Olive-backed Pocket Mouse

Perognathus fasciatus

REGULATORY STATUS

USFWS: No special status
USFS R2: No special status
UWFS R4: No special status
Wyoming BLM: No special status
State of Wyoming: Nongame Wildlife

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS4 (Cb), Tier III
WYNDD: G5, S3S5
Wyoming contribution: LOW
IUCN: Least Concern

STATUS AND RANK COMMENTS

Olive-backed Pocket Mouse (*Perognathus fasciatus*) is assigned a range of state conservation ranks by the Wyoming Natural Diversity Database (WYNDD) due to uncertainty concerning the abundance, population trends, amount of occupied habitat, and extent of extrinsic stressors in Wyoming.

NATURAL HISTORY

Taxonomy:

Olive-backed Pocket Mouse is a member of the family Heteromyidae, which includes the pocket mice and kangaroo rats [1]. There are two recognized subspecies of *P. fasciatus*, both of which are found in Wyoming: *P. f. callistus* occupies southwestern Wyoming, while *P. f. fasciatus* is found in the eastern two-thirds of the state [2, 3]. There is no apparent barrier between the distributions of these two subspecies, suggesting the potential for introgression. A recent genetic analysis confirms that *P. fasciatus* is distinct from other, geographically proximate *Perognathus* species, but does not further resolve subspecific designations [4].

Description:

Olive-backed Pocket Mouse, like other pocket mice, is a small-bodied rodent with a relatively long tail and visible, external, fur-lined cheek pouches. Dorsal pelage of Olive-backed Pocket Mouse is generally olivaceous, being darker in the northeast portion of its range (i.e., *P. f. fasciatus*) and more buffy in the southwest (i.e., *P. f. callistus*) [3]. Olive-backed Pocket Mouse typically has whitish ventral pelage, usually with a bright yellowish lateral line separating dorsum and venter [5, 6]. It can be identified in the field, but positive identification can be difficult as it is similar in appearance to other, sympatric congeners. It is most similar to Plains Pocket Mouse (*P. flavescens*) and Silky Pocket Mouse (*P. flavus*), which both have generally lighter (i.e., yellow, buff, or creamy) dorsal pelage rather than olivaceous. In addition to lacking olivaceous coloring, Great Basin Pocket Mouse (*P. parvus*) has a tail that is penciled (i.e., having

a tuft of longer hair at the end) and longer in proportion to its body, while Hispid Pocket Mouse (*P. hispidus*) is generally larger [5-7].

Distribution & Range:
Wyoming is on the southwestern edge of Olive-backed Pocket Mouse range. It is Wyoming's most widely distributed pocket mouse and is presumed to occur throughout the grassland and shrubland basins of the state, although this is based on only about 30 records of documented occurrence [8]. There have apparently been no major recent range expansions or contractions, either in Wyoming or elsewhere in its range, although data are lacking.

Habitat:
The Olive-backed Pocket Mouse is found in a variety of arid and semiarid upland habitats, generally with a large grass component, sparse vegetation, and loose sandy to clayey soils that accommodate tunnel construction [3]. Although commonly associated with relatively open grasslands, it can also occupy farmland, grassy rock outcroppings, arid shrublands, and semi-wooded habitat [3, 9]. In a survey of rodents in eastern Wyoming, Olive-backed Pocket Mouse only occurred in a grassland site dominated by blue grama (*Bouteloua gracilis*) and needle and thread grass (*Stipa comata*), on loamy-sand soil, and having less than 40% bare ground [10]. Habitat associations in other portions of Wyoming are poorly understood. Olive-backed Pocket Mouse lives in burrows year round, becoming almost entirely fossorial during winter [3].

Phenology:
Olive-backed Pocket Mouse can breed from April to August, with duration of the breeding season and number of litters produced per year varying with location and inter-annual weather patterns [3]. Litters of roughly 4 to 6 young are born after a one-month gestation period. Olive-backed Pocket Mouse becomes almost entirely fossorial during winter, but there is some confusion regarding over-winter habits. Some sources suggest hibernation [9], while others report continued activity [3, 6]. Alternating periods of winter torpor and activity is perhaps most likely, with mice feeding on food cached in their burrow complexes during periods of arousal.

