Wyoming Pocket Gopher

Thomomys clusius

REGULATORY STATUS

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

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS2 (Ab), Tier I
WYNDD: G2G3, S1
Wyoming Contribution: VERY HIGH
IUCN: Least Concern

STATUS AND RANK COMMENTS

Wyoming Pocket Gopher (*Thomomys clusius*) was petitioned for listing under the Federal Endangered Species Act in 2007. In 2010, the U.S. Fish and Wildlife Service (USFWS) determined that listing was not warranted (12-month decision) because the species was not likely in danger of extinction throughout all or significant portions of its range [1]. The species was again petitioned for listing in 2016, and the USFWS again determined that listing was not warranted (via a "not substantial" 90-day decision) in September 2016 [2].

NATURAL HISTORY

Taxonomy:

Although Wyoming Pocket Gopher was initially described as unique species in 1875 [3], subsequent revisions of the *Thomomys* genus placed Wyoming Pocket Gopher as a subspecies (*T. talpoides clusius*) of Northern Pocket Gopher (*T. talpoides*) until 1979 [4]. Wyoming Pocket Gopher is now considered a unique species based on genetic evidence [5]. Wyoming Pocket Gopher is monotypic, having no defined subspecies [4].

Description:

Wyoming Pocket Gopher is the smallest member of the genus *Thomomys* (total length: 161–184 mm; weight: 44.0–71.5 g). The species does not demonstrate sexual dimorphism [5]. Like other pocket gophers, Wyoming Pocket Gopher has a large head and shoulders tapering towards the posterior end. The front feet are large and strong with large claw-like nails used for digging. The species has small eyes and ears and fur-lined cheek pouches that open externally of the mouth [6, 7]. Pelage is generally pale yellow-brown [3], with young individuals lighter than adults. On the dorsal side, pelage is uniform in color. Wyoming Pocket Gopher can be distinguished from the sympatric Northern Pocket Gopher by its smaller size, lack of dark post-auricular patches, and presence of white hairs on the margins of pinnae that are lighter than the hair of the dorsum [5].

Distribution & Range:
Wyoming Pocket Gopher is Wyoming's only endemic mammal and is found only in south-central Wyoming. The distribution of the species extends roughly from southeast of Rock Springs in Sweetwater County to northwest of Rawlins in Carbon County [4]. It is unknown if changes in distribution have occurred either historically or recently. Confirmed breeding has been documented in 2 of the 28 latitude/longitude degree blocks in Wyoming [8].

Habitat:
Wyoming Pocket Gopher is found in shrub steppe and mixed desert shrublands. The species is often associated with relatively flat habitat characterized by well-drained clay soils and greater amounts of bare soil with little rock or litter cover along gravelly ridgelines and stream-cut riverbanks [5, 9, 10]. Wyoming Pocket Gopher is fossorial, spending the majority of its life underground. Therefore, soils that are deep and tractable enough to hold burrow systems are necessary to maintain pocket gopher populations [6]. It is suspected that Wyoming Pocket Gopher can utilize harder soils with higher clay content than sympatric pocket gopher species [9]. Further, the species is associated with areas containing less Big Sagebrush (*Artemisia tridentata*) and Yellow Rabbitbrush (*Chrysothamnus viscidiflorus*) and more Gardner's Saltbush (*Atriplex gardneri*), Winterfat (*Krascheninnikovia lanata*), and potentially greasewood (*Sarcobatus* spp.) [5, 9, 10]; the presence of Gardner's Saltbush may be the best predictor of the presence of Wyoming Pocket Gopher [10], although this may amount to only 0.01–15.00% cover [9]. Because pocket gophers in general have small home ranges, it is unlikely that habitat use varies greatly among seasons [6].

Phenology:
Phenology of Wyoming Pocket Gopher is largely unknown, but it is assumed to be similar to the closely related and well-studied Northern Pocket Gopher [4]. Northern Pocket Gopher is fossorial and active year-round, with above-ground movements limited to nighttime or overcast daytime conditions [11]. Breeding occurs from mid-March to mid-June with juveniles dispersing from early June to late July, at which time they begin to develop their own burrow systems [11, 12]. While it is thought that Wyoming Pocket Gopher disperses above ground based on evidence from other species, it is not explicitly known how this species disperses. Litter size is also unknown, although Northern Pocket Gopher in Wyoming gives birth to 4 (range: 1–10) young annually [11, 12].

