STATUS OF THE NORTHERN ROCK DEERMOUSE, *PEROMYSCUS NASUTUS* (RODENTIA: CRICETIDAE), IN UTAH

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ABSTRACT.—*Peromyscus nasutus* has been considered to occur in Utah since it was first reported in the state in 1935. Authors since then have considered the distribution of *P. nasutus* to include southeastern Utah. However, the original Utah specimen was later reidentified as *Peromyscus boylii*. A query of museums revealed only 1 other specimen considered to be *P. nasutus* from Utah. This specimen was examined and found to be *P. boylii*. Thus, there is no evidence of the occurrence of *P. nasutus* in Utah, and the northwesternmost accepted records of this species are in the Chuska Mountains of northeastern Arizona.

Key words: *Peromyscus nasutus*, *Peromyscus difficilis*, northern rock deermouse, northern rock mouse, rock mouse, *Peromyscus boylii*, brush deermouse, brush mouse, mammals, Utah.

The northern rock deermouse, *Peromyscus nasutus* (J.A. Allen, 1891), has long been considered a part of the mammalian fauna of Utah, albeit 1 of the rarest mammals in the state. Because of its perceived rarity in Utah, this species was for many years included in the Utah Division of Wildlife Resources' Utah Sensitive Species List (e.g., Utah Division of Wildlife Resources 1997, 1998), and more recently it has been considered a species of potential conservational concern and is included in the Utah Division of Wildlife Resources' Utah Comprehensive Wildlife Conservation Strategy (Sutter et al. 2005). Mammalogical literature continues to indicate the occurrence of *P. nasutus* in Utah. Evidence for the occurrence of this species in Utah is here reevaluated.

Nomenclature used here follows Musser and Carleton (2005). Baker et al. (2003) have advocated slightly different English common names for species of *Peromyscus*, and they placed this genus in the family Muridae (as did Musser and Carleton 1993) rather than in Cricetidae. Many authors in recent years have treated *P. nasutus* as a species distinct from the southern rock deermouse, *Peromyscus difficilis* (J.A. Allen, 1891), but others have considered *nasutus* to be only a subspecies of *P. difficilis*. Musser and Carleton (2005), while tentatively listing both as species, summarized the taxonomic controversy, which they considered to be unresolved, and commented concerning the 2 nominal species that “the matter

of their synonymy deserves reconsideration and decisive resolution.”

Peromyscus nasutus was first reported from Utah by Benson (1935) based on field work conducted in the vicinity of Navajo Mountain in 1933. In his account for this species, Benson (1935) wrote: “Two caught in a rocky gully at Rainbow Bridge. This species inhabits rocky situations in the juniper zone and doubtless occurs throughout the lower canyons in this region.” Seemingly only 1 of these was saved as a specimen, for in the same account Benson referred to “[t]he single specimen from Rainbow Bridge.” At the same locality Benson (1935) also reported the capture of the brush deermouse, *Peromyscus boylii* (Baird, 1855): “One taken at Rainbow Bridge in a rocky side-canyon.” Rainbow Bridge is 8.3 km north of the Arizona boundary and ~4.4 km south-southeast of the Colorado River (now inundated by Lake Powell) in extreme southwestern San Juan County, Utah (Fig. 1). Elevations in the vicinity of Rainbow Bridge are ~1100 m.

Durrant (1952), based on Benson's (1935) report and on his own examination of the Rainbow Bridge specimen, included *P. nasutus* in his monograph on the mammals of Utah as part of the accepted fauna of the state. Durrant (1952) noted that he knew of no other specimens of this species from Utah but speculated that “further collecting may reveal its presence in suitable habitat in all of that part of Utah east of the Colorado and Green rivers.”

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Fig. 1. The Four Corners area (Utah–Colorado–New Mexico–Arizona) showing 4 refuted locational records of *Peromyscus nasutus* (open circles), 2 undisputed records of this species (solid circles), and various place names mentioned in the text.

Hoffmeister and Diersing reexamined Benson's Rainbow Bridge specimen (no. 61160, Museum of Vertebrate Zoology, University of California, Berkeley) and determined that it was not *P. nasutus* but *P. boylii* (Hoffmeister 1986). They also reexamined a specimen (no. 33403, Museum of Vertebrate Zoology) from Tuba City, Coconino County, Arizona (~97 km south of the Utah boundary; Fig. 1), considered by Benson (1935), Cockrum (1961), and others (e.g., Hall and Kelson 1959, Hall 1981) to be *P. nasutus*, and concluded that it too was *P. boylii* rather than *P. nasutus*. Hoffmeister (1986) further commented that he did not consider the range of *P. nasutus* to extend into north central Arizona or into Utah. Hoffmeister (1986) did, however, present records of *P. nasutus* from the Chuska Mountains, Apache County, Arizona, the closest of these to Utah being ~63 km south of the state boundary (Fig. 1), and Findley et al. (1975) had records of this species from just southeast of the Chuska Mountains in McKinley County, New Mexico.

Anderson (1961) reported a single specimen of *P. nasutus* (no. 69413, University of Kansas

Museum of Natural History, Lawrence) from Mesa Verde National Park, Montezuma County, Colorado, which is the nearest reported locality for this species outside of Utah, ~45 km east of the state boundary (Fig. 1). However, Armstrong (1972) reexamined Anderson's Mesa Verde specimen and concluded that it is *P. boylii*, adding that he did not consider there to be any valid records of *P. nasutus* west of the San Juan Mountains in Colorado. In fact, the westernmost localities for *P. nasutus* in Colorado are in the Sangre de Cristo Range (Armstrong 1972, Hall 1981), well to the east of the San Juan Mountains.