Diet:
Olive-backed Pocket Mouse is largely granivorous, feeding on wide variety of small seeds [6], although it may also consume green vegetation and invertebrates [11]. Seeds are gathered in cheek pockets and cached within the burrow complex [3].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: UNCOMMON
Although a fairly widespread species of the Great Plains and Rocky Mountain front, densities of the Olive-backed Pocket Mouse are generally low throughout its range, with studies reporting from 0.62 to 4.00 individuals per ha [3]. In Wyoming, Olive-backed Pocket Mouse abundance is largely unknown. There are reported occurrences from many of Wyoming's basins, but no systematic surveys have been conducted for the species across its purported range in the state. Local small mammal surveys in Wyoming have generally reported very low capture rates of Olive-backed Pocket Mouse, suggesting it is relatively rare [6, 10, 12], although it is not clear if this reflects true rarity or could be the result of low capture probability. A recent study using occurrence of small mammal remains in owl pellets suggests that Olive-backed Pocket Mouse

was the 5th most abundant small mammal in a study in the Canadian Great Plains, but still only represented 2–5% of specimens identified [13]. Based on accumulated opportunistic data, Olive-backed Pocket Mouse is assumed to be relatively widely distributed in Wyoming and to occur at relatively low densities.

Population Trends:
Historic: UNKNOWN
Recent: UNKNOWN
No information is available regarding population trends of Olive-backed Pocket Mouse anywhere within its range.

Intrinsic Vulnerability:
LOW VULNERABILITY
Olive-backed Pocket Mouse has slightly lower fecundity compared to other small mammal species, producing one or two litters of 4–6 young per year [3, 9]. Although occurring in a variety of lowland habitat types, evidence from the literature suggests that Olive-backed Pocket Mouse may be sparsely distributed and occur at low densities. It is thought that the distributions of several species of pocket mouse, including Olive-backed Pocket Mouse, are limited by interspecific competition [3].

Extrinsic Stressors:
MODERATELY STRESSED
Threats to Olive-backed Pocket Mouse in Wyoming are largely speculative. It may be impacted by invasive species, as suggested by studies of other pocket mice that occurred at lower abundance at sites that had undergone invasions of nonnative plants [14]. Grasslands across the world, including Wyoming, have undergone similar invasions of nonnative plants. Habitats within Olive-backed Pocket Mouse range in Wyoming continue to be affected by traditional and renewable energy development, but it is unknown how these activities affect the species.

KEY ACTIVITIES IN WYOMING

The Wyoming Game and Fish Department (WGFD) has recently funded three studies relating (directly or indirectly) to Olive-backed Pocket Mouse in Wyoming. First, the Wyoming Cooperative Fish and Wildlife Research Unit completed a study of small mammals in sagebrush steppe habitats in southwestern Wyoming in 2011. This study captured a single Olive-backed Pocket Mouse near Pinedale, slightly outside the previously known Wyoming distribution [15]. Second, from 2013–2015 the Wyoming Cooperative Fish and Wildlife Research Unit evaluated the impact of Cheatgrass (*Bromus tectorum*) on small mammal communities in Thunder Basin National Grassland [16]. Third, the WYNDD initiated a study in 2015 to refine the distribution of several rare small mammals in the state, including Olive-backed Pocket Mouse. The goals of this project are to develop pocket mouse survey protocols, determine occupancy, and evaluate habitat, distribution, and threats from energy development to pocket mice. It has an expected completion date in 2017 [17, 18].

ECOLOGICAL INFORMATION NEEDS

Assessment of Olive-backed Pocket Mouse status in Wyoming is hampered by limited information regarding distribution, habitat use, abundance, and population trends. Improved distribution and habitat information are necessary to develop refined estimates of potential impact from development activities across Wyoming's basins. Estimates of abundance and

occupancy rates are important to establish an accurate conservation rank and as a baseline for eventual population monitoring that can be used to assess trends over time.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Nichole L. Bjornlie. Although the Olive-backed Pocket Mouse is likely widespread throughout Wyoming, very little is known regarding trends, density, and limiting factors. Consequently, priorities in Wyoming in the short-term will focus on addressing these data deficiencies. Of particular importance are data on habitat requirements, distribution, population status, and limiting factors, which will ultimately be used to develop management and conservation recommendations.

