

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Animal Abstract

Element Code: AMAFD03024

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Dipodomys microps leucotis*

COMMON NAME: Houserock Valley Chisel-toothed Kangaroo Rat, Arizona chisel-toothed kangaroo rat, House Rock Valley kangaroo rat, Marble Canyon kangaroo rat.

SYNONYMS:

FAMILY: Heteromyidae

AUTHOR, PLACE OF PUBLICATION: Goldman, E. A. 1931. Proc. Biol. Soc. Washington 44:133-136.

TYPE LOCALITY: Six miles west of Colorado River Bridge (=Navajo Bridge), Houserock Valley, north side of Marble Canyon, Coconino County, Arizona, 3700 feet.

TYPE SPECIMEN: U.S. National Museum 250036 (adult male), E. A. Goldman, October 17, 1931. Original collector's specimen number 23570.

TAXONOMIC UNIQUENESS: In North America, there are 16 species of *Dipodomys*, and thirteen subspecies of *Dipodomys microps*. Two subspecies of this taxon are found in Arizona; including *D. m. leucotis* and *D. m. celsus*.

DESCRIPTION: Small, but medium-sized compared to other kangaroo rats. Body length 4-5 inches (10.16-12.7 cm); tail 5.5-7.5 (13.97-19.05 cm); weight 2.5-3.2 (72-91 g). Has pale hip stripe; long striped tufted tail; forepaw small in comparison to well developed hind legs; hind feet has five toes; bipedal hopping; kangaroo-like gait. Grayish brown fur on its upper parts; white fur below; external brownish fur-lined cheek pouches. Large and luminous eyes which aid in their nocturnal lifestyle. Lateral enlargement or flange extending from maxilla above anterior base of zygomatic arch. As in all *Dipodomys*, the papery thin skull is distinctive. Skull has exceptionally inflated auditory bullae, which considerably broadens the posterior part of the skull, making it noticeably triangular. The skull has 16 cheek teeth and 4 incisors, which are unrooted and grow throughout life. (Hoffmeister 1986, Spicer and Johnson 1988).

AIDS TO IDENTIFICATION: *D. m. leucotis* can be easily distinguished from all non-*Dipodomys* within its range by its long tufted tail, long and well-developed hindlegs, and bipedal locomotion. The only other species of *Dipodomys* found within the range of *D. m. leucotis* is *D. ordii* (Ord's Kangaroo Rat). *D. m. leucotis* is easily distinguished from *D. ordii*

by its lower incisors, which are flat-fronted and chisel-shaped in cross-section. The incisors of *D. ordii* are rounded and awl-shaped in cross-section. *D. m. leucotis* is also larger and darker than *D. ordii* and has a dark ventral tail stripe extending to the tail tip rather than stopping just short of it, as it does in *D. ordii*. The dark tail stripes of *D. m. leucotis* are usually wider and narrower than the white tail stripes, and the cheek pouches are lined with dusky, rather than white fur (Spicer and Johnson 1988).

ILLUSTRATIONS: Line drawing of skull (Hoffmeister 1986: Fig. 5.156)
Line drawing of *D. microps* skull and entire animal (Ingles 1954)
Color photo, of the genus (Chisholm.htm 2001)

TOTAL RANGE: Found only in Houserock Valley, on the west side of the Colorado River, Coconino County, northern Arizona (Hafner et al. 1998). Only one specimen has been captured on the east side of the Colorado River. This specimen, captured by Hardy just east of Navajo Bridge in 1949, appears to be a straggler (Spicer and Johnson 1988).

RANGE WITHIN ARIZONA: See "Total Range."

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: The Houserock Valley Chisel-toothed Kangaroo Rat is mostly a nocturnal animal; like other kangaroo rats, they are solitary. They are active above ground all year long, with the most activity occurring during the early hours of the night. Their above ground activities become shorter and shorter as temperatures cool in the fall and winter (Kenagy 1973). Typically, they rest during the daytime and at night they burrow, forage, socialize and sand bathe. They have sharp, chisel-like lower incisors that help strip epithelium from leaves of perennial shrubs to expose inner, moisture-rich tissues. Their life span is four to five years (Whitaker 1996). Common predators of the chisel-tooth include rattlesnakes, gopher snakes, and owls, and less commonly coyotes, bobcats, house cats and various raptors.

