Hispid Pocket Mouse

Chaetodipus hispidus

REGULATORY STATUS

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

CONSERVATION RANKS

USFWS: No special status
WGFD: NSSU (U), Tier III
WYNDD: G5, S1S3
Wyoming Contribution: LOW
IUCN: Least Concern

STATUS AND RANK COMMENTS

The Wyoming Natural Diversity Database has assigned Hispid Pocket Mouse (*Chaetodipus hispidus*) a state conservation rank ranging from S1 (Critically Imperiled) to S3 (Vulnerable) because of uncertainty about the proportion of range occupied and population trends for this species in Wyoming.

NATURAL HISTORY

Taxonomy:

Historically, there were four recognized subspecies of Hispid Pocket Mouse, and only *C. h. paradoxus* was found in Wyoming [1-5]. A recent DNA-based study determined that the previously accepted subspecies are neither morphologically nor genetically distinct and instead proposed new subspecies boundaries delineated by four geographically and ecologically disjunct mitochondrial clades [6]. Following this taxonomic revision, Wyoming remains within the distribution of the newly defined subspecies *C. h. paradoxus* [6].

Description:

It is possible to identify Hispid Pocket Mouse in the field. It is the largest Wyoming pocket mouse species; adults weigh between 40–60 g and can reach total lengths of 200–223 mm [2]. Tail, hind foot, and ear length ranges from 90–113 mm, 25–28 mm, and 12–13 mm, respectively [2]. Hispid Pocket Mouse is named for its distinctly coarse dorsal pelage, which is buff to yellowish orange mixed with black hairs, thus leading to an overall brownish or even olive appearance [1, 2, 4, 5, 7]. The species has a prominent band of buff to yellowish orange hair running laterally along the side and around the eyes, and the venter is white. The hair-covered tail does not have an obvious crest or terminal tuft and is white or buff with a dark mid-dorsal stripe [1, 2, 4, 5, 7]. Like all pocket mice, Hispid Pocket Mouse has external cheek pouches that are lined with hair and used for transporting food [2, 5]. Where sympatric, Olive-backed Pocket Mouse (*Perognathus fasciatus*; weight 8–14 g), Plains Pocket Mouse (*P. flavescens*; 7–15 g), and Silky Pocket Mouse (*P. flavus*;

5–10 g) can all be distinguished from Hispid Pocket Mouse by their much smaller size and soft dorsal pelage [2].

Distribution & Range:
Hispid Pocket Mouse is widely distributed across the Great Plains of central North America, from southeastern Montana and southwestern North Dakota, south into central Mexico [8]. Far eastern Wyoming is on the northwestern edge of the species' continental range [4, 9]. Confirmed or suspected breeding has been documented in 3 of the 28 latitude/longitude degree blocks in Wyoming [9].

Habitat:
Hispid Pocket Mouse inhabits a wide range of arid grassy environments across its continental range including shortgrass, bunchgrass, and tallgrass prairie; mixed grasslands; shrub grasslands; piñon-juniper (*Pinus* spp.-*Juniperus* spp.) mesas; oak (*Quercus* spp.) uplands; and active and inactive cropland [1, 5, 10-16]. However, the species is typically most abundant in short-grass and bunch-grass environments with relatively sparse vegetation [1]. In Wyoming, Hispid Pocket Mouse is found in short-grass prairie, mixed-grass prairie, sagebrush (*Artemisia* spp.) and Soapweed Yucca (*Yucca glauca*) grasslands, and vegetated dunes [2, 4]. Shallow burrow systems are constructed in a variety of soil types and are used for food storage, refuge, and nesting. Older animals tend to build more complex burrow systems than younger animals [1, 5].

Phenology:
The phenology of Hispid Pocket Mouse in Wyoming is largely unknown. The species is nocturnal and does not hibernate; however, it will enter periods of torpor when temperatures are low, especially when food is limited [1, 2]. Hispid Pocket Mouse is solitary outside of the breeding season, which occurs during the spring and summer in the northern parts of its range. Females may have several litters of 5 or 6 young (range 2–9) per season, which are likely dependent on the mother for approximately 30 days [1, 2, 5].

