Mammals

Spotted Bat (*Euderma maculatum*)

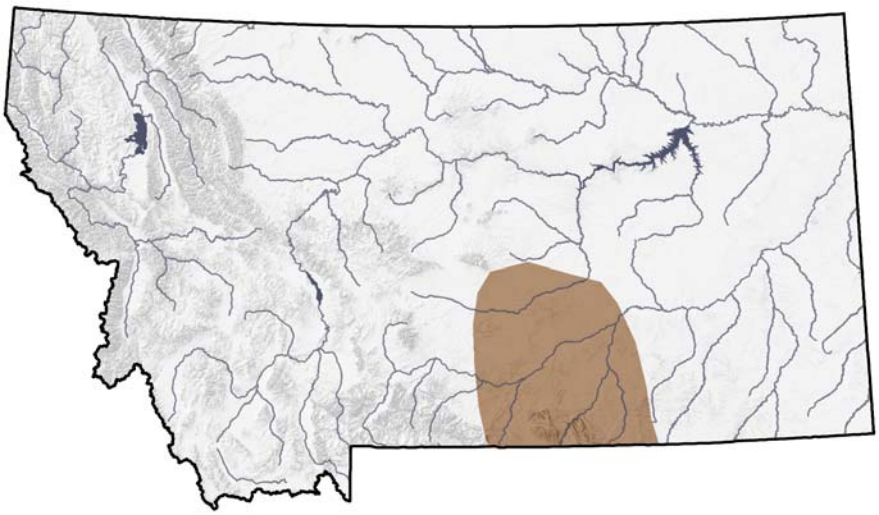

Figure 88. Distribution of the Spotted Bat

Range

The full extent of the spotted bat's range in Montana is unknown due to limited survey efforts and less than two dozen reported encounters (mostly from Carbon County). Spotted bats appear to be restricted to areas east of the Continental Divide in south-central Montana. Voucher specimens exist for Carbon and Yellowstone counties, and there are reports from Big Horn and Powder River counties, all dating from 1949 to 1990 (Nicholson 1950; Fenton et al. 1987; Worthington 1991a, 1991b; Foresman 2001). There also are recent observations from additional localities in Carbon County (Hendricks and Carlson 2001). Recently, they have been heard along the Missouri River at several locations in the Wild and Scenic section (DuBois personal communication 2005). Spotted bats in Montana have been encountered at elevations ranging from 3,124 to 7,800 feet (952 to 2,377 meters).

Habitat

Spotted bats often have been encountered or detected in open, arid habitats in close proximity to tall cliffs. Outside Montana, these areas are sometimes dominated by Utah juniper (*Juniperus osteosperma*) and sagebrush (*Artemisia tridentata* and *A. nova*), sometimes intermixed with limber pine or Douglas-fir, or in grassy meadows in ponderosa pine savannah (Fenton et al. 1987; Worthington 1991b; Hendricks and Carlson 2001). In Montana, these areas are sometimes dominated by Rocky Mountain juniper (*juniperus scopulorum*). Cliffs, rocky outcrops, and water are other attributes of sites where spotted bats have

been found (Foresman 2001), which are typical for the global range. A spotted bat was captured foraging over an isolated pond within a few kilometers of huge limestone escarpments in the Big Horn Canyon National Recreation Area, Carbon County (Worthington 1991a, 1991b), and the first record for the state was of an individual that flew in an open window at a private residence in Billings, Yellowstone County (Nicholson 1950). Spotted bats are now known to be fairly widespread but quite sparse in population, adding to the difficulty of detection (DuBois personal communication 2005). Factors that limit their distribution are not understood, and roost habitats and sites have not been documented in Montana. In other areas, spotted bats have been detected at water sources and in meadow openings, often with large cliffs nearby (Leonard and Fenton 1983; Storz 1995; Perry et al. 1997; Rabe et al. 1998; Gitzen et al. 2001).

Spotted bats roost in caves and in cracks and crevices in the cliffs and canyons with which this species is consistently associated; it can crawl with ease on both horizontal and vertical surfaces (Snow 1974; Van Zyll de Jong 1985). In British Columbia, individuals used the same roost each night during May through July, but not after early August (Wai-Ping and Fenton 1989). Winter habitat is poorly documented. A possible explanation for the early paucity of collections in natural situations is the bat's narrow habitat tolerance (Handley 1959; Snow 1974).

Management

Spotted bats have persisted for more than 50 years in the general area of the state where they were first discovered (Nicholson 1950; Hendricks and Carlson 2001). This is encouraging given that essentially nothing is known in Montana of spotted bat abundance, reproductive biology, habitat requirements, movements, and roost site selection. Their audible calls make a survey much easier to conduct (Pierson and Rainey 1998), because no special skill is needed other than familiarity with the calls and knowledge of the habitats likely to support spotted bats.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Riparian degradation that could affect sustainable prey (moths) populations	Complete the Montana Bat Management Plan (in progress)
Open waste sumps and similar hazardous standing water bodies associated with oil and gas fields	Protection of water sources in arid regions
Lack of information due to difficulty of surveying	Increase monitoring and surveys
Recreational climbing disturbs roost sites	Protect roost sites

Use of pesticides that bats may accumulate through their diet and that kill their prey	Support and cooperate in studies to determine more about the impacts of humans

Management Plans

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Townsend's Big-eared Bat (*Corynorhinus townsendii*)

Figure 89. Distribution of the Townsend's Big-eared Bat

Range

The complete extent of the range of the Townsend's big-eared bat in Montana is unknown, due to the limited survey effort across many areas. It has been documented in more than 20 counties (voucher specimens from 14) and on both sides of the Continental Divide, from the Idaho state line in the west to the North Dakota and South Dakota state lines in the east, and from the Wyoming state line in the south to the Canadian border at Alberta in the northwest (Hoffmann et al. 1969; Swenson and Shanks 1979; Hendricks et al. 1996; Hendricks and Kampwerth 2001; Foresman 2001), at elevations of 1,968 to 7,820 feet (600 to 2,384 meters). The only known location north of the Missouri River in northeastern Montana is in the Little Rocky Mountains (Hendricks et al. 2000); the species has not yet been reported in Alberta or Saskatchewan.

Habitat

Habitat use in Montana has not been evaluated in detail, but it seems to be similar to other localities in the western United States. Caves and abandoned mines are used for maternity roosts and hibernacula (Worthington 1991; Hendricks et al. 1996; Hendricks 2000; Hendricks et al. 2000; Foresman 2001; Hendricks and Kampwerth 2001); use of buildings in late summer also has been reported (Swenson and Shanks 1979). Habitats in the vicinity of roosts include Douglas-fir and lodgepole pine forests, ponderosa pine woodlands, Utah juniper-sagebrush scrub, and cottonwood bottomlands. In hibernacula, ambient temperatures ranged from minus 1 to 8 degrees F (30 to 46 degrees F when torpid Townsend's big-eared bats were present) (Hendricks and Kampwerth 2001). Temperatures at maternity roosts are poorly documented; the temperature

was 54 degrees F in mid-July near a colony in an abandoned mine in Lake County and 66 degrees F in August near a colony in a large and relatively open cave chamber in Lewis and Clark County. Many caves and mines in Montana remain cool in summer, with the potential of being too cool to be used as maternity roosts. Townsend's big-eared bats feed on many different flying insects and may be a moth specialist.