Although questioned in the past, Chisel-toothed kangaroo rats are known to form mounds associated with a concentration of burrow entrances (Hayssen 1991 in O'Farrell 1997). Mounds may range from 30 to over 67 cm high, and may be 2 to 4 m in diameter. Burrows are typically built in sand or in the natural dirt mounds at the base of shrubs. The burrows descend at least 25 centimeters, to avoid fluctuations in daytime temperatures. Entrances are usually plugged in the daytime. At two Houserock Valley sites, occupied complexes averaged 2.45 per acre; no single complex yielded more than one adult chisel-tooth (Spicer and Johnson 1988).

D. microps has been shown to have less capacity for physiological water conservation than some other species of *Dipodomys*. Lower, more stable soil temperatures and higher humidity levels are found in their burrows. Because of their cool, humid burrow, the seeds stored in their caches, absorb water vapor from the burrow air. This water retention aids in their water

requirements during times of food scarcity. Movements inside their network of burrow levels enable this species to maintain desired body temperatures and conserve water (Spicer and Johnson 1988). Kangaroo rats in general, have specialized kidneys which allow them to dispose of waste materials with very little output of water; another mechanism in conserving water.

REPRODUCTION: No studies of the reproduction of *D. m. leucotis* have been done. For the species: births in California occurred from March to mid-April or sometimes later, and in Nevada, from April-June. Gestation lasts 30-34 days. Single litter of 1-4 (most often 2), though under exceptionally good conditions a few may produce 2 litters/year. Juveniles typically do not mature sexually in season of birth. (NatureServe 2000). Specimens of immature *D. m. leucotis* captured in late July and early August were probably born in late May (Hoffmeister 1986). O'Farrell (1995) captured estrous and pregnant females in August, providing evidence of the production of second litters. Based on studies of other subspecies of *D. microps*, it is probable that *D. m. leucotis* breeds every year (Kenagy 1973). Reproduction possibly triggered by vitamins in perennial-shrubs leaves or in winter annuals (Johnson 1988).

FOOD HABITS: Generally granivores, although they are known to feed extensively on saltbush leaves. Seeds are stored in burrows when plentiful, and are relied on during extremely dry periods, and where saltbush is less common or absent (Csuti 1979). Kenagy (1973) found caches of shadscale leaves in storage chambers but did not find any major caches of seeds.

HABITAT: Shrub dominated Great Basin desertscrub communities with relatively high shrub cover and sparse grass cover. According to O'Farrell (1995), the preferred soils have a rocky or gravelly component and are moderately deep to deep. Spicer and Johnson (1988) collected *D. m. leucotis* in areas with shallow to deep sandy soils.

Chisel-toothed kangaroo rats require good shrub cover, in contrast to Merriam's kangaroo rats (*D. merriami*) which require much less cover. If the shrub cover is removed or destroyed, Merriam's kangaroo rat replaces the chisel-toothed species. (Hoffmeister 1986).

ELEVATION: 3,500 - 6,500 feet (1068-1983 m). Spicer and Johnson (1988) state elevations of 3,200 - 5,500 ft (976-1678 m).

PLANT COMMUNITY: This subspecies is primarily found in shrub dominated Great Basin desertscrub communities. They are particularly fond of areas dominated by shadscale (*Atriplex confertifolia*) and four-wing saltbush (*Atriplex canescens*). They are also found to a lesser degree in blackbrush (*Coleogyne ramosissima*) dominated areas. Shadscale dominated communities also contained galleta (*Hilaria jamesii*), indian ricegrass (*Achnatherum hymenoides*), prickly pear (*Opuntia sp.*), and fluffgrass (*Erioneuron pulchellum*). Four-wing saltbush dominated communities also contained blue grama (*Bouteloua gracilis*), green rabbitbrush (*Chrysothamnus viscidiflorus*), snakeweed (*Gutierrezia sarothrae*), sand dropseed

(*Sporobolus cryptandrus*), mormon tea (*Ephedra sp.*), winterfat (*Krascheninnikovia lanata*), prickly pear, and indian ricegrass. Blackbrush dominated communities also contained scattered narrow-leaved yucca (*Yucca angustissima*), ephedra, and indian ricegrass (O'Farrell 1995).

