

**FIELD SURVEYS FOR PREBLE'S MEADOW JUMPING
MOUSE (*Zapus hudsonius preblei*) IN THE CASPER FIELD
OFFICE REGION**

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INTRODUCTION

Preble's meadow jumping mouse (*Zapus hudsonius preblei*; hereafter Preble's) is restricted to riparian environments at the foot of the Front Range of the Rocky Mountains in southern Wyoming and northern Colorado. Conversion of these environments from their native states to human-dominated landscapes over the past century, and particularly over the last 20 years, is thought to have drastically reduced both range and abundance of Preble's (Beauvais 2001, U.S. Fish and Wildlife Service 2002a). In response to this declining ecological status, the U.S. Fish and Wildlife Service listed Preble's as Threatened under the U.S. Endangered Species Act in 1998 (U.S. Fish and Wildlife Service 1998). In 2001 the same agency implemented special rules that allowed for the incidental take of this taxon as a result of certain agricultural and maintenance activities (U.S. Fish and Wildlife Service 2001a, 2001b). In 2002 the U.S. Fish and Wildlife Service (2002a) proposed critical habitat needed for recovery of Preble's, and also released a draft economic analysis (Industrial Economics Incorporated 2003) and draft environmental assessment (U.S. Fish and Wildlife Service 2002b) pertaining to that proposal.

This increase in statutory protection and regulation since 1998 has established Preble's as a priority for land and wildlife managers in the region. It has also simultaneously increased the amount of survey effort and research applied to the taxon, which has raised some questions regarding the validity of the Preble's subspecies. Krutzsch (1954) originally established the subspecies using morphological comparisons, but his conclusions were subsequently questioned by Jones (1981). More recent morphological analyses (Conner and Shenk 2001) suggest that Preble's has a very slightly, but significantly, different cranial configuration than similar taxa; however, it also suggests some confusion between taxa in specific portions of Preble's range, most notably southeastern Wyoming. Molecular research (Hafner et al. 1981, Riggs et al. 1997) has produced similar results; although a unique taxon assignable to Preble's exists to the south, there may not be a distinct subspecific or even specific taxon so assignable in southeastern Wyoming.

Additionally, the increased number of field surveys for Preble's conducted since 1998 suggest that the taxon is more widespread and abundant than previously thought. Currently, the assumed range of Preble's extends farther south and east in Colorado, and farther north and west in Wyoming, than it did when the taxon was listed in 1998 (U.S. Fish and Wildlife Service 2002a, Beauvais 2001; see also unpublished data at the Wyoming Natural Diversity Database,

University of Wyoming). However, survey efforts in Goshen and eastern Platte counties in Wyoming have failed to document presence of the subspecies, despite the long-standing (e.g., Long 1965, Clark and Stromberg 1987) assumption that it ranges into these areas. This apparent absence supports the findings of Keinath (2001) that environments in extreme eastern Wyoming are possibly unsuitable for Preble's and the center of the taxon's state range lies to the west, maybe even extending into the Laramie Valley. Field surveys in 2000 and 2002 confirmed *Zapus* spp. in riparian areas on the floor of the Laramie Valley (unpublished data, Wyoming Natural Diversity Database, University of Wyoming). The specific and subspecific identities of these specimens are still being researched.

To generate data that will inform the management of Preble's in Wyoming, the Wyoming State Office of the USDI Bureau of Land Management (hereafter BLM) established a research project (Task Order 17 tiered to Cooperative Agreement KAA010012) with the Wyoming Natural Diversity Database at the University of Wyoming to survey for Preble's in portions of the Casper Field Office in summer 2002.

The objective of this project was to survey suitable patches of habitat on BLM surface lands for presence of Preble's. In particular, we focused on areas that had not previously been surveyed for the taxon in an attempt to increase knowledge of its true distribution in the state.

STUDY AREA

The study area encompassed the portion of the BLM Casper Field Office within Platte and Goshen counties, and Natrona and Converse counties south of Interstate Highway 25 and north of the hydrological divide of the Laramie Mountains (Figure 1). Surveys were performed only on surface lands owned and managed by the BLM, and focused on sites that had not received substantial Preble's survey effort prior to this project.