Management

The response by Townsend's big-eared bats to human activities is largely undocumented in Montana. The maternity colony at Lewis and Clark Caverns has persisted for more than a century but has decreased in recent years (no bats returned in 2005). In eastern Montana numerous abandoned coal mines, several of which were used as hibernacula, have been completely closed in recent decades; these mines are no longer accessible to bats. Abandoned mine reclamation has also been underway in western Montana during the same time. During the last decade, mine surveys prior to closure have been undertaken by land management agencies to determine the potential of abandoned mines as bat habitat. In some cases bat-friendly gates were installed at known Townsend's big-eared bat roosts, and the roosts have continued to be used after gate installation (Hendricks 1999; Hendricks and Kampwerth 2001). Some caves in the Pryor Mountains and Little Rocky Mountains with documented use by Townsend's big-eared bat are protected with bat-friendly gates (Worthington 1991; Hendricks et al. 2000). Surveys should follow protocols in the conservation assessment and conservation strategy (Pierson et al. 1999). All observations of Townsend's big-eared bat roosts should be reported to the appropriate land management agency, the Montana Natural Heritage Program, or the Montana Department of Fish, Wildlife & Parks.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Vandalism to maternity colonies and hibernacula	Identification of maternity colonies and hibernacula and closures to recreationists to these areas
	Reduce levels of human activities around known bat roosts through road management, signs, and public education
	Continue surveying caves and mines for maternity colonies and hibernacula
Abandoned mine closures	Install bat-friendly gates on coal mines instead of closure
	Recruit and educate recreational caving groups to assist with management of caves

Toxic material impoundments	Ensure utilization of nontoxic materials and nontoxic byproducts during mining activities
Degradation and loss of native riparian vegetation	Complete the Montana Bat Management Plan (in progress)
	Maintain and improve the condition of riparian vegetation for bat foraging areas

Management Plans

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Pallid Bat (*Antrozous pallidus*)

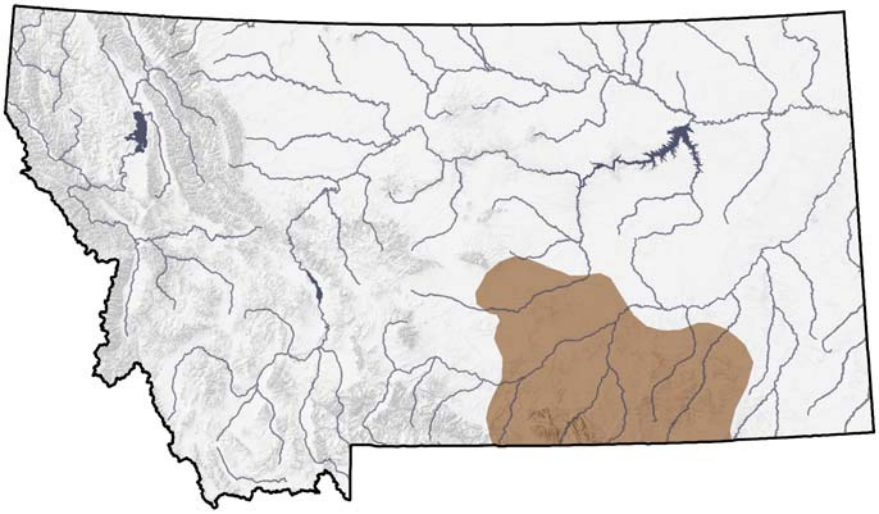

Figure 90. Distribution of the Pallid Bat

Range

The known distribution of the pallid bat in the state is not yet well defined, but Montana is at the northeastern edge of its global range. Several have been captured east of the Continental Divide in south-central Montana at Layout Creek and Gyp Spring in southern Carbon County (Shryer and Flath 1980; Worthington 1991; P. Hendricks and J. Carlson, personal observation) and west of Colstrip in Rosebud County. Montana records are from elevations between 3,800 and 4,600 feet (1,158 to 1,402 meters).

Habitat

Habitat at the Carbon County sites is Utah juniper-black sagebrush (*Juniperus osteosperma-Artemisia nova*). The Rosebud County site is in an area of ponderosa pine (*Pinus ponderosa*) savannah and big sagebrush (*Artemisia tridentata*). Both areas have rock outcrops (limestone or sandstone) in the immediate vicinity or within a short flying distance. This species has not yet been detected at rock crevices, caves, or abandoned mines in Montana; most observations have been at water sources (spring-fed streams or ponds, e.g., Carbon County) (Shryer 1980). However, habitat use in Montana by this species remains poorly known and unstudied.

At other locations, pallid bats have been found in arid deserts, juniper woodlands, sagebrush shrub-steppes, and grasslands, often with rocky outcrops and water nearby. They are less abundant in evergreen and mixed-conifer woodlands, but have been found in ponderosa pine forests near cliffs (Nagorsen and Brigham 1993). They typically roost in rock crevices or buildings and less often in caves,

tree hollows, under bridges, and in abandoned mines (Hermanson and O'Shea 1983; Verts and Carraway 1998). In Oklahoma, night roosts often are in caves (Caire et al. 1989). Four summer roosts in Wyoming were in rock shelters (1), caves (2), and mines (1) (Priday and Luce 1997). Day and night roosts are usually distinct. In Oregon, night roosts were in buildings, under rock overhangs, and under bridges; bats generally were faithful to particular night roosts both within and between years (Lewis 1994). Night roosts in British Columbia were often in cavities in ponderosa pines (Nagorsen and Brigham 1993). Day roosts include rock piles, tree hollows, and rock crevices. Pallid bats found in caves or mines usually use crevices within these places (Hermanson and O'Shea 1983; Caire et al. 1989). Maternity colonies are often located in horizontal crevices in rock outcrops and man-made structures, where temperatures are a fairly constant 30 degrees F. Pallid bats forage on or near the ground and consume invertebrates such as scorpions, centipedes, crickets, grasshoppers, and beetles.

Management

Pallid bats have persisted for more than 20 years in the general area of the state where they were first discovered (Shryer and Flath 1980; Worthington 1991; P. Hendricks and J. Carlson, personal observation). This is encouraging given that essentially nothing is known in Montana of the pallid bat's abundance, reproductive biology, habitat requirements, movements, and roost site selection, nor have the potential threats to this bat been identified.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Little information of distribution, population, and requirements	Complete the Montana Bat Management Plan (in progress)
	Increased survey and monitoring techniques
Oil and gas fields disturbance of water sources	Protection of water sources in arid regions
Roost disturbance	Protection of roost sites
Recreational caving	Educate recreationists on the threats to bats
Closure of mines for reclamation	Work to install new entrance barriers that allow free passage of bats
Use of pesticides that bats may accumulate through their diet and that kill their prey	Support and cooperate in studies to determine more about the impacts of humans

Management Plans

Altenbach, J. S., W. Amy, P. V. Bradley, P. E. Brown, K. Dewberry, D. B. Hall, J. Jeffers, B. Lund, J. E. Newmark, M. J. O'Farrell, M. Rahn, R. E. Sherwin, C. R. Tomlinson, J. A. Williams. 2002. Nevada Bat Conservation Plan. Nevada Bat Working Group. Austin, NV. 188 pp.

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Pygmy Rabbit (*Brachylagus idahoensis*)

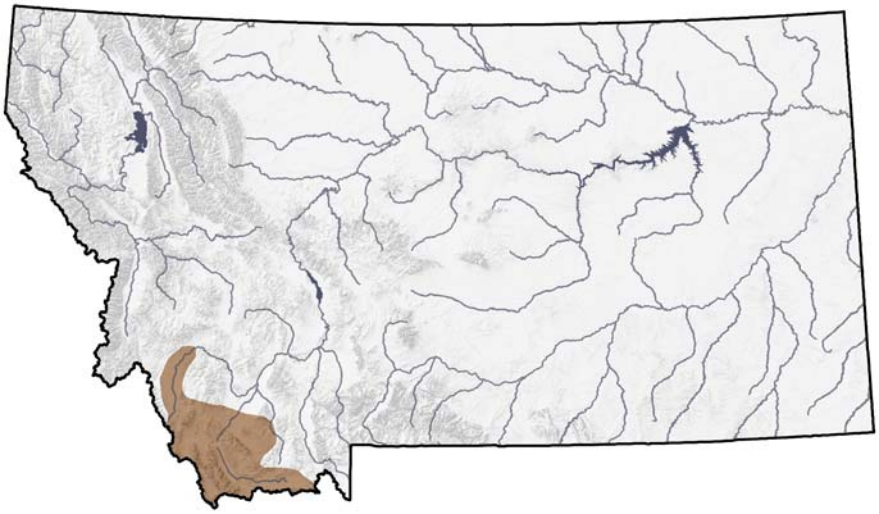

Figure 91. Distribution of the Pygmy Rabbit

Range

Montana lies on the northeastern edge of pygmy rabbit distribution. There are confirmed records dating back to 1918 from three southwestern counties (Beaverhead, Jefferson, and Madison), with most of the Montana range in Beaverhead County (Davis 1937; Hoffmann et al. 1969; Rauscher 1997; Foresman 2001a); a 1937 specimen reported from near Lake Como in Ravalli County needs verification. Rauscher (1977) documented occupation in the southern portion of Silver Bow County. Records are from elevations between 4,500 and 6,700 feet (1,372 to 2,042 meters).