Diet:
Wyoming Pocket Gopher diet is poorly understood but is also assumed to be similar to sympatric *Thomomys* species. For Northern Pocket Gopher, primary dietary components include roots, tubers, shoots, and leaves of forbs, grasses, and shrubs. Most food items are likely collected underground, although above-ground food items are also collected and pulled into burrow entrances. Food is likely cached [11].

CONSERVATION CONCERNS

Abundance:
Continental: LOCAL ENDEMIC
Wyoming: VERY RARE
The global distribution of Wyoming Pocket Gopher is limited to an area roughly 19,700 km^2 in size in south-central Wyoming [4], although actual presence of individuals within this distribution is patchy [13]. While little is known about the abundance of the species, it is assumed to be quite

rare on the landscape based on low capture rates during targeted sampling efforts – Wyoming Pocket Gopher was captured in only 29% of 84 quarter sections (0.65 km^2 each) known to be occupied by pocket gophers in the predicted range of the species [10].

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

Intrinsic Vulnerability:
HIGH VULNERABILITY
Wyoming Pocket Gopher is a local endemic with a global distribution limited to a very small area of south-central Wyoming [4]. Further, within this limited distribution, Wyoming Pocket Gopher appears to be relatively rare and is about half as common on the landscape as the more widespread Northern Pocket Gopher [10]. Species with small geographic ranges are vulnerable to a single localized threat, including anthropogenic and stochastic factors, and thus face a higher probability of extinction than do species occupying a large range [6]. In general, pocket gophers have limited dispersal ability [6, 7], which may impact Wyoming Pocket Gopher's ability to expand its distribution.

Extrinsic Stressors:
MODERATELY STRESSED
Wyoming Pocket Gopher range coincides with existing and planned oil, natural gas, and wind energy developments [1]. Development of energy resources and construction of associated infrastructure has the potential to result in the loss, fragmentation, and degradation of Wyoming Pocket Gopher habitat; soil compaction from oil and gas exploration and extraction may be particularly detrimental to this fossorial species, especially if individuals disperse below ground [6, 9, 14]. However, effects of these activities on Wyoming Pocket Gopher are unquantified. Furthermore, responses to natural and anthropogenic disturbances by other pocket gopher species are mixed, making it hard to make any predictions about Wyoming Pocket Gopher [1]. Finally, livestock grazing has reduced abundance of some pocket gopher species in some systems [6]. Although grazing does occur at some level across parts of the distribution of Wyoming Pocket Gopher [1], it is unknown how grazing practices affect Wyoming Pocket Gopher.

KEY ACTIVITIES IN WYOMING

As a Wyoming-endemic species, all work to date on the Wyoming Pocket Gopher has occurred in the state, much of it in response to a petition to list the species as threatened or endangered (e.g., Hayden-Wing Associates 2008, Griscom and Keinath 2010, Griscom et al. 2010). Recent work has addressed developing a better understanding of genetics, distribution, and habitat use. Genetic analyses completed in 2010 further elucidated the relatedness among pocket gophers in Wyoming and supported the species designation of Wyoming Pocket Gopher by demonstrating genetic uniqueness and a lack of hybridization with Northern Pocket Gopher [15]. Also in 2010, the Wyoming Natural Diversity Database and other partners completed field efforts that greatly increased current understanding of the distribution, status, and habitat use of Wyoming Pocket Gopher [9, 10], results of which are mentioned throughout this document.

ECOLOGICAL INFORMATION NEEDS

Although recent research has greatly increased our knowledge of Wyoming Pocket Gopher distribution and habitat, small sample sizes necessitate additional surveys to better assess range-wide distribution and habitat use of the species. Additionally, knowledge of basic biology, including phenology, diet, and dispersal behavior, remains poorly understood. Abundances, population densities, and trends are also not well known for this species. A number of potential threats have been identified for Wyoming Pocket Gopher, including soil compaction from energy development; habitat loss and fragmentation; and stochastic weather events, including runoff from melting snow, high groundwater tables, late and early season freezes, and weather-caused limitations on the availability of food and cover; however, an understanding of the impacts from these threats is needed. Finally, the distribution of Wyoming Pocket Gopher is completely overlapped by the distribution of Northern Pocket Gopher, and additional information is needed to determine whether and to what extent this larger species competes with and potentially limits Wyoming Pocket Gopher.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Nichole L. Bjornlie. Although recent work has increased our knowledge of the habitat and distribution of Wyoming Pocket Gopher, very little is known regarding abundance, density, and population trends. Consequently, priorities for the species include developing and implementing a monitoring strategy that will address these data deficiencies. Because of the low density and limited distribution of Wyoming Pocket Gopher on the landscape, acquiring these data will likely require targeted survey efforts. The most pressing management needs for Wyoming Pocket Gopher in the short-term are an understanding of the current population status and impacts of potential limiting factors, particularly threats resulting from energy development. Long-term priorities will focus on increasing the understanding of basic biology for the species, all of which will ultimately be used to develop management and conservation recommendations.