METHODS

Survey site selection - By overlaying data layers pertaining to previous Preble's survey efforts, stream courses, and surface ownership, we identified 4 areas on the eastern periphery of known Preble's range to survey during this project.

Field surveys - Field surveys followed the protocol developed by the U. S. Fish and Wildlife Service (1999). Briefly, we used Sherman live-traps, supplied with polyester bedding and rolled oats, arrayed in linear transects along riparian corridors. Traps were opened in the evening and checked the following morning; transects were run for several consecutive nights. For each transect, trapping effort was calculated and reported as raw trap-nights (i.e., number of traps x number of nights) and net trap-nights (following Beauvais and Buskirk 1999). Captured animals were identified in the field and released unharmed at the trap site.

RESULTS

Survey site selection - The 4 survey sites (Figures 2 and 3; Appendices A - D) all fell within Goshen County. Because BLM ownership is rather fragmented in this area, and because flowing streams and riparian zones are under primarily private ownership, large blocks of suitable BLM-managed habitat were extremely rare.

After scouting the RAWHIDE CREEK site (Appendix B) we decided to locate the trapping transect downstream of BLM-managed land to land managed by the Wyoming Game and Fish Department. Habitat quality for Preble's on the BLM land appeared to be rather low, likely due to persistent drought. We decided there was a higher probability of capturing Preble's on the Wyoming Game and Fish Department land, and that captures here would be close enough to the BLM surface to confidently assume Preble's presence under better conditions.

Field surveys - We conducted a total of 1489 raw (1333.5 net) trap-nights of survey effort during this project, for an average of 372 raw (333 net) trap-nights per site. We captured no individuals of *Zapus* spp. at any of the sites. Several common and expected small mammal species were captured: *Peromyscus maniculatus* (132 individuals), *Microtus* spp. (24), and *Sorex* spp. (2).

DISCUSSION

All sites appeared to support habitat comparable to that on sites where Preble's have been captured in the past. Habitat appeared especially suitable on TABLE MOUNTAIN (Appendix A). Active management (including water impoundment and surface irrigation) intended to increase habitat quality for game birds on this site produced extensive areas of thick vegetation in proximity to open water.

Habitat appeared suitable, but not optimal, on all other sites, especially compared to areas to the west on the footslope of the Laramie Range. The persistent drought has reduced stream flows and water table levels, leading to atypically narrow and sparse bands of riparian vegetation throughout the study area. Furthermore, the high degree of ownership fragmentation in eastern Wyoming in general, and Goshen County in particular, has produced a rather fine-grained pattern of stream management. Stream segments only a few hundred meters long may be managed by multiple owners with multiple objectives, resulting in apparently only a very few long segments with the consistently thick streamside vegetation preferred by Preble's. Because this study focused on BLM-managed stream segments, and because such segments are relatively rare and short, it is unlikely that Preble's will be documented on BLM surface in this area. A more effective way to determine presence or absence of Preble's in this area would be to work with private landowners to locate and survey the best potential habitat, with attention to both condition and extent, regardless of public / private ownership.

ACKNOWLEDGEMENTS

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LITERATURE CITED

- Beauvais, G. P. 2001. Preble's meadow jumping mouse (*Zapus hudsonius preblei*) in Wyoming: status report, July 2001. Report prepared by the Wyoming Natural Diversity Database - University of Wyoming, Laramie, Wyoming.
- Beauvais, G.P. and S.W. Buskirk. 1999. Modifying estimates of sampling effort to account for sprung traps. *Wildlife Society Bulletin* 27:39-43.
- Clark, T. W. and M. R. Stromberg. 1987. *Mammals in Wyoming*. University Press of Kansas, Lawrence, Kansas.
- Conner, M.M. and T. Shenk. 2001. Use of morphometric measurements to differentiate *Zapus hudsonius preblei* from *Zapus princeps princeps* in Colorado and southeastern Wyoming. Report prepared for the USDI Fish and Wildlife Service and the Preble's Meadow Jumping Mouse Recovery Team by the Department of Fishery and Wildlife Ecology, Colorado State University, and Colorado Division of Wildlife, Fort Collins, Colorado.