Habitat

Occupied habitats in Montana include shrub grasslands on alluvial fans, floodplains, plateaus, high mountain valleys, and mountain slopes where suitable sagebrush cover and soils for burrowing are available. Some occupied sites may support a relatively sparse cover of sagebrush and shallow soils but usually support patches of dense sagebrush and deeper soils. Big sagebrush was the dominant shrub at all occupied sites, averaging 21.3 to 22.6 percent coverage; bare ground averaged 33 percent and forbs 5.8 percent. Average height of sagebrush in occupied sites was 0.4 meter (Rauscher 1997). In southwestern Wyoming, pygmy rabbits selectively used dense and structurally diverse stands of sagebrush that accumulated a relatively large amount of snow; the subnivean environment provided access to a relatively constant supply of food and protection from predators and thermal extremes (Katzner and Parker 1997).

Pygmy rabbits dig burrows extending to a depth of 1 meter, and they form

chambers as part of the burrow system. Burrows have been excavated, but no nests have been found and the location of nests is not known (Green and Flinders 1980a). A recent increase in surveying by the Montana Natural Heritage Program has identified more observations of individuals, burrow locations, and habitat preferences.

Management

No special management activities have been developed or implemented in Montana specifically for pygmy rabbits. However, conservation habitat management to preserve sagebrush habitat for other species, e.g., sage grouse, will likely benefit pygmy rabbits. Removal of sagebrush will make the landscape unsuitable for pygmy rabbits. This species is found where grazing occurs and will continue to survive as long as sagebrush cover is maintained. Dense stands of sagebrush along streams, fence lines, and borrow ditches are probably essential avenues for dispersal of pygmy rabbits.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Loss of sagebrush habitat due to range management practices	Consider preparing a management plan for the pygmy rabbit or include it into other comprehensive taxonomic plans
	Livestock rest and rotation on lands
Fragmentation of available habitat	Coordination efforts with federal agencies including BLM and USFS
	Continue surveying for new populations and monitoring of existing ones
Habitat specialist on all scales	Sagebrush protection on a large scale

Management Plan

None

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Hoary Marmot (*Marmota caligata*)

Figure 92. Distribution of the Hoary Marmot

Range

Although the distribution map provided above indicates that haory marmots occur throughout western Montana, they most likely only occupy 5 to 10 percent of the area depicted. They do not occur in the Salish Mountains and occur only in small pockets in the Whitefish Range. They are generally confined to high subalpine and alpine habitats and may move through coniferous forests in northwest Montana. There are small, scattered, isolated populations south of the Mission Mountains (Foresman 2001).

Habitat

The hoary marmot is found primarily in rocky outcroppings and large boulder fields in high subalpine and alpine regions of Montana where they feed, burrow, and raise young.

Management

There are no management strategies for this species in Montana at this time.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Lack of data on status and size of Montana's populations	Prepare conservation plan, addressing conservation concerns and establishing a monitoring protocol

	Conduct inventory to obtain estimates of population status and size and habitat needs and distribution, mountain range by mountain range
Little or no connectivity between populations in distinct mountain ranges	Determine the effects of inbreeding in isolated populations and examine feasibility of transplanting individuals between populations in an effort to increase genetic diversity
	Conserve small populations found on the periphery of their distribution, including scattered populations in the high mountains of the Mission and Swan mountains
Change in climate due to global warming	Conduct monitoring program to establish long-term trends of abundance and distribution of populations

Management Plan

None

Citations

Foresman, K. R. 2001. The wild mammals of Montana. Special Publication No. 12. American Society of Mammalogists.

Black-tailed Prairie Dog (*Cynomys ludovicianus*)

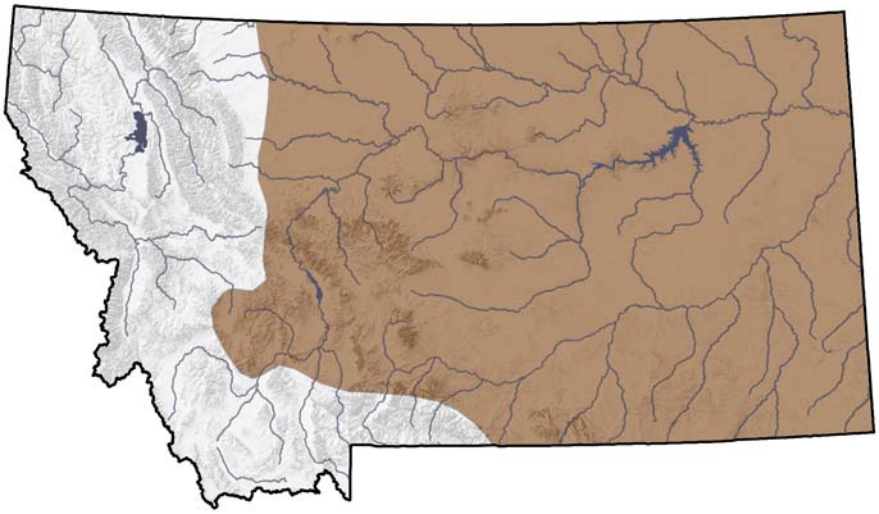

Figure 93. Distribution of the Black-tailed Prairie Dog

Range

Black-tailed prairie dogs are found across eastern Montana except in the northeastern corner and the Clarks Fork of the Yellowstone drainage (Campbell 1989).

Habitat

Prairie dog colonies are found on flat, open grasslands and shrub grasslands with low, relatively sparse vegetation. The most frequently occupied habitat in Montana is dominated by western wheatgrass, blue grama, and big sagebrush (Montana Fish, Wildlife & Parks 2002). Colonies are associated with silty clay loams, sandy clay loams, and loams (Thorp 1949; Bonham and Lerwick 1976; Klatt and Hein 1978; Agnew et al. 1986), and fine- to medium-textured soils are preferred (Merriam 1902; Thorp 1949; Koford 1958) presumably because burrows and other structures tend to retain their shape and strength better than in coarse, loose soils. Encroachment into sandy soil (e.g., loamy fine sand) does occur if the habitat is needed for colony expansion (Osborn 1942).

Shallow slopes of less than 10 percent are preferred (Koford 1958; Hillman et al. 1979; Dalsted et al. 1981) presumably in part because such areas drain well and are only slightly prone to flooding. By colonizing areas with low vegetative stature, prairie dogs often select areas with past human (as well as animal) disturbance, including areas heavily used by cattle such as near water tanks and at long-term supplemental feeding sites (Licht and Sanchez 1993; FaunaWest 1998).

Management

In Montana, the black-tailed prairie dog has been designated a nongame wildlife species in need of management. Shooting of prairie dogs on public lands (excluding state school trust lands) is regulated. Contact Montana Fish, Wildlife & Parks for the latest regulations. Prairie dogs are managed under the Conservation Plan for Black-tailed and White-tailed Prairie Dogs in Montana (Montana Prairie Dog Working Group 2002). Please consult this plan for details concerning prairie dog management in Montana.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Conversion of native rangelands to agriculture and, to a lesser degree, residential development	Institute a landowner incentive program and a prairie dog control program designed to manage prairie dog acreage, rather than eradicate prairie dogs
Conflicts between the present abundance of prairie dogs and other land uses	Develop regional prairie dog distribution and abundance goals
	Identify and support or conduct research projects designed to form solutions to short-term and long-term biological and social problems related to black-tailed prairie dog communities and their management
	Identify isolated prairie dog colonies and apply management measures necessary to maintain current distribution
Disease, particularly sylvatic plague (Yersinia pestis)	Continue prairie dog inventory and monitoring efforts
	Assist in funding research projects targeting effects of disease on prairie ecosystems, particularly sylvatic plague (Yersinia pestis)
Poisoning as a governmental control program	Develop and implement a prairie dog ecosystem education program

Management Plans

Bureau of Land Management (BLM). 1979. Habitat management plan for prairie dog ecotypes. USDI, BLM, Montana State Office. Wildlife Habitat Area MT-02-06-07-S1. 61 pp.

Conservation Plan for Black-tailed and White-tailed Prairie Dogs in Montana (Montana Prairie Dog Working Group 2002).

Citations

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Thorp, J. 1949. Effects of certain animals that live in soils. Scientific Monthly 68:180–91.

