survey involving 4.8 hours of helicopter charter over the Music Mountains and the Hualapai Indian Reservation identified ten potential habitat areas. In August 1992, ground searches of sites in the southern part of the Music Mountains near Laughing Jack Butte, T25N R13W Sec 22, 27, 28, 29, were conducted but no vole sign was found. More surveys of the Music Mountains are scheduled for the summer of 1994. In November 1992, a survey involving 3.2 hours of helicopter charter over the Aquarius Mountains identified four potential habitat areas. Ground searches near Sam Spring, T17N R11W Sec 27 SW¹/₄, were conducted but no vole sign was

found. Three other areas were located on the north facing slopes of Bonner Peak and two unnamed peaks in Sections 28 and 33, however, because the area is remote and has limited access, surveys were