- Hafner, D. J., K. E. Petersen, and T. L. Yates. 1981. Evolutionary relationships of jumping mice (genus *Zapus*) of the southwestern United States. *Journal of Mammalogy* 62:501-512.
- Industrial Economics Incorporated. 2003. Draft economic analysis of critical habitat designation for the Preble's meadow jumping mouse. Report prepared for the USDI Fish and Wildlife Service - Division of Economics, Arlington, Virginia.
- Jones, G. S. 1981. The systematics and biology of the genus *Zapus* (Mammalia, Rodentia, Zapodidae). Ph.D. dissertation, Indiana State University, Terre Haute, Indiana.
- Keinath, D.A. 2001. Habitat associations of Preble's meadow jumping mice in Wyoming: a GIS model and descriptive analysis. Report prepared for the USDI Fish and Wildlife Service-Wyoming Field Office by the Wyoming Natural Diversity Database-University of Wyoming, Laramie, Wyoming.
- Krutzsch, P. H. 1954. North American jumping mice (genus *Zapus*). *University of Kansas Museum of Natural History Publication* 7:349-472.
- Long, C.A. 1965. The mammals of Wyoming. *University of Kansas Museum of Natural History Publication* 14: 493-758.
- Riggs, L. A., J. M. Dempcy, and C. Orrego. 1997. Evaluating distinctness and evolutionary significance of Preble's meadow jumping mouse: phylogeography of mitochondrial DNA non-coding region variation. Colorado Division of Wildlife, Denver, Colorado.
- U.S. Fish and Wildlife Service. 2002a. Endangered and Threatened Wildlife and Plants: designation of critical habitat for the Preble's meadow jumping mouse (*Zapus hudsonius preblei*); proposed rule. *Federal Register* 6(137): 47154-47210.
- U.S. Fish and Wildlife Service. 2002b. Draft environmental assessment: proposal of critical habitat for Preble's meadow jumping mouse. U.S. Fish and Wildlife Service Ecological Services Office, Cheyenne, Wyoming.
- U.S. Fish and Wildlife Service. 2001a. Endangered and Threatened Wildlife and Plants: final special regulations for the Preble's meadow jumping mouse. *Federal Register* 66(99): 28125-28131.
- U.S. Fish and Wildlife Service. 2001b. Endangered and Threatened Wildlife and Plants: proposed special regulations for the Preble's meadow jumping mouse. *Federal Register* 66(99): 45829-45833.
- U.S. Fish and Wildlife Service. 1999. Interim survey guidelines for Preble's meadow jumping mouse; revised May 19, 1999. USDI Fish and Wildlife Service - Region 6 office, Lakewood, Colorado.
- U.S. Fish and Wildlife Service. 1998a. Endangered and Threatened Wildlife and Plants: final rule to list the Preble's meadow jumping mouse as a Threatened species. *Federal Register* 63(92): 26517-26530.

FIGURES

Figure 1. General study area, within the state of Wyoming. Black lines show county boundaries; green lines show major roads. The bold red line is the boundary of the Casper Field Office of the USDI Bureau of Land Management; the gray polygon shows that portion of the field office within which Preble's mouse surveys were performed.