CONTRIBUTORS

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REFERENCES

[1] United States Fish and Wildlife Service. (2010) Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Wyoming Pocket Gopher as Endangered or Threatened with Critical Habitat, *Federal Register 75*, 19592-19607.

[2] United States Fish and Wildlife Service. (2016) Endangered and Threatened wildlife and plants; 90-day findings on 10 petitions, *Federal Register 81*, 63160-63165.

[3] Coues, E. (1875) Synopsis of the Geomyidae, *Proceedings of the Academy of Natural Sciences in Philadelphia 27*, 130-138.

[4] Cudworth, N. L., and Grenier, M. B. (2015) *Thomomys clusius*, *Mammalian Species 47*, 57-62.

[5] Thaeler, C. S., Jr., and Hinesley, L. L. (1979) *Thomomys clusius*, a rediscovered species of pocket gopher, *Journal of Mammalogy 60*, 480-488.

[6] Keinath, D. A., and Beauvais, G. P. (2006) Wyoming Pocket Gopher (*Thomomys clusius*): a technical conservation assessment, p 38, USDA Forest Service, Rocky Mountain Region.

[7] Buskirk, S. W. (2016) *Wild Mammals of Wyoming and Yellowstone National Park*, University of California Press, Oakland, California.

[8] 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.
[9] Griscom, H., Keinath, D., and Anderson, M. (2010) Pocket gopher surveys in southwestern Wyoming, final project report, p 39, Wyoming Natural Diversity Database, University of Wyoming, Laramie, WY.
[10] Keinath, D. A., Griscom, H. R., and Anderson, M. D. (2014) Habitat and distribution of the Wyoming Pocket Gopher (*Thomomys clusius*), *Journal of Mammalogy 95*, 803-813.
[11] Verts, B. J., and Carraway, L. N. (1999) *Thomomys talpoides*, *Mammalian Species 618*, 1-11.
[12] Clark, T. W., and Stromberg, M. R. (1987) *Mammals in Wyoming*, University of Kansas Press, Lawrence, Kansas.
[13] Hayden-Wing Associates. (2008) Wyoming Pocket Gopher (*Thomomys clusius*) surveys in south-central Wyoming, p 12, Prepared for Petroleum Association of Wyoming by Hayden-Wing Associates, LLC, Laramie, Wyoming.
[14] Griscom, H., and Keinath, D. (2010) Wyoming Pocket Gopher habitat & radio telemetry, final project report, p 17, Wyoming Natural Diversity Database, University of Wyoming, Laramie, Wyoming.
[15] McDonald, D. B., and Parchman, T. L. (2010) Genetics of the Wyoming Pocket Gopher, In *Threatened, Endangered, and Nongame Bird and Mammal Investigations: Annual Completion Report* (Orabona, A. C., Ed.), pp 191-196, Wyoming Game and Fish Department.

Figure 1: Adult Wyoming Pocket Gopher. (Photo courtesy of Hannah Griscom)

Figure 2: North American range of *Thomomys clusius*. (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: Typical Wyoming Pocket Gopher habitat in south-central Wyoming. Note fresh gopher mounds in foreground of photo. (Photo courtesy of Hannah Griscom)