CONTRIBUTORS

Douglas A. Keinath, WYNDD
Katherine Leuenberger, WYNDD
Nichole L. Bjornlie, WGFD
Gary P. Beauvais, WYNDD
Ian M. Abernethy, WYNDD

REFERENCES

[1] Bradley, R. D., Ammerman, L. K., Baker, R. J., Bradley, L. C., Cook, J. A., Dowler, R. C., Jones, C., Schmidly, D. J., Stangl, F. B., Jr., Van Den Bussche, R. A., and Wursig, B. (2014) Revised checklist of North American mammals north of Mexico, *Occasional Papers Museum of Texas Tech University*.

[2] Wilson, D. E., and Ruff, S., (Eds.) (1999) *The Smithsonian Book of North American Mammals*, Smithsonian Institution Press, Washington and London.

[3] Manning, R. W., and Jones, J. K., Jr. (1988) *Perognathus fasciatus*, *Mammalian Species 303*, 1-4.

[4] Neiswenter, S. A., and Riddle, B. R. (2011) Landscape and climatic effects on the evolutionary diversification of the *Perognathus fasciatus* species group, *Journal of Mammalogy 92*, 982-993.

[5] Armstrong, D. M., Fitzgerald, J. P., and Meaney, C. A. (2011) *Mammals of Colorado, Second Edition*, University Press of Colorado, Boulder, Colorado.

[6] Clark, T. W., and Stromberg, M. R. (1987) *Mammals in Wyoming*, University of Kansas Press, Lawrence, Kansas.

[7] Genoways, H. H., and Brown, J. H. (1993) *Biology of the Heteromyidae*, Vol. 10, The American Society of Mammalogists.

[8] Keinath, D., Anderson, M., and Beauvais, G. (2010) Range and modeled distribution of Wyoming's species of greatest conservation need, Wyoming Natural Diversity Database, University of Wyoming, Laramie, Wyoming.

[9] Wrigley, R. E., Dubois, J. E., and Copland, H. W. R. (1991) Distribution and ecology of 6 rare species of prairie rodents in Manitoba, *Canadian Field-Naturalist 105*, 1-12.

[10] Maxwell, M. H., and Brown, L. N. (1968) Ecological distribution of rodents on the high plains of Eastern Wyoming, *Southwestern Naturalist 13*, 143-158.

[11] Gummer, D. L., and Kissner, K. J. (2004) Olive-backed Pocket Mouse (*Perognathus fasciatus*), In *MULTISAR: The Milk River Basin Project Habitat Suitability Models for Selected Wildlife Management Species. Alberta Sustainable Resource Management, Fish and Wildlife Division, Alberta Species at Risk Report No. 86.* (Downey, B. A., Downey, B. L., Quinlan, R. W., Castelli, O., Remesz, V. J., and Jones, P. F., Eds.), pp 71-75, Edmonton, Alberta, Canada.

[12] Boulerice, J., and Grenier, M. (2014) Evaluation of Oral Sylvatic Plague Vaccine in White-tailed Prairie Dogs: Year One, In *Threatened, Endangered, and Nongame Bird and Mammal Investigations: Annual Completion Report* (Orabona, A. C., and Cudworth, N., Eds.), pp 431-452, Wyoming Game and Fish Department.

[13] Heisler, L. M., Somers, C. M., Wellicome, T. I., and Poulin, R. G. (2013) Landscape-scale features affecting small mammal assemblages on the northern Great Plains of North America, *Journal of Mammalogy 94*, 1059-1067.
[14] Litt, A. R., and Steidl, R. J. (2011) Interactive effects of fire and nonnative plants on small mammals in grasslands, *Wildlife Monographs*, 1-31.
[15] Abernethy, I. M. (2011) Independent and interactive effects of anthropogenic disturbance and habitat on small mammals, p 69, University of Wyoming, Laramie, WY.
[16] Ceradini, J. P. (2016) Behavioral, demographic, and community responses of small mammals to habitat homogenization by cheatgrass, p 124, University of Wyoming, Laramie, WY.
[17] Harkins, K., Keinath, D., and Ben-David, M. (2015) Unpublished data from pocket mouse surveys of Wyoming's basins, University of Wyoming, Wyoming Natural Diversity Database, Laramie, Wyoming.
[18] Harkins, K. (2016) Clarifying exposure risk of small mammals to energy development in Wyoming, In *Threatened, Endangered, and Nongame Bird and Mammal Investigations: Annual Completion Report* (Orabona, A. C., Ed.), pp 485-492, Wyoming Game and Fish Department.

Figure 1: Olive-backed Pocket Mouse in Natrona County, Wyoming. (Photo courtesy of Kristina M. Harkins)

Figure 2: North American range of *Perognathus fasciatus*. (Map from: Patterson, B. D., et al. (2007) Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, NatureServe, Arlington, Virginia.)