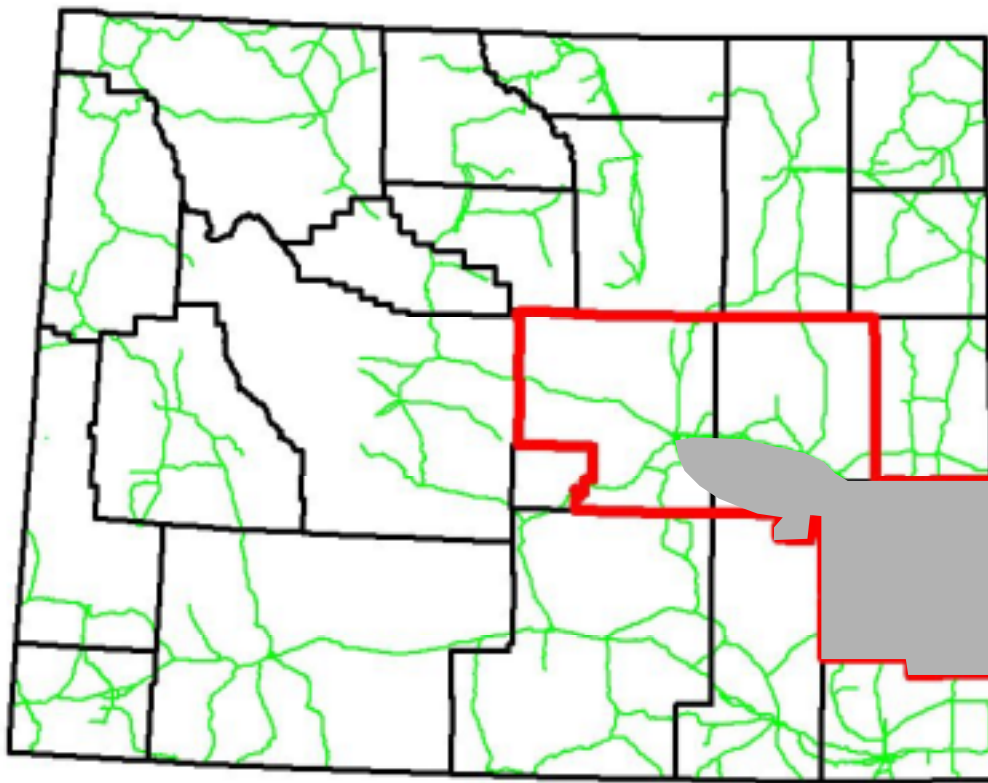


Figure 2. Observations of suspected Preble's meadow jumping mice within the boundary (bold red line) of the Casper Field Office (Wyoming) of the USDI Bureau of Land Management. Black lines show county boundaries; green lines show major roads. Blue dots show all known Preble's mouse capture sites to date (no captures were documented during this study). Gray dots show Preble's mouse trapping efforts that failed to record the taxon, excluding efforts from this study. All data on file at the Wyoming Natural Diversity Database at the University of Wyoming, Laramie, Wyoming.

