

RH: GENERAL NOTES

FIRST RECORD OF THE DUSKY-FOOTED WOODRAT, *NEOTOMA FUSCIPES*, IN  
NORTHERN NEVADA

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ABSTRACT—On 3 August 2018, a single specimen of the Dusky-footed Woodrat, *Neotoma fuscipes*, was collected as the 1st occurrence of the species in Nevada.

Key words: *Neotoma fuscipes*, Nevada, woodrat

Woodrats are a unique genus (*Neotoma*) of North American rodents, many of which are adapted to dry and rocky habitats (Goldman 1910). Woodrats are known for constructing nests that are maintained across generations (Goldman 1910; Carraway and Verts 1991). These middens can be used for long-term studies of adaptations to climate variation and evolutionary change over time (Matocq 2009; Hornsby and Matocq 2012). In the Northwestern United States, the Desert Woodrat (*Neotoma lepida*), Bushy-Tailed Woodrat (*Neotoma cinerea*), and Dusky-Footed Woodrat (*Neotoma fuscipes*) can be found, but maintain different habitat associations (Reid 2006). Of these 3 species, the Dusky-footed Woodrat maintains the most western and limited range, and was previously not thought to occur in Nevada. Here we describe the 1st capture and collected specimen of the Dusky-Footed Woodrat in northern Nevada.

As a part of a larger study measuring biodiversity response to conifer removal in the northern Great Basin, we deployed 2 lines of baited box traps along Horse Creek in Washoe County, Nevada at the end of July and first days of August in 2018. For all individuals captured, we used pelage, tail length, ear length, and hindfoot characteristics for species level identification (Fig. 1, Fig. 2, Fig. 3). Multiple field guides and previous studies using live individuals use size and pelage to distinguish the Bushy-tailed Woodrat (*Neotoma cinerea*), the Desert Woodrat (*Neotoma lepida*), and the Dusky-Footed Woodrat (*Neotoma fuscipes*) in hand (Salmon and Gorenzel 1994; McEachern and others 2006; Reid 2006; Innes and others 2008). The Desert Woodrat is smaller in total body size and length than the Bushy-tailed and Dusky-Footed Woodrats and the Bushy-tailed Woodrat is easily distinguished by their long, bushy, “squirrel-like” tails. The 3 groups of Dusky-Footed Woodrat subspecies are also morphologically distinct, with our trapping location being closest in proximity to the known range of the *Neotoma fuscipes fuscipes* subspecies (Hooper 1938; Matocq 2002). Penile morphology can additionally be used to determine species and subspecies level identification in male woodrats (Matocq 2002; Matocq and others 2006). All trap mortalities are collected and stored in ethanol in the University of Nevada, Reno Museum of Natural History for continued work on mammal ecology in the Great Basin and phylogenetic studies of *Neotoma* species.

We captured 1 Dusky-Footed Woodrat at 41.975° N and -119.918° W near Horse Creek in a baited box trap on 3 August 2018 (Fig. 4). The capture site is heavily shaded by Juniper (*Juniperus occidentalis*) with approximately 80% canopy cover along the small stream transitioning to 30% tree cover in a mixed sagebrush habitat 75 meters from the water. The habitat of our capture site is similar to conifer-forest habitat being used by the Dusky-Footed Woodrat in its northeastern-most range (northwestern Lassen County, CA and Klamath County,

OR west of the Cascade Mountains; Murray and Barnes 1969). These habitat characteristics are also consistent with previous research indicating that Dusky-Footed Woodrats select habitat with 75 to 100% canopy cover over more open areas (Cranford 1977). The water needs of *Neotoma* species are complex and variable depending on water availability, effort in obtaining water, and habitat associated vegetation preferences affecting consumption rates and efficiency by species and locality (Boice 1969; Birney and Twomey 1970). Our capture of this Dusky-Footed Woodrat within a meter of a stream lends support to previous research that shows that woodrats consume more water when succulents and water storage plants are less available, and that Dusky-Footed Woodrats are likely less efficient at water storage than other desert-specialized rodents (Lee 1963; Birney and Twomey 1970).

This novel collection extends the known range of the Dusky-Footed Woodrat approximately 120 km directly east of the most northeastern point of capture in California, which is along Clear Lake Reservoir Road between Clear Lake National Wildlife Refuge and Goose Lake. Also, our collection is approximately 120 km northeast of the historical eastern most population of Dusky-Footed Woodrats that has been documented by multiple encounters near Flourney, California. No baseline information is available for Dusky-Footed Woodrats at our remote Nevada field sites, so our observation brings into question habitat or climate driven range shifts for the species. Previous research has shown that dispersal ability, transition of dominant vegetation structure (grasses to shrubs), and rate of change in climate variables have significant effects on range shifts in small mammals (Williams and Blois 2018; Christensen and others 2018). Continued monitoring of small mammal communities in remote field sites of northern Nevada is critical to increase our understanding of under-studied regions, and to track potential future population changes.

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## FIGURES

FIGURE 1. Picture of tail measurement for the collected Dusky-Footed Woodrat after preservation in 95% ethanol. The tail is furred, which distinguishes it from invasive rat species such as *Rattus rattus*. It is typical for the tail length of the Dusky-Footed Woodrat to be approximately 200 mm and half of their total body length. The individual is a lactating female, which prevents species confirmation by penile morphology.

FIGURE 2. Picture of the top of the right hind foot of the collected Dusky-Footed Woodrat. This picture highlights the dark coloring of the feet for which the species is named.

FIGURE 3. Picture of the full body of the collected Dusky-Footed Woodrat on a lab tray after preservation. This image shows the large, rounded ears of the species.

FIGURE 4. Map of study area in northeastern Nevada. The blue circle encompasses the field site where the Dusky-Footed Woodrat was collected.