Diet:
Nothing is known about the specific diet composition of Hispid Pocket Mouse in Wyoming. In other parts of its range, the species eats an assortment of seeds (i.e., grass, forb, shrub, tree, and succulent), as well as some insects and green vegetation depending on availability [1, 2, 5]. Hispid Pocket Mouse stores seeds in burrows for consumption during the winter [1, 2, 4, 5].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: RARE
There are no robust estimates of abundance available for Hispid Pocket Mouse in Wyoming. An ongoing study designed to survey pocket mouse distributions across the state captured just 5 individuals across 3 of 47 trapping sites surveyed in 2015; however, only 8 of the 47 sites fell within the predicted range of Hispid Pocket Mouse [17, 18]. The species has a statewide abundance rank of RARE, and appears to be rare within suitable environments in its predicted range [9].

Population Trends:
Historic: UNKNOWN
Recent: UNKNOWN
Historic and recent population trends for Hispid Pocket Mouse in Wyoming are unknown.

Intrinsic Vulnerability:

MODERATE VULNERABILITY

Hispid Pocket Mouse has moderate intrinsic vulnerability in Wyoming because it has a restricted distribution and apparent low abundance in the state, even within suitable habitat. As a small mammal with relatively limited dispersal ability, Hispid Pocket Mouse would likely have little opportunity for range expansion within the state should major disturbance or loss of existing habitat occur.

Extrinsic Stressors:

MODERATELY STRESSED

Primary potential extrinsic stressors to Hispid Pocket Mouse in Wyoming are loss or degradation of habitat from natural or anthropogenic disturbances. Grassland environments in the state are vulnerable due to development for energy, infrastructure, and agriculture; invasive plant species; anthropogenic disturbance from off-road recreational activities; altered fire and grazing regimes; and drought and climate change [9]. Like other pocket mouse species that typically favor open environments with sparse vegetation, Hispid Pocket Mouse may be negatively impacted by invasive plant species that grow in tall and/or dense stands such as Cheatgrass (*Bromus tectorum*) [19]. Hispid Pocket Mouse had higher abundance in interior versus edge plots in mixed grasslands in Colorado, and was trapped most frequently in landscapes with little surrounding development [10]. However, the species appears to be very tolerant of fire and grazing across much of its distribution, even showing preference for grazed and recently burned habitat in some areas [15, 16, 20-23]. Hispid Pocket Mouse will also use some agricultural landscapes including cornfields, wheat fields, and fallow fields, but may be more abundant in nearby natural habitat [10, 12-15]. It is not known how potential extrinsic stressors might impact Hispid Pocket Mouse in Wyoming.

KEY ACTIVITIES IN WYOMING

Hispid Pocket Mouse is classified as a Species of Greatest Conservation Need by the Wyoming Game and Fish Department (WGFD). From 2013–2015, the WGFD funded a project at the Wyoming Cooperative Fish and Wildlife Research Unit to evaluate the impact of Cheatgrass on small mammal communities in Thunder Basin National Grassland; however, Hispid Pocket Mouse was not detected during this study [19]. In 2015, the University of Wyoming and WGFD initiated a two-year graduate research project to better understand the distribution, occupancy, habitat, and diet partitioning of small mammals in the state, including Hispid Pocket Mouse, through statewide surveys. Hispid Pocket Mouse was detected at several sites during the first season of trapping in 2015, and this project is already providing valuable information on the distribution and habitat associations of this species in Wyoming [18, 24]. Data from this project's 2016 field season is not yet available, but is expected to add important new information in this context.