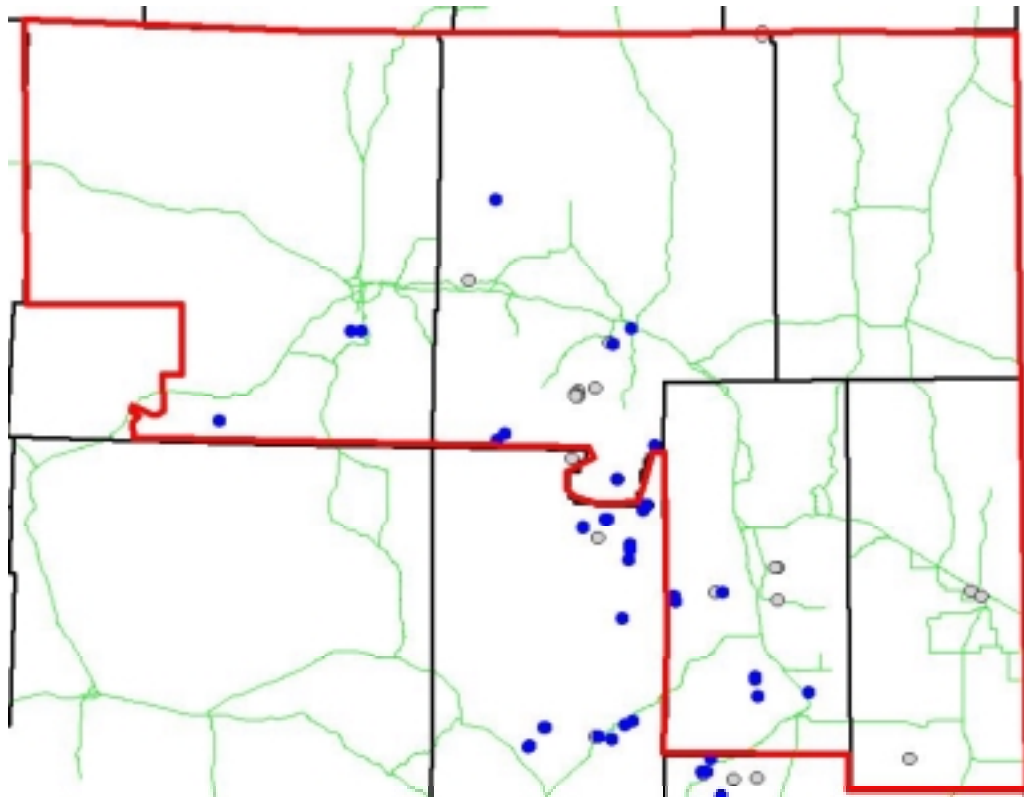
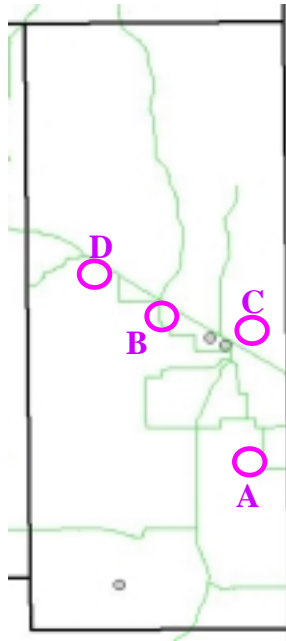


Figure 3a. Sites (circled in purple) within the Casper Field Office (bold red line) of the USDI Bureau of Land Management at which trapping for Preble's meadow jumping mice took place during this project. Letters match descriptions in appendices. See Figure 3b for close-up of Goshen County.