White-tailed Prairie Dog (*Cynomys leucurus*)

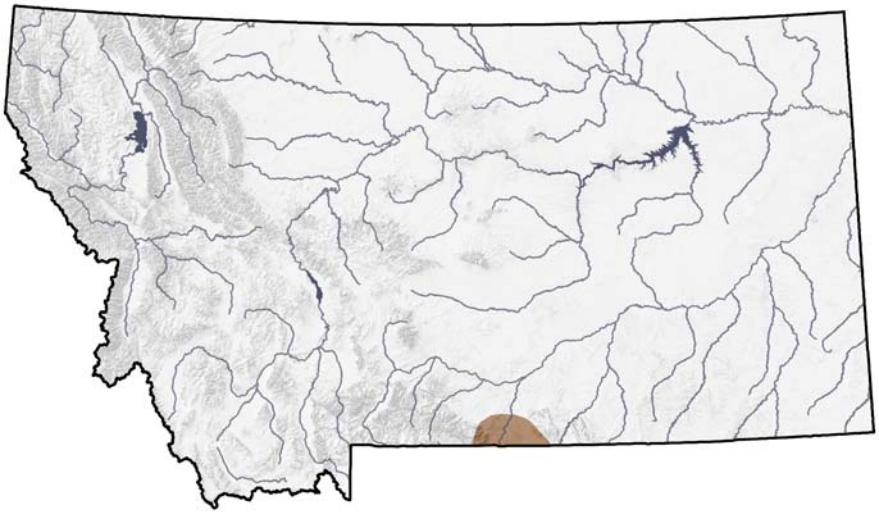

Figure 94. Distribution of the White-tailed Prairie Dog

Range

In Montana, white-tailed prairie dogs now only inhabit a small area in the south-central portion of state, near the Pryor Mountains.

Habitat

Throughout their range, white-tailed prairie dogs inhabit xeric sites with mixed stands of shrubs and grasses. In Montana they inhabit sites dominated by Nuttall saltbrush with lesser amounts of big sage and areas with povery sumpweed (Flath 1979). They live at higher elevations and in meadows with more diverse grass and herb cover than do black-tailed prairie dogs (Hoffmann, in Wilson and Ruff 1999), and their range in Montana is at higher elevations than other sites within their distribution.

Management

White-tailed prairie dogs are designated as a nongame wildlife species in need of management in Montana. Public lands (excluding state school trust lands) in the portion of Carbon County occupied by white-tailed prairie dogs has been closed to sport shooting on a year-round basis. Contact Montana Fish, Wildlife & Parks for the most current regulations concerning prairie dogs. White-tailed prairie dogs are managed under the Conservation Plan for Black-tailed and White-tailed Prairie Dogs in Montana (Montana Prairie Dog Working Group 2002). Please consult this plan for details concerning prairie dog management in Montana.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Conversion of native rangelands to agriculture, and, to a lesser degree, residential development	Institute a landowner incentive program and a prairie dog control program designed to manage prairie dog acreage, rather than eradicate prairie dogs
Disease, particularly sylvatic plague (Yersima pestis)	Assist in funding research projects targeting effects of disease on prairie ecosystems, particularly sylvatic plague (Yersinia pestis)
Vulnerability of remaining small and isolated colonies to extirpation, which could result in contraction in the current range of this species	Translocate white-tailed prairie dogs from a colony in the path of a highway upgrade project to a formerly occupied site on BLM land
	Reintroduce white-tailed prairie dogs to sites that were formerly occupied until the early 1990s

Management Plans

Bureau of Land Management (BLM). 1979. Habitat management plan for prairie dog ecotypes. USDI, BLM, Montana State Office. Wildlife Habitat Area MT-02-06-07-S1. 61 pp.

Conservation Plan for Black-tailed and White-tailed Prairie Dogs in Montana. Montana Prairie Dog Working Group 2002.

Citations

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Knowles, C. J. 2002. Status of the white-tailed and Gunnison's prairie dog. Environmental Defense and National Wildlife Federation. FaunaWest Wildlife Consultants. Boulder, MT.

Wilson, D. E., and S. Ruff. 1999. The Smithsonian book of North American mammals. Smithsonian Institution, Washington, DC. 750 pp.

Great Basin Pocket Mouse (*Perognathus parvus*)

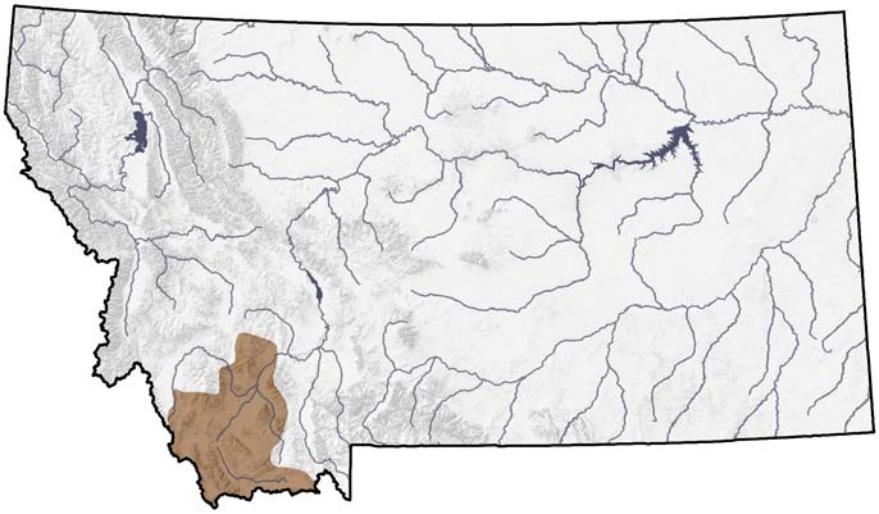

Figure 95. Distribution of the Great Basin Pocket Mouse

Range

The Great Basin pocket mouse is restricted in Montana to the extreme southwestern portion of the state, east of the Continental Divide. All records are from Beaverhead County except one from Jefferson County (Hoffmann et al. 1969; Foresman 2001a; Hendricks and Roedel 2002). Great Basin pocket mice are suspected to occur in Madison County. Individuals have been captured at elevations up to 6,660 feet (2,030 meters). The Great Basin pocket mouse is found throughout the Great Basin and adjacent regions of the West, from south-central British Columbia southward through eastern Washington and Oregon to southern California, Nevada, northern Arizona, western Utah, southern Idaho, southwestern Montana, and southwestern Wyoming (Verts and Kirkland 1988). It usually occurs below elevations of 8,200 feet (2,500 meters).

Habitat

Occupied habitats in Montana are arid and sometimes sparsely vegetated. They include grassland and shrubland with less than 40 percent cover; stabilized sandhills; and landscapes with sandy soils, more than 28 percent sagebrush cover, and 0.3 to 2 meters shrub height (Hoffmann et al. 1969; Frissell 1978; Hendricks and Roedel 2001, 2002; P. Hendricks, unpublished data).

Data from other portions of its range suggest a variety of western arid and semiarid habitats are occupied, including pine woodlands, juniper-sagebrush scablands, sandy short-grass steppes, and shrublands covered with sagebrush, bitterbrush, greasewood, and rabbitbrush; heavily forested habitats are avoided. Great Basin pocket mice are captured more often than expected (based on

availability) at sites with more than 40 percent ground cover. On plots where fire has killed the shrub cover, the species is one-third as abundant as on adjacent unburned plots. Great Basin pocket mice usually are found in habitats with light-textured, deep soils, and sometimes in shrublands among rocks. Presence is positively correlated with percent sand and negatively with percent clay. Adults sleep and rear young in underground burrows (Verts and Kirkland 1988; Verts and Carraway 1998).

Management

No special management activities are currently recognized in order to maintain viable populations of this species in Montana.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Habitat loss, large-scale removal of sagebrush	Land management designed to maintain a mosaic of sagebrush cover, size, and age classes will benefit this species, especially if it promotes the growth of grasses and forbs within sagebrush stands
	Evaluate the quality and quantity of occupied and potentially suitable areas
Competition for grasses (livestock probably compete with pocket mice for grasses and reduce shrub and grass cover)	Rotation of livestock areas
Lack of biological information on Great Basin Pocket Mouse in Montana	Consider preparing a management plan for the Great Basin pocket mouse or include it into other comprehensive taxonomic plans

Management Plan

None

Citations

Foresman, K. R. 2001. The wild mammals of Montana. Special Publication No. 12. American Society of Mammologists.

Frissell, S. S. 1978. Nongame wildlife inventory. Prepared for U.S. Department of the Interior, Bureau of Land Management, Dillon Resource Area, Dillon, MT. 194 pp.

Hall, E. R. 1981. The Mammals of North America, Vols. I and II. John Wiley & Sons, New York, NY.