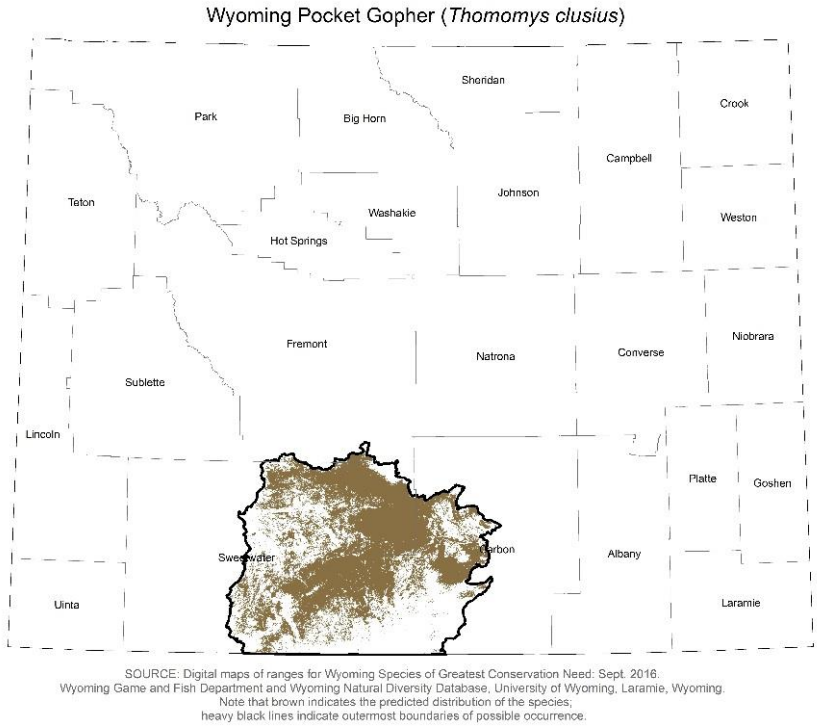

Figure 4: Range and predicted distribution of *Thomomys clusius* in Wyoming.

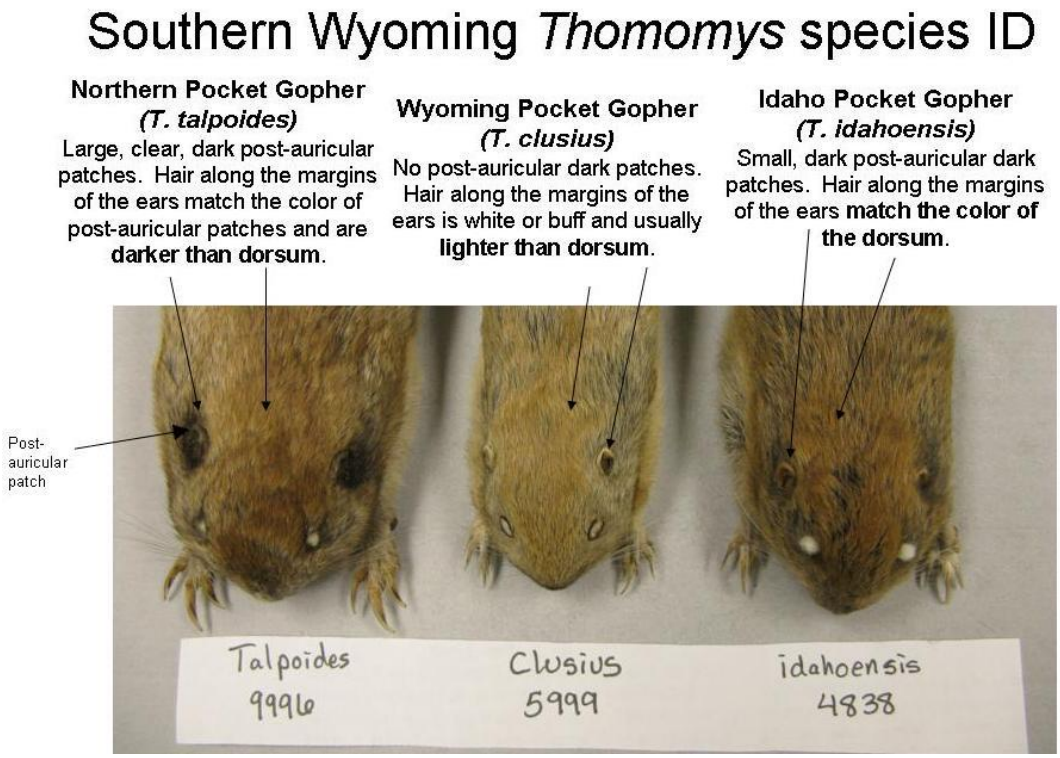

Figure 5: Key morphological characteristics of *Thomomys* species found in southern Wyoming. (Photo courtesy of Hannah Griscom)