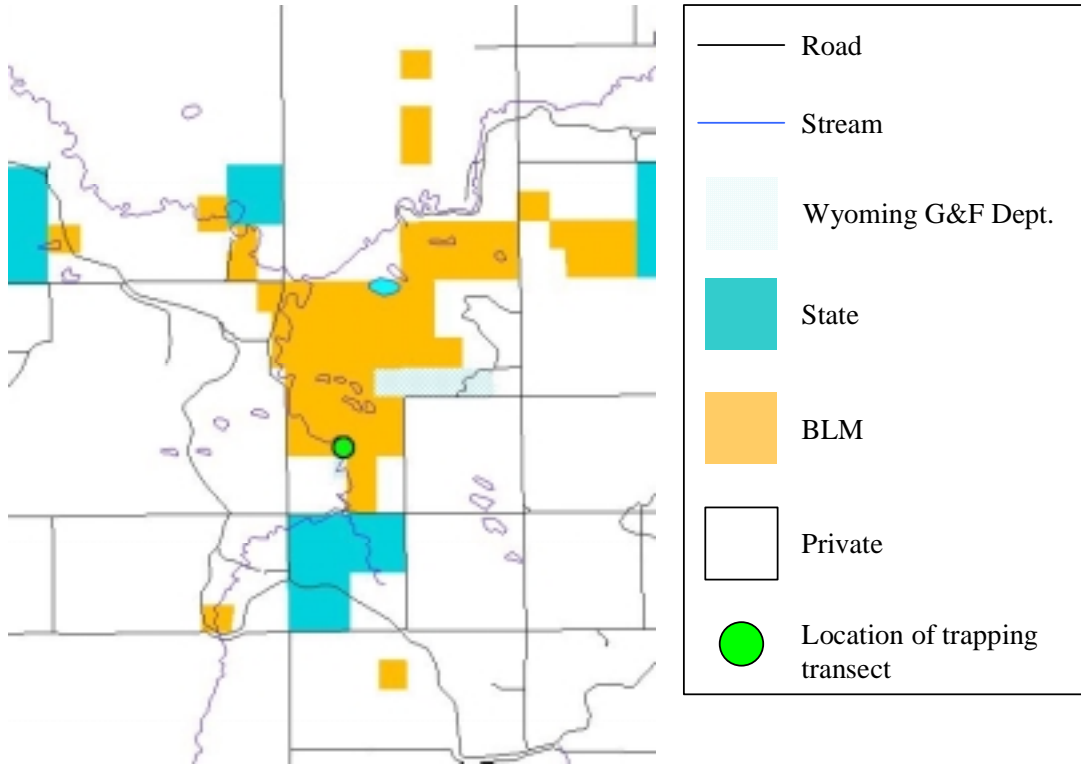


Figure 3b. Sites (circled in purple) within Goshen County, Wyoming, at which trapping for Preble's meadow jumping mice took place during this project. Gray dots show previous Preble's mouse trapping efforts that failed to record the taxon, excluding efforts from this study. All data on file at the Wyoming Natural Diversity Database at the University of Wyoming, Laramie, Wyoming. Letters match descriptions in appendices.



APPENDICES

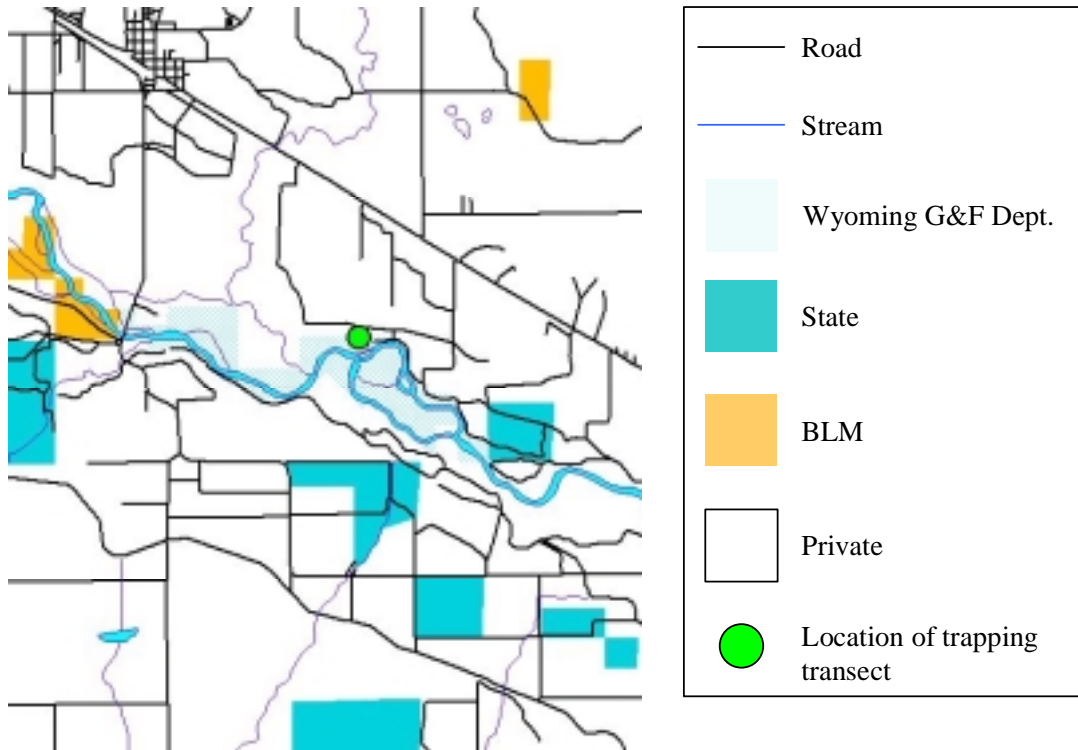
Appendix A. Preble's mouse survey area A – **TABLE MOUNTAIN**, Casper Field Office (Wyoming) of the USDI Bureau of Land Management. Approximately 17 miles S of the town of Torrington; see Figure 3.