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Verts, B. J., and L. N. Carraway. 1998. Land mammals of Oregon. University of California Press, Berkeley, CA. 668 pp.

Northern Bog Lemming (*Synaptomys borealis*)

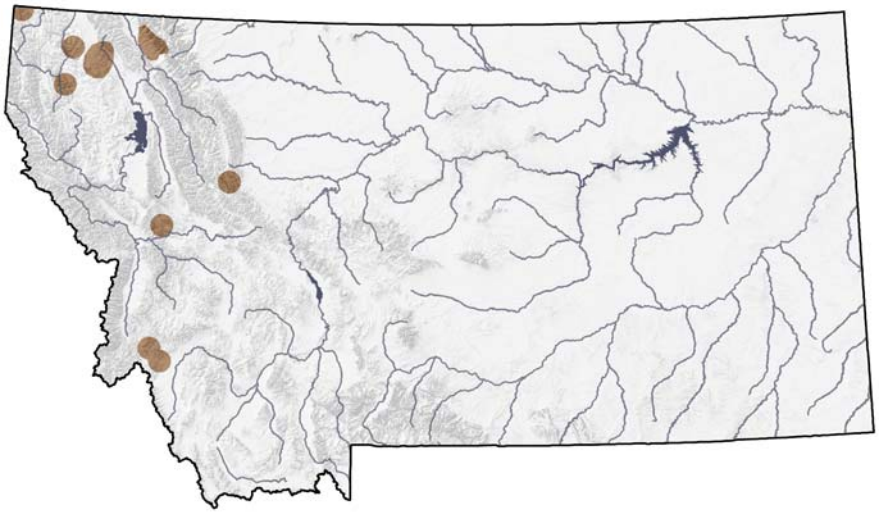

Figure 96. Distribution of the Northern Bog Lemming

Range

The northern bog lemming has a widespread distribution extending from Alaska east to Labrador and south to portions of the northern United States. In Montana the northern bog lemming is at the southern margin of its global distribution in the Rocky Mountains and has been documented at 18 isolated sites, found mainly on U.S. Forest Service–managed lands. Records are available for six counties (Beaverhead, Flathead, Lewis and Clark, Lincoln, Missoula, and Ravalli), with all but two sites (one in Beaverhead County, Lost Trail Pass, and one in Lewis and Clark County) occurring west of the Continental Divide (Reichel and Corn 1997; Foresman 2001a). Elevation of these sites ranges from 3,340 to 6,520 feet (1,018 to 1,987 meters), but a 2003 record from a new site in Ravalli County extends the upper elevation limit to 7,400 feet (2,256 meters) (B. Maxell, personal communication).

Habitat

Northern bog lemmings occupy a variety of habitats throughout their range, especially near the southern edge of their global distribution. Typically, these habitats have high moisture levels and include sphagnum bogs, wet meadows, moist mixed and coniferous forests, montane sedge meadows, krummholz spruce-fir forests with dense herbaceous and mossy understory, alpine tundra, mossy streamsides, and even sagebrush slopes in the case of *S. b. artemisiae* in British Columbia (Clough and Albright 1987; West 1999; Streubel 2000). Within these habitats, they occupy surface runways and burrow systems up to 12 inches deep and can be found in small colonies with population densities that may reach 36 individuals per acre. (Streubel 2000). They are active day and night

throughout the year, feeding on grasses and other herbaceous vegetation. Young are born in nests that may be underground or on the surface in concealing vegetation. Northern bog lemmings in Montana have been found in at least nine community types, including Engelmann spruce, subalpine fir, birch, willow, sedge (*Carex*), spike rush (*Eleocharis*), or combinations of the above, often occurring in wet meadows, fens, or boglike environments. Wright (1950) captured lemmings in a swampy area containing spruce trees, timothy, alder, and other moist-site plants (Wright 1950). The Upper Rattlesnake Creek specimen was captured in a wet-sedge/bluejoint meadow near subalpine fir (Adelman 1979). Areas with extensive moss mats, primarily sphagnum, are the most likely sites to find new populations (Wright 1950; Reichel and Beckstrom 1994; Reichel and Corn 1997; Pearson 1999; Foresman 2001a).

Management

No coordinated management activities have been developed or implemented for this species in Montana. Nevertheless, some populations on U.S. Forest Service lands are provided added protection through special management/conservation policy guidelines applied to peatlands, including the Research Natural Area (RNA) designation (Chadde et al. 1998). RNA designation typically prohibits manipulative management, such as timber harvest and livestock grazing. The Clean Water Act and state water quality standards protect water quality of these peatlands. Protection guidelines (Reichel and Corn 1997) should be applied to all sites where northern bog lemmings are known to occur, as well as potential peatland sites not yet surveyed for them.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Bogs/fens are threatened by range management practices, invasion of heavily grazed fens by exotic plants, and potential changes in the water regimes feeding the bogs/fens.	Minimize livestock grazing in drainages with unsurveyed moss mats
Timber harvest around bog/fen habitats as well as adjacent riparian areas used as dispersal corridors	Working with coordinating federal and state agencies, limit timber harvests within a buffer zone of 100 meters surrounding sphagnum or other fen moss mats or associated riparian areas that could provide corridors for dispersal to adjacent patches of suitable habitat

Poorly understood distribution of the species in Montana	Consider preparing a management plan for the northern bog lemming or include it into other comprehensive taxonomic plans
	Known sites should be monitored routinely to determine population persistence and trends
Human disturbances (timber harvesting and roads) are directly related to the decreased diversity of vascular plants, a common food source for northern bog lemmings in bogs/fens	Elimination of management activities that could destroy bogs (road-building, pothole blasting, trail construction, dam construction, alteration of surface and subsurface water flow, recreational vehicle use in fen habitats)

Management Plan

None

Citations

Adelman, E. B. 1979. A survey of the nongame mammals in the Upper Rattlesnake Creek drainage of western Montana. M.S. thesis, University of Montana, Missoula MT. 129 pp.

Chadde, S. W., J. S. Shelly, R. J. Bursik, R. K. Moseley, A. G. Evenden, M. Mantas, F. Rabe, and B. Heidel. 1998. Peatlands on national forests of the Northern Rockies.

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Foresman, K. R. 2001. The wild mammals of Montana. American Society of Mammalogists, Special Publication No. 12. 278 pp.

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Pearson, Dean E. 1999. Small mammals of the Bitterroot National Forest: a literature review and annotated bibliography. General Technical Report RRS-GTR-25. Ogden, UT: U.S.D.A. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 63 pp.

Reichel, J. D., and J. G. Corn. 1997. Northern bog lemmings: survey, population parameters, and population analysis. Unpublished report to the Kootenai National Forest. Montana Natural Heritage Program, Helena, MT. 27 pp.

Reichel, J. D., and S. G. Beckstrom. 1994. Northern bog lemming survey: 1993. Unpublished report. Montana Natural Heritage Program. Helena, MT. 87 pp.

West, S. D. 1999. Northern bog lemming (*Synaptomys borealis*). Pp. 655–656 in the Smithsonian book of North American mammals, D. E. Wilson and S. Ruff, eds. Smithsonian Institution Press, Washington, DC.

Wright, P. L. 1950. *Synaptomys borealis* from Glacier National Park, Montana. Journal of Mammalogy 31(4):460.

Meadow Jumping Mouse (*Zapus hudsonius*)

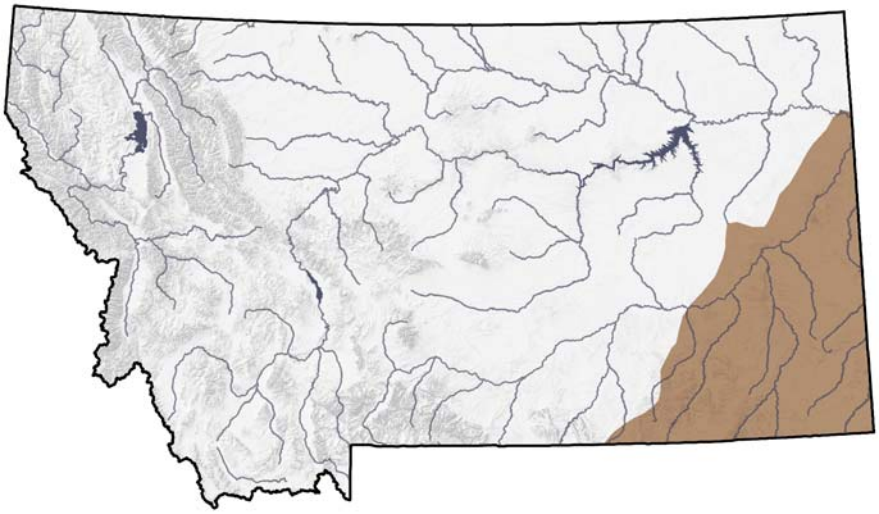

Figure 97. Distribution of the Meadow Jumping Mouse

Range

Montana is on the western edge of the species' global distribution in the northern Great Plains. The meadow jumping mouse has been documented in six eastern and southeastern counties (Bighorn, Carter, Dawson, Powder River, Richland, and Wibaux), at elevations up to 4,200 feet (1,272 meters) (Foresman 2001a; Montana Natural Heritage Program database).