POPULATION TRENDS: The relative abundance of *D. m. leucotis* throughout the occupied portion of Houserock Valley appears to be low and generally patchy. Approximately 73,624 acres of habitat is occupied out of a total of about 150,000 acres in Houserock Valley. Based on past collection information and recent trapping efforts, it appears that this species is now absent from part of its former range (O'Farrell 1995).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None (USDI, FWS 1996)
[C2 USDI, FWS 1985]

STATE STATUS: WSC (WSCA, AGFD in prep)
[Candidate, TNW, AGFD 1988]

OTHER STATUS: None (USDI, BLM AZ 2005)
[Bureau of Land Management Sensitive
(USDI, BLM AZ 2000)]
Group 4, full species level (NNDFW, NESL
2005)
[Group 4, full species level (NNDFW,
NESL 2000, 2001)]

MANAGEMENT FACTORS: Areas with high degrees of past livestock and agricultural disturbances have been found to be absent of *D. m. leucotis*. This is especially true around livestock water sources and areas where shrubs were removed for agricultural purposes. The majority of occupied habitat is publicly owned and will not be developed in the future. However, this species can be considered a sensitive taxon due to its limited distribution, low general abundance, and the intense past and present grazing practices in the area (O'Farrell 1995). Threats include: excessive concentrations of browsing livestock; feral and free-ranging cats (*Felis catus*) may also be a local problem in developed areas near Glen Canyon Recreation Area (AGFD 1996 in prep).

PROTECTIVE MEASURES TAKEN: None

SUGGESTED PROJECTS: Areas that have had intense past livestock and agricultural disturbances have been shown to be free of *D. m. leucotis* (O'Farrell 1995). Limits should be put on grazing in those areas to allow natural recruitment of saltbush and other important shrubs. Range conditions should be monitored in the occupied portion of Houserock Valley.

Per O'Farrell (1997): 1) A reduction in livestock use or a more frequent shift of use on existing pastures within the blackbrush, shadscale, and four wing saltbush habitats, would

increase the carrying capacity for *D. m. leucotis*; 2) Periodic monitoring of kangaroo rat population levels would provide trends that allow remedial action should there be a precipitous decline in kangaroo rat numbers; 3) detailed studies of demography and spatial use by *D. m. leucotis* are needed to gain a better perspective on critical aspects of the biology of the species and to allow a better opportunity to provide suitable management for the long-term protection of this isolated taxon; 4) Avoid placement of new livestock water sources in the blackbrush, shadscale, and four wing saltbush habitats; 5) When possible, the response of vegetation and subsequent kangaroo rat response in areas where livestock use has declined, especially around water sources, should be studied in detail. It is critical to understand the dynamics of habitat recovery in areas no longer used intensively.

LAND MANAGEMENT/OWNERSHIP: Bureau of Land Management, Arizona State Land Department, U. S. Forest Service, and National Park Service.

SOURCES OF FURTHER INFORMATION

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- Michael J. O'Farrell - O'Farrell Biological Consulting, Las Vegas, NV.
- Robert B. (Barry) Spicer - private consultant, former Arizona Game and Fish Dept. employee, Phoenix, AZ.

ADDITIONAL INFORMATION:

D. m. leucotis occurs at the southeastern edge of the range for *microps*, and is isolated geographically from all other *microps*. It is separated from the nearest population of *D. microps* (*D. m. celsus*) by the Kaibab Plateau, which was uplifted 50 million years ago. The distance separating these two subspecies is approximately 40 miles (Spicer and Johnson 1988).

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