DATES SURVEYED	RAW TRAP-NIGHTS	NET TRAP-NIGHTS	# INDIVIDUALS CAPTURED
1 – 3 July 2002	324	300.5	25 <i>Peromyscus maniculatus</i> 11 <i>Microtus</i> spp.

NOTES : Trapping transect encircled the southernmost pond in the hunting area. Habitat generally good for Preble's mouse; water impoundment and irrigation intended to increase habitat quality for game birds also produces thick vegetation preferred by Preble's mouse.

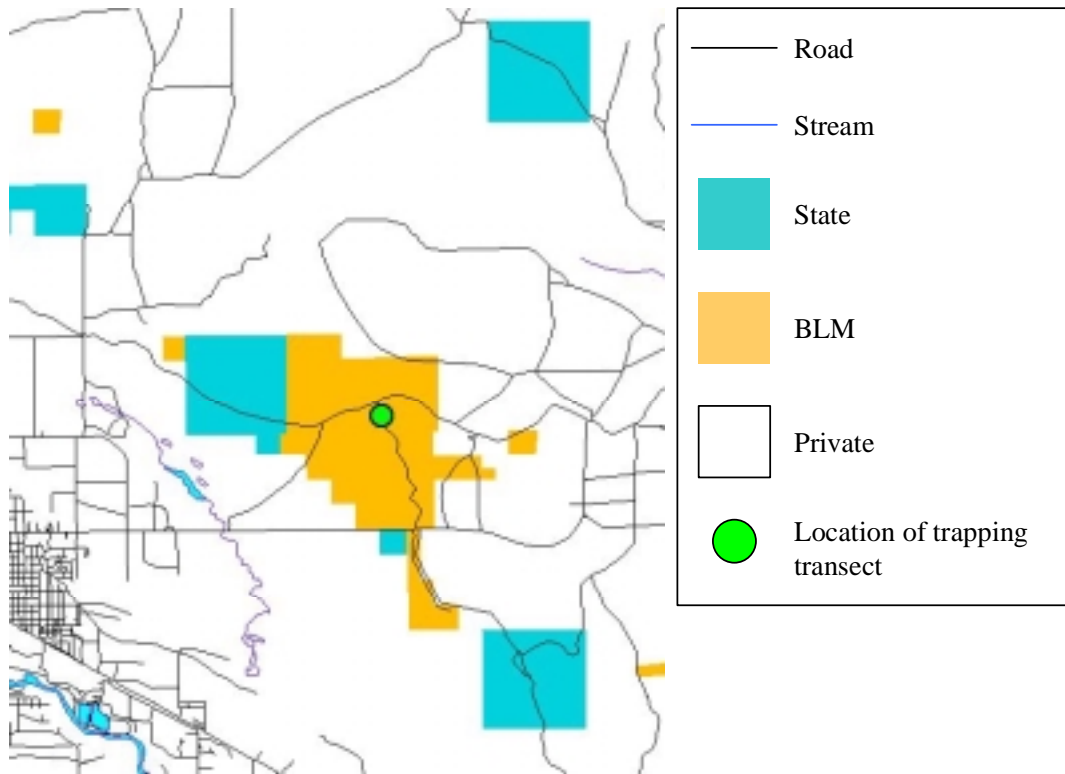
Appendix B. Preble's mouse survey area B – **RAWHIDE CREEK**, Casper Field Office (Wyoming) of the USDI Bureau of Land Management. Approximately 8 miles NW of the town of Torrington; see Figure 3.



DATES SURVEYED	RAW TRAP-NIGHTS	NET TRAP-NIGHTS	# INDIVIDUALS CAPTURED
9 - 12 July 2002	480	434.5	49 <i>Peromyscus maniculatus</i> 13 <i>Microtus</i> spp. 2 <i>Sorex</i> spp.

NOTES : Habitat appeared to be suitable for Preble's mouse; relatively heavy vegetation lining flowing stream. See report text for comparison to BLM-managed surface upstream (west) of this transect.