ECOLOGICAL INFORMATION NEEDS

Hispid Pocket Mouse is not well-studied in Wyoming, and little is known about the detailed distribution, abundance, natural history, or reproductive habits of this species in the state. As a rare, peripheral species, Hispid Pocket Mouse would benefit from research to identify potential natural and anthropogenic disturbances to its already limited Wyoming distribution.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Nichole L. Bjornlie. Hispid Pocket Mouse is assigned an NSSU rank because survey data that would provide for an assessment of population status are lacking. Consequently, priorities in Wyoming in the short-term will focus on addressing these data deficiencies. Of particular importance are data on population status and trends and a more refined understanding of distribution within the state. Because of the low density and patchy distribution of Hispid Pocket Mice on the landscape, acquiring these data will likely require targeted survey efforts. Additional priorities will focus on assessing limiting factors and habitat requirements, including the impact of invasive species and energy development, which will ultimately be used to develop management and conservation recommendations.

CONTRIBUTORS

Kaylan A. Hubbard, WYNDD
Nichole L. Bjornlie, WGFD
Gary P. Beauvais, WYNDD

REFERENCES

[1] Paulson, D. D. (1988) *Chaetodipus hispidus*, *Mammalian Species 320*, 1-4.
[2] Clark, T. W., and Stromberg, M. R. (1987) *Mammals in Wyoming*, University of Kansas Press, Lawrence, Kansas.
[3] Wilson, D. E., and Reeder, D. M., (Eds.) (2015) *Wilson and Reeder's Mammal Species of the World, 3rd edition (MSW3) [online database]*, http://vertebrates.si.edu/msw/mswcfapp/msw/index.cfm.
[4] Buskirk, S. W. (2016) *Wild Mammals of Wyoming and Yellowstone National Park*, University of California Press, Oakland, California.
[5] Wilson, D. E., and Ruff, S., (Eds.) (1999) *The Smithsonian Book of North American Mammals*, Smithsonian Institution Press, Washington and London.
[6] Andersen, J. J., and Light, J. E. (2012) Phylogeography and subspecies revision of the Hispid Pocket Mouse, *Chaetodipus hispidus* (Rodentia: Heteromyidae), *Journal of Mammalogy 93*, 1195-1215.
[7] Reid, F. A. (2006) *Peterson Field Guide to Mammals of North America*, Houghton Mifflin Company, New York.
[8] Patterson, B. D., Ceballos, G., Sechrest, W., Tognelli, M. F., Brooks, T., Luna, L., Ortega, P., Salazar, I., and Young, B. E. (2007) Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, NatureServe, Arlington, Virginia.
[9] Orabona, A., Rudd, C., Grenier, M., Walker, Z., Patla, S., and Oakleaf, B. (2012) Atlas of birds, mammals, amphibians, and reptiles in Wyoming, p 232, Wyoming Game and Fish Department Nongame Program, Lander, WY.
[10] Bock, C. E., Vierling, K. T., Haire, S. L., Boone, J. D., and Merkle, W. W. (2002) Patterns of rodent abundance on open-space grasslands in relation to suburban edges, *Conservation Biology 16*, 1653-1658.
[11] Davis, S. S., Mitchell, R. B., and Demarais, S. (2000) Trap-revealed microhabitat use by small mammals in monoculture grasslands, *Texas Journal of Science 52*, 195-200.
[12] Fleharty, E. D., and Navo, K. W. (1983) Irrigated cornfields as habitat for small mammals in the sandsage prairie region of western Kansas, *Journal of Mammalogy 64*, 367-379.
[13] Kaufman, D. W., and Kaufman, G. A. (1990) Small mammals of wheat fields and fallow wheat fields in north-central Kansas, *Transactions of the Kansas Academy of Science 93*, 28-37.
[14] Kaufman, D. W., Clark, B. K., and Kaufman, G. A. (1990) Habitat breadth of nongame rodents in the mixed-grass prairie region of north central Kansas, *Prairie Naturalist 22*, 19-26.
[15] Kaufman, D. W., Kaufman, G. A., and Clark, B. K. (2000) Small mammals in the native and anthropogenic habitats in the Lake Wilson area of north-central Kansas, *Southwestern Naturalist 45*, 45-60.
[16] Kaufman, G. A., Kaufman, D. M., and Kaufman, D. W. (2012) Hispid Pocket Mice in tallgrass prairie: abundance, seasonal activity, habitat association, and individual attributes, *Western North American Naturalist 72*, 377-392.