Habitat

In Montana, meadow jumping mice have been found in dense, tall, and lush grasses and forbs in marshy areas (sometimes with standing water), riparian areas, woody draws, and grassy upland slopes, sometimes within or near forested sites of ponderosa pine (Lampe et al. 1974; Matthews 1980; Matthews and Swenson 1982).

The meadow jumping mouse is generally described as a species that occupies moist lowland habitats rather than drier uplands, preferring relatively dense vegetation in open grassy and brushy areas of marshes, meadows, swamps, and open conifer forests and often favoring sites bordered by small streams. On the northern Great Plains this usually results in its restriction primarily to riparian habitats. When inactive, meadow jumping mice occupy underground burrows, usually in banks or hills (in winter) or under logs or grass clumps. Young are born in an underground nest or under other cover (Krutzsch 1954; Whitaker 1972; Jones et al. 1983).

Management

No special management activities have been developed or implemented for this species in Montana. Refer to the following articles for more information on the management of the meadow jumping mouse: Lampe et al. 1974; Matthews 1980; Matthews and Swenson 1982.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Destruction of natural springs/seeps by and for livestock, and wetland conversion	Increased management and protection of all springs and seeps within the potential range
Lack of knowledge regarding immediate and long-term impacts of grazing	Prepare a conservation plan addressing species-specific concerns and actions or those pertaining to a suite of species with similar habitat use and needs
Lack of data on species status, distribution, habitat use, and abundance in Montana	Standardized surveys in eastern and southeastern Montana to obtain estimates of population status, distribution, and habitat use, and to monitor known populations

Management Plan

None

Citations

Foresman, K. R. 2001. The wild mammals of Montana. American Society of Mammalogists, Special Publication No. 12. 278 pp.

Jones, J. K., Jr., D. M. Armstrong, R. S. Hoffmann, and C Jones. 1983. Mammals of the northern Great Plains. University of Nebraska Press, Lincoln, NE. 379 pp.

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Lampe, R. P., J. K. Jones Jr., R. S. Hoffman, and E. C. Birney. 1974. The mammals of Carter County, southeastern Montana. Occasional Paper. Museum of Natural History, University of Kansas 25:1–39.

Matthews, W. L., and J. E. Swenson. 1982. The mammals of east-central Montana. Proceedings of the Montana Academy of Sciences 39:1–13.

Matthews, W. L. 1980. The meadow jumping mouse in southeastern Montana. The Prairie Naturalist 12(2):63–64.

Whitaker, J. O., Jr. 1972. *Zapus hudsonius*. American Society of Mammalogists, Mammalian Species No. 11. 7 pp.

Gray Wolf (*Canis lupus*)

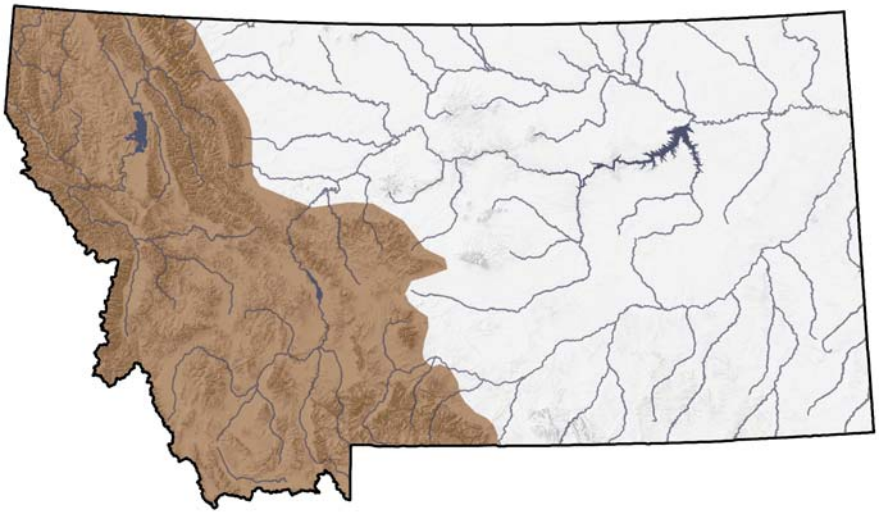

Figure 98. Distribution of the Gray Wolf

Range

There are three federally designated wolf recovery areas in the Northern Rockies. Montana contains portions of all three. Natural dispersers decolonized northwest Montana beginning in the late 1970s. In 1995 and 1996 wolves were reintroduced in both central Idaho and Yellowstone National Park. As those reintroduced populations grew, the wolves dispersed, and the three distinct recovery areas now function increasingly as one large meta-population. The distribution of wolves in Montana has expanded accordingly, but is still primarily in western Montana. Wolves are capable of dispersing long distances and could plausibly attempt to colonize eastern Montana. Individual wolves have been documented in eastern Montana, but no packs have been confirmed.

Habitat

The gray wolf exhibits no particular habitat preference. Wolves establishing new packs in Montana have demonstrated greater tolerance of human presence and disturbance than previously thought characteristic of this species (Thiel 1985; Mech et al. 1988; Mech 1989). They have established territories where prey is more abundant at lower elevations than expected, especially in winter (Montana Fish, Wildlife & Parks 2003).

Management

Although wolves dispersing from Canada were occasionally observed, gray wolves were essentially extirpated from Montana and the rest of the western United States in the early 1900s primarily due to conflicts with people. Wolves

started recolonizing the area around Glacier National Park in 1979, and the first den documented in Montana in more than 50 years was found in Glacier National Park in 1986. Wolves have since colonized much of northwestern Montana as a result of dispersal from Canada and Glacier National Park. In 1995 and 1996 wolves were reintroduced into Yellowstone National Park and central Idaho. Wolves resulting from these reintroductions have since expanded into areas in Montana near these reintroduction sites and continue to expand in numbers and distribution in Montana.

Gray wolves in Montana are classified under the Endangered Species Act as "endangered" in the northwest Montana federal recovery area and as "experimental non-essential" across southern Montana in the federal central Idaho and Greater Yellowstone recovery areas. Gray wolves reached biological recovery goals for the northern Rocky Mountains at the end of 2001. However, the process of delisting the species is currently on hold due to the lack of approved management plans from all three states (Montana, Idaho, and Wyoming). Early in 2004 the U.S. Fish and Wildlife Service approved the Montana Gray Wolf Conservation and Management Plan (Montana Fish, Wildlife & Parks 2003). Since then, Montana Fish, Wildlife & Parks (FWP) has been expanding its role, and the agency is now implementing the state's wolf conservation and management plan. FWP assumed that management responsibility through a cooperative agreement between the two agencies. The agreement transferred legal authority to FWP to begin implementing as much of the state plan as allowed under federal regulations, even though wolves currently remain listed.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Variable public tolerance in Montana	Public outreach to increase awareness of wolf biology, conservation, and management
	Technical assistance to private landowners to decrease potential for negative livestock-wolf interactions
Human-caused mortality (illegal shooting, conflicts with livestock, misidentification, vehicle or train strikes)	Adaptive management that is dynamic with the status of wolf populations and distribution
	Monitoring to document maintenance of a recovered population via different protocols
Disease	Monitor populations through blood sampling to identify the extent of the problem

Management Plan

Montana Fish, Wildlife & Parks. 2003. Montana Gray Wolf Conservation and Management Plan.

Northern Rocky Mountain Wolf Recovery Team. 1980. Northern Rocky Mountain wolf recovery plan interagency report. 67 pp.

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. U.S. Fish and Wildlife Service, Denver CO. 119 pp.