Figure 3: Olive-backed Pocket Mouse habitat in Campbell County, Wyoming. (Photo courtesy of Kristina M. Harkins)

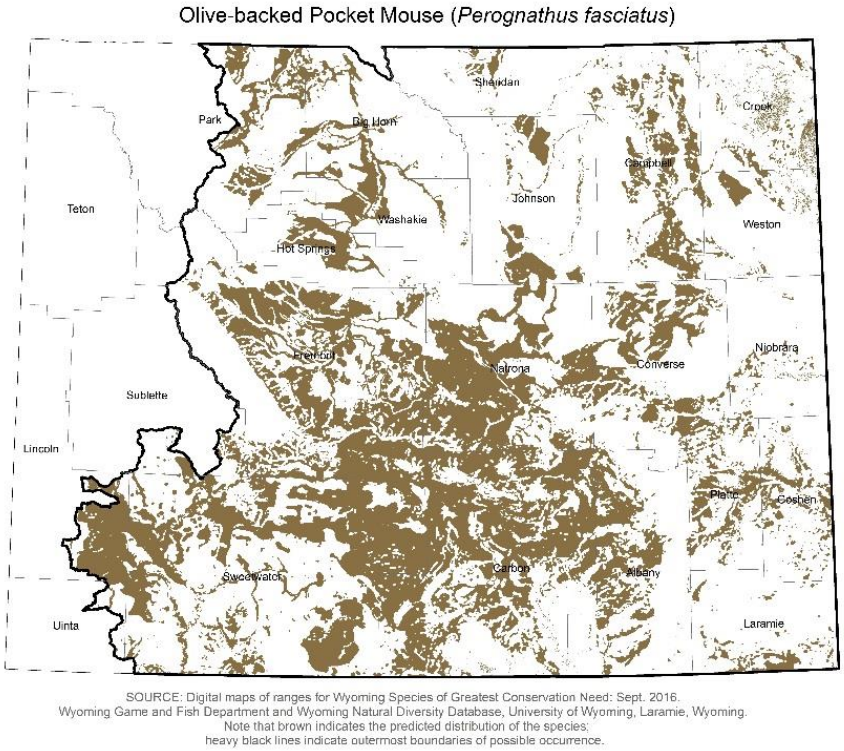

Figure 4: Range and predicted distribution of *Perognathus fasciatus* in Wyoming.

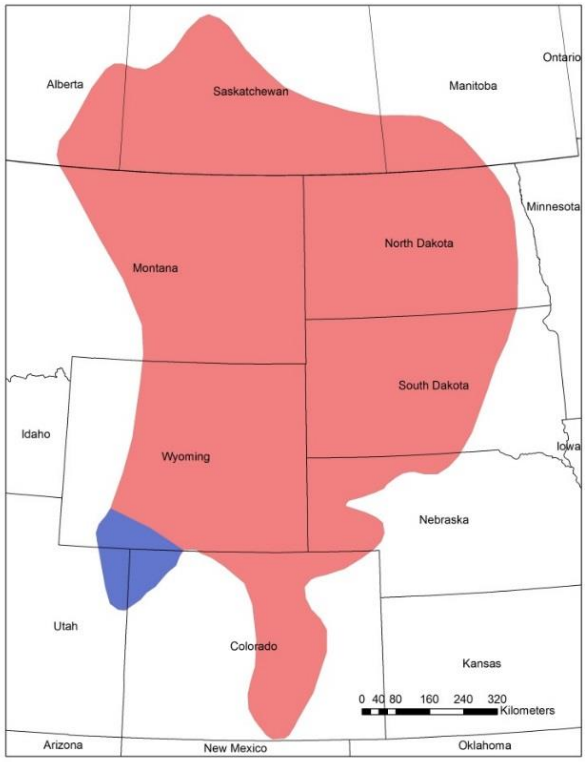

Figure 5: Range of *Perognathus fasciatus* subspecies; *P. f. fasciatus* in red and *P. f. callistus* in blue. (Overall range from: Patterson, B. D., et al. (2007) Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, NatureServe, Arlington, Virginia. Sub-specific boundaries adapted from: Manning, R. W., and Jones Jr., J. K. (1988) *Perognathus fasciatus*, *Mammalian Species 303*, 1-4.)