A query of museum collections revealed only 1 other specimen considered to be *P. nasutus* that has been collected in Utah. The specimen was collected by Robert S. Hoffmann on 9 June 1973 at Devil's Canyon campground, 10 miles north-northeast of Blanding, San Juan County, which is on the east side of the Abajo Mountains at an elevation of ~2175 m (Fig. 1). This specimen, in the mammal collection of the University of Kansas Museum of Natural History (no. 154282), is a female, with measurements

recorded by the collector as follows: total length 213 mm, tail length 112 mm, hind foot length 24 mm, ear length 21 mm, and weight 29.7 g.

The specimen was examined by the author. Tooth wear indicates that it is a moderately old individual. The lower molars (m1, m2) are not complex. On both the right and left mandibles, m1 lacks an entolophulid, and m2 lacks a mesostylid. Left m1 lacks an ectostylid and right m1 possesses an ectostylid. These dental characters suggest *P. boylii*, not *P. nasutus*, according to Hooper (1957), Dalquest and Stangl (1983), and Hoffmeister (1986), but not Cornely et al. (1981), who found no important differences in molar complexity between these 2 species.

Dalquest and Stangl (1983) used characters of the mandibles and lower molars to distinguish 7 species of *Peromyscus* from trans-Pecos Texas. The anteroconid of m1 of the Devil's Canyon specimen lacks a notch or groove, agreeing with Dalquest and Stangl's (1983) grade 0, which they found in 43% of *P. boylii* but only in 11% of *P. nasutus* that they examined. Alveolar length of the lower molar tooththrow (m1–m3) of the Devil's Canyon specimen is 4.14 mm, near the lower end of the range for *P. nasutus* (4.10–4.70 mm) and near the upper end of the range for *P. boylii* (3.65–4.20 mm) (Dalquest and Stangl 1983). The length of m1 is 1.71 mm, which is within the range for *P. boylii* but not for *P. nasutus* (Dalquest and Stangl 1983). Breadth of m1 is 1.00 mm, agreeing with *P. boylii* but not *P. nasutus* (Dalquest and Stangl 1983). As discussed above, the complexity of m1 also agrees more closely with the findings of Dalquest and Stangl (1983) for *P. boylii* than for *P. nasutus*.

Cornely et al. (1981) also evaluated characters of 7 species of *Peromyscus* in trans-Pecos Texas (in the Guadalupe Mountains). Unlike other authors (Hooper 1957, Dalquest and Stangl 1983, Hoffmeister 1986), they did not find any obvious or meaningful differences in the complexity of the upper or lower molars (frequencies of styles and lophs or of stylids and lophids) of *P. boylii* and *P. nasutus*. However, they did find cranial differences between these species. The auditory bullae of the Devil's Canyon specimen are slightly inflated, the condition found in *P. boylii*, not moderately inflated as in *P. nasutus* (Cornely et al.

1981). The interparietal of the Devil's Canyon specimen is diamond-shaped and pointed anteriorly as in *P. boylii*, not triangular and unpointed anteriorly as in *P. nasutus* (Cornely et al. 1981).

Greatest length of skull of the Devil's Canyon specimen is 27.06 mm, which would be exceptionally small for *P. nasutus* (and is small even for *P. boylii*). Pelage characters of this specimen agree more closely with those of *P. boylii* than with *P. nasutus*. The flanks, and other parts of the dorsum including the head, are suffused with ochre and are not so distinctly or uniformly gray as in typical *P. nasutus*. Applying the cranial and dental characters discussed above as well as external characters (measurements and pelage), I consider the Devil's Canyon specimen to be *P. boylii*.

In her inventory the mammals of the Abajo Mountains and vicinity, San Juan County, Utah, Schafer (1991) did not detect *P. nasutus*. Apparently she was unaware of the University of Kansas specimen from Devil's Canyon, and she did not mention *P. nasutus*, not even as a species of hypothetical occurrence. However, she did collect *P. boylii* at a location "9 mi. SSW Monticello" at 7200 ft (2195 m) elevation, which is approximately the same as that of the University of Kansas specimen, the highway crossing of Devil's Canyon being 9.5 miles south-southwest of the center of Monticello. Durrant (1952), too, examined a specimen of *P. boylii* from Devil's Canyon.

Many technical publications (e.g., Hoffmeister 1951, Hall and Kelson 1959, Hoffmeister and de la Torre 1961, Hooper 1968, Hall 1981, Carleton 1989, Musser and Carleton 1993, 2005, Nowak 1999, Durish et al. 2004) as well as popular works (e.g., Burt and Grossenheider 1980, Planz 1999, Kays and Wilson 2002, Bowers et al. 2004, Reid 2006) have followed Benson (1935) and Durrant (1952) in indicating that the distribution of *P. nasutus* includes southeastern Utah. Furthermore, this species has been considered to be of conservation concern in Utah because of its apparent rarity in this state (Utah Division of Wildlife Resources 1997, 1998, Sutter et al. 2005). Reconsideration of the evidence for the occurrence of this species in Utah, however, does not support its inclusion in the fauna of the state. Because the 1933 Rainbow Bridge specimen and the 1973 Devil's Canyon specimen, which represent the only known evidence of *P.*

nasutus in Utah, both have been found to be *P. boylii* rather than *P. nasutus*, there remains no reason to consider *P. nasutus* to occur in Utah. Although *P. boylii* occurs throughout the Four Corners area of Utah, Colorado, New Mexico, and Arizona (Durrant 1952, Armstrong 1972, Findley et al. 1975, Hoffmeister 1986), the northwesternmost credible records of *P. nasutus* are those in the Chuska Mountains, Apache County, Arizona (Hoffmeister 1986) (Fig. 1).

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