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Citations

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Mech, L. D., et al. 1988. Wolf distribution and road density in Minnesota. Wildlife Society Bulletin 16:85–87.

Thiel, R. P. 1985. Relationship between road densities and wolf habitat suitability in Wisconsin. American Midland Naturalist 113:404–407.

Grizzly Bear (*Ursus arctos horribilis*)

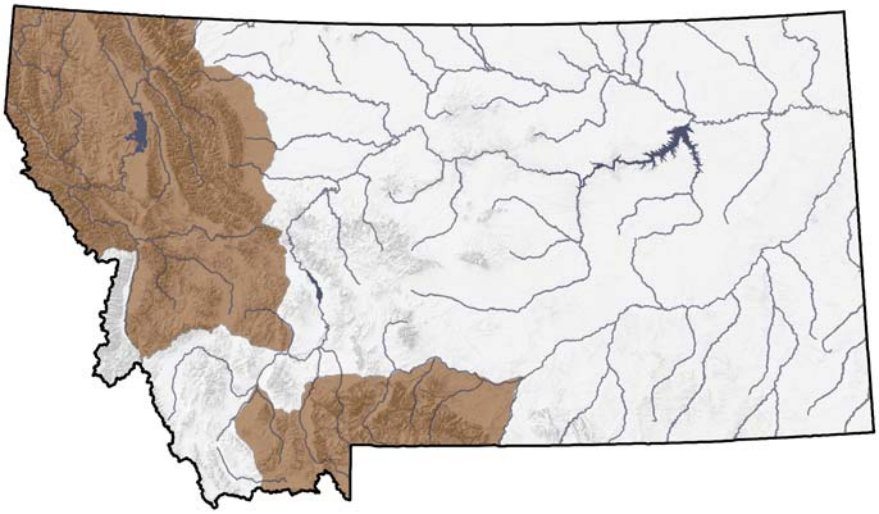

Figure 99. Distribution of the Grizzly Bear

Range

In Montana, grizzlies occur in northwest Montana, extending through Glacier National Park, into the Bob Marshall Wilderness area, and to the Blackfoot River. Grizzlies are also found coming down east off the Rocky Mountain Front. Individuals may also be found in the Helena, Bitterroot, and Lolo national forests. In addition, grizzlies are found in Yellowstone National Park, and individuals are moving into the Absaroka-Beartooth Wilderness and the Gallatin and Beaverhead/Deerlodge national forests.

Habitat

In Montana, grizzlies primarily use meadows, seeps, riparian zones, mixed shrub fields, closed timber, open timber, side-hill parks, snow chutes, and alpine slabrock habitats. Habitat use is highly variable between areas, seasons, local populations, and individuals (Servheen 1983; Craighead et al. 1982; Aune et al. 1984). Historically, the grizzly also was present on the plains occurring throughout most of eastern Montana.

Management

Current grizzly bear management throughout its range in Montana is dictated by its threatened listing under the Endangered Species Act (ESA). Under the ESA, no federal actions can cause further endangerment of grizzly bears. Federal land management agencies such as the U.S. Forest Service and the Bureau of Land Management must conduct management actions on their lands so that grizzly bears are not jeopardized. Interagency grizzly bear management guidelines have

been developed for these managed lands. In addition, the state of Montana has the Grizzly Bear Policy (MCA 12.9.103), which outlines policy guidelines for Montana Fish, Wildlife & Parks to promote the conservation of grizzly bears in Montana. Other regionally specific management plans include the Grizzly Bear Management Plan for Southwestern Montana 2002–2012 (Montana Fish, Wildlife & Parks 2002) and various tribal, national forest, and national park plans and policies. Most of these management plans are centered on three major themes: (1) Management of habitat to ensure grizzly bears have large expanses of suitable interconnected lands in which to exist, (2) Management of grizzly/human interactions, which most often result in death for the bears (and sometimes humans) involved (this is a particularly important concern for female bears because their removal may have significant impacts on the demography of isolated populations), and (3) Research to determine the population size and trends to ensure that grizzly bear populations are not being jeopardized. Please consult any of the management plans listed above for grizzly bear management specifics.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Human-bear and bear-livestock interactions	Proactive management including public outreach, utilizing Montana citizens
	Reduce human-caused mortality, including vehicles and trains
	Continued interagency management efforts
Habitat loss, degradation, and fragmentation	Protection of critical habitats through easements and other methods
Genetic fragmentation among Montana populations	Ongoing research projects, including genetic analysis projects

Management Plans

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Black-footed Ferret (*Mustela nigripes*)

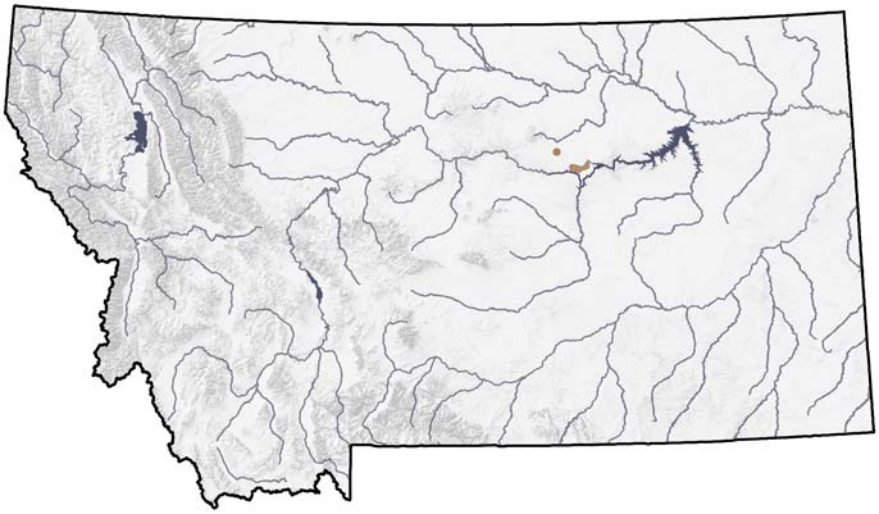

Figure 100. Distribution of the Black-footed Ferret

Range

Only reintroduced populations of the black-footed ferret in southern Phillips County are currently present. Historically, ferrets ranged throughout much of central and eastern Montana.

Habitat

Black-footed ferrets are intimately tied to prairie dogs (*Cynomys* spp.) throughout their range and have only been found in association with prairie dogs. They are therefore limited to the same open habitat used by prairie dogs: grasslands, steppe, and shrub-steppe. Black-footed ferrets do not dig their own burrows and rely on abandoned prairie dog burrows for shelter. Only large complexes (several thousand acres of closely spaced colonies) can support and sustain a breeding population of black-footed ferrets. It has been estimated that about 40 to 60 hectares of prairie dog colony is needed to support one ferret, and females with litters have never been found on colonies smaller than 49 hectares (Miller et al. 1996). Ferrets scent-mark to maintain spatial separation (Richardson 1986).

Management

Black-footed ferrets have been extirpated from most of their former large range largely as a result of loss of habitat due to prairie dog control programs. Canine distemper, in conjunction with captures for captive breeding, resulted in extirpation of the last known wild population near Meeteetse, Wyoming, by early 1987. See Miller et al. (1996) for more information on the discovery of the Meeteetse ferrets and subsequent distemper-caused decline and captive

breeding decisions that occurred in 1985. All known populations are a result of the reintroduction of captive-bred ferrets from animals taken into captivity from this population. Reintroductions have occurred annually in Montana on federal and/or tribal land since 1994 with varying success. It is unknown why reintroductions in Montana have not established a self-sustaining population. Predation by coyotes and badgers and long-distance dispersal may be the primary problems with the reintroduction efforts. Disease, such as sylvatic plague, has also apparently resulted in deaths for released animals. Some wild reproduction has occurred, but no self-sustaining populations have been established yet.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Reduction of habitat	Research to validate critical habitat needs of black-footed ferrets
	Support strategic conservation easements by conservation organizations and public agencies to enhance critical habitat
	Work to develop information campaign to inform land owners and public concerning the need to maintain healthy critical habitats for black-footed ferret
Lack of prey base due to declining prairie dog colonies	Work through cooperative agreements to manage for healthy populations of prairie dogs
Disease, such as canine distemper	Continue monitoring diseases that impacts health of populations
Failure of reintroduction efforts	Continue supporting future reintroduction efforts that include the adaptive management paradigm

Management Plans

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U.S. Fish and Wildlife Service (USFWS). 1988. Black-footed ferret recovery plan. Denver, CO. 154 pp.