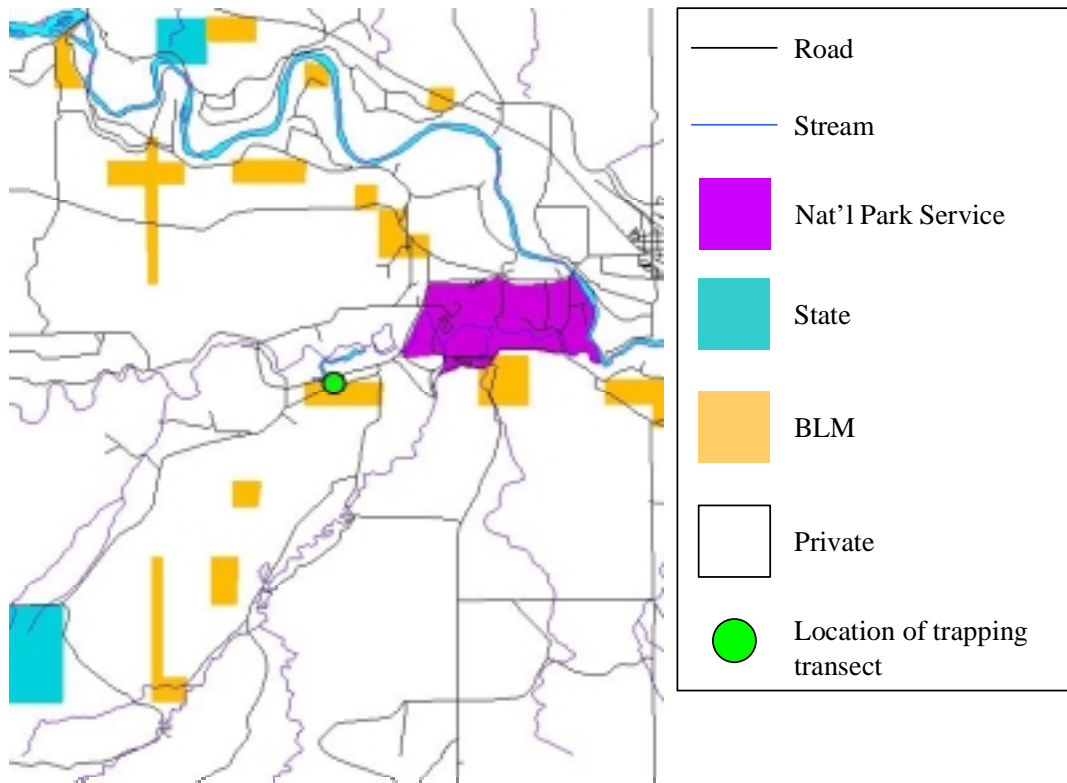
Appendix C. Preble’s mouse survey area C – **TORRINGTON SAND HILLS**, Casper Field Office (Wyoming) of the USDI Bureau of Land Management. Approximately 4 miles NE of the town of Torrington; see Figure 3.



<u>DATES SURVEYED</u>	<u>RAW TRAP-NIGHTS</u>	<u>NET TRAP-NIGHTS</u>	<u># INDIVIDUALS CAPTURED</u>
16 – 19 July 2002	476	442.5	57 <i>Peromyscus maniculatus</i>

NOTES : Trapping transect was along the “Interstate Canal” bisecting the area. Riparian vegetation not very well developed, although appeared to be suitable for Preble’s mouse.

Appendix D. Preble's mouse survey area D – **FORT LARAMIE SOUTHWEST**, Casper Field Office (Wyoming) of the USDI Bureau of Land Management. Approximately 1 mile SW of the Fort Laramie National Historic Site; see Figure 3.



<u>DATES SURVEYED</u>	<u>RAW TRAP-NIGHTS</u>	<u>NET TRAP-NIGHTS</u>	<u># INDIVIDUALS CAPTURED</u>
17 – 19 July 2002	209	156	1 <i>Peromyscus maniculatus</i>

NOTES : Trapping transect ran along only the south side of the canal. Riparian vegetation not very well-developed, but appeared to be suitable for Preble's mouse. Traps were rather heavily disturbed by raccoons (*Procyon lotor*), reducing net trapping effort.