[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.
[19] Ceradini, J. P. (2016) Behavioral, demographic, and community responses of small mammals to habitat homogenization by cheatgrass, p 124, University of Wyoming, Laramie, WY.
[20] Bock, C. E., Jones, Z. F., Kennedy, L. J., and Bock, J. H. (2011) Response of rodents to wildfire and livestock grazing in an Arizona desert grassland, *The American Midland Naturalist 166*, 126-138.
[21] Fuhlendorf, S. D., Townsend, D. E., II, Elmore, R. D., and Engle, D. M. (2010) Pyric-herbivory to promote rangeland heterogeneity: evidence from small mammal communities, *Rangeland Ecology and Management 63*, 670-678.
[22] Jones, Z. F., Bock, C. E., and Bock, J. H. (2003) Rodent communities in a grazed and ungrazed Arizona grassland, and a model of habitat relationships among rodents in southwestern grass/shrublands, *American Midland Naturalist 149*, 384-394.
[23] Kirchner, B. N., Green, N. S., Sergeant, D. A., Mink, J. N., and Wilkins, K. T. (2011) Responses of small mammals and vegetation to a prescribed burn in a tallgrass blackland prairie, *American Midland Naturalist 166*, 112-125.
[24] Harkins, K. (2015) Personal communication and unpublished data from statewide pocket mouse surveys conducted in 2015, Wyoming Natural Diversity Database, University of Wyoming, Laramie, Wyoming.

Figure 1: Hispid Pocket Mouse captured in Goshen County, Wyoming. (Photo courtesy of Tegan May)

Figure 2: North American range of *Chaetodipus hispidus*. (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: Grassland habitat where Hispid Pocket Mouse has been captured in Goshen County, Wyoming. (Photo courtesy of Kristina M. Harkins)

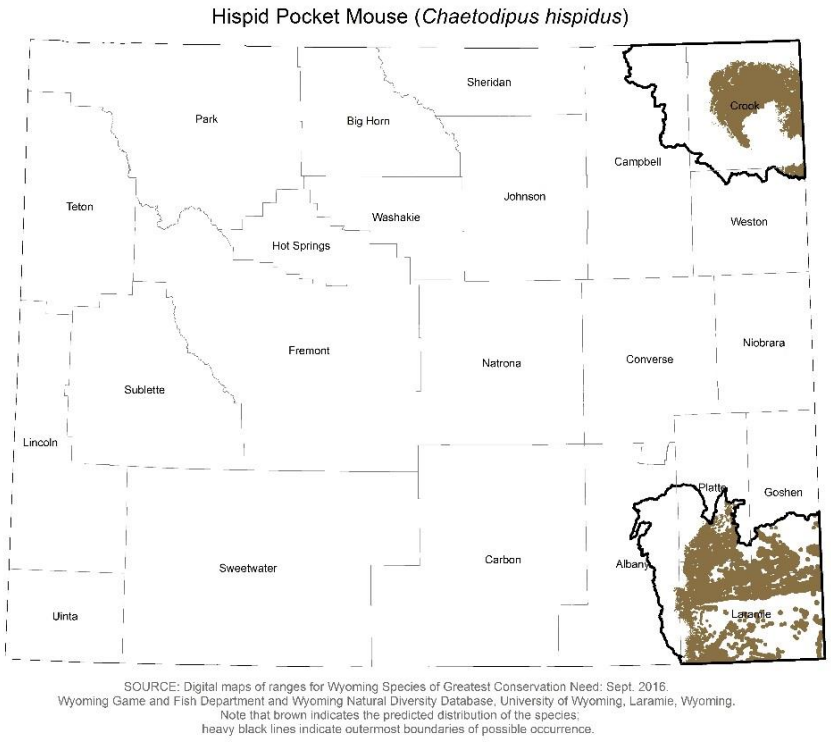

Figure 4: Range and predicted distribution of *Chaetodipus hispidus* in Wyoming.