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Canada Lynx (*Felis lynx*)

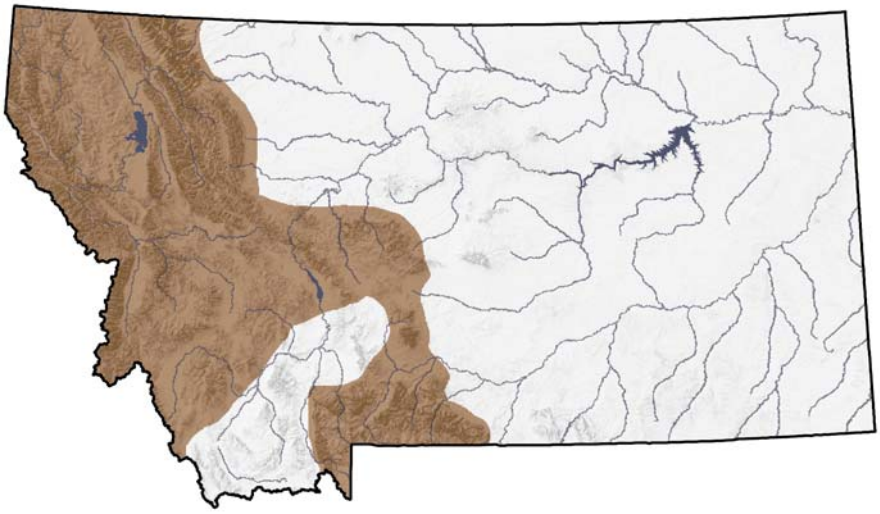

Figure 101. Distribution of the Canada Lynx

Range

Canada lynx are limited to western mountains of Montana; however, dispersers have been occasionally documented in eastern Montana.

Habitat

Canada lynx west of the Continental Divide generally occur in subalpine forests at elevations between 1,220 and 2,150 meters, in stands composed of pure lodgepole pine but also mixed stands of subalpine fir, lodgepole pine, Douglas-fir, grand fir, western larch, and hardwoods (J. Squires, personal communication 1999, in Ruediger et al. 2000). In extreme northwestern Montana, primary vegetation may include cedar-hemlock habitat types (Ruediger et al. 2000). East of the Continental Divide, the subalpine forests inhabited by lynx occur at higher elevations (1,650 to 2,400 meters) and are composed mostly of subalpine fir. Secondary habitat is intermixed Engelmann spruce and Douglas-fir habitat types where lodgepole pine is a major seral species (Ruediger et al. 2000). Throughout their range, shrub-steppe habitats may provide important linkage habitat between the primary habitat types described above (Reudiger et al. 2000). Typical snow conditions are important factors for the species, with lynx occurring primarily in habitats that also receive relatively uniform and moderately deep snowfall amounts (total annual snowfall of 100 to 127 centimeters) (Kelsall et al. 1977). Within these habitat types, disturbances that create early successional stages, such as fire, insect infestations, and timber harvest, provide foraging habitat for lynx by creating forage and cover for snowshoe hares, although older forests also provide habitats for snowshoe hares and lynx for longer periods of time than disturbance-created habitats (Ruediger et al. 2000).

Canada lynx avoid large openings but often hunt along edges in areas of dense cover (Ruediger et al. 2000). When inactive or birthing, they occupy dens typically in hollow trees, under stumps, or in thick brush. Den sites tend to be in mature or old-growth stands with a high density of logs (Koehler 1990; Koehler and Brittell 1990). These habitats must be near or adjacent to foraging habitat because the hunting range of the female is reduced during this time (Ruediger et al. 2000).

In the South Fork Flathead River, Canada lynx were mostly located in fire-created, densely stocked young stands of lodgepole pine where snowshoe hares were most abundant. No locations in open or semi-open areas were observed (Koehler at al. 1979). In the Garnet Range, most were found in subalpine fir forest (Smith 1984). Denning sites are found in mature and old-growth lodgepole pine, spruce, and subalpine fir forests with a high density of logs (Koehler 1990, Koehler and Brittell 1990). Denning stands need not be large (1 to 3 hectares), but several stands should be interconnected (Koehler and Brittell 1990). Lynx require cover for stalking and security, and usually do not cross openings wider than 100 meters (Koehler and Brittell 1990).

Management

Canada lynx are classified as a furbearer in Montana, but the trapping season is currently closed in the state. Any lynx accidentally trapped must be released uninjured and reported to designated Montana Fish, Wildlife & Parks (FWP) employees in the trapping district within five days. Any lynx trapped that cannot be released unharmed must be reported to FWP for assistance to determine disposition and/or collection of the animal. The Canada Lynx was listed as a threatened species under the Endangered Species Act in the contiguous United States in 2000 because of the inadequacy of guidance for conservation of lynx in the National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans (Reudiger et al. 2000). Subsequently, the Canada Lynx Conservation Assessment and Strategy (Reudiger et al. 2000) was produced to provide guidance for conservation measures on federally managed lands to ensure that lynx populations were not jeopardized by management of critical habitat. Please consult the plan for details of this strategy.

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Habitat, specifically conifer loss and destruction	Adequate management strategies between agencies to protect dense tree stands
	Maintain natural mosaic of forest by allowing low- to medium-level fires

Fragmented landscapes suppress principle prey (snowshoe hare) populations	Continue research on prey base (snowshoe hare and red squirrel)
Road construction decreases connectivity and movement and increases potential for human disturbance	Conserve contiguous tracks of habitat by working with state and federal agencies to manage for road construction and development
Grazing increases competition for forage resources with Canada lynx prey	Manage forests for sustainable livestock grazing

Management Plan

Ruediger, Bill, and 14 others on Lynx Biology Team. 2000. Canada Lynx Conservation Assessment and Strategy. 120 pp.

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Koehler, G. M., and J. D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry, October 1990.

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American Bison (*Bos bison*)

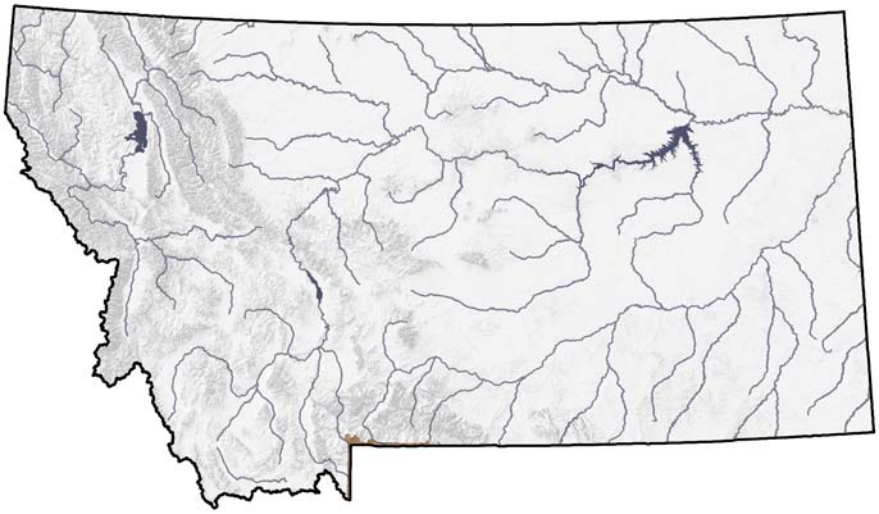

Figure 102. Distribution of the American Bison

Range

Free-ranging American bison in Montana are located only in areas surrounding Yellowstone National Park. Another semi-wild population occurs at the National Bison Range in northwestern Montana. American bison are also located on private ranches throughout Montana. The animals in Yellowstone National Park are partially descended from animals originally found in the park. Intervention has led to a genetically diverse population with genetics derived from bison imported in the early 1900s mixed with remnant native bison following the great reduction in the 1800s. Other bison descended from five founder herds captured in various portions of the bison's former range, including Canada. Some were caught along the Milk River in Montana (Pattie and Hoffman 1992). American bison were formerly widespread in North America from Alaska and western Canada across the United States into northern Mexico.

Some American bison migrate out of Yellowstone National Park during the winter; these movements are more frequent and involve greater numbers of animals during years of heavy snow when populations are high (generally more than 3,000 individuals) (National Academy of Sciences 1998). Recently (1985–1986), bison harvest has resumed in response to Montana movements out of Yellowstone National Park. American bison at the National Bison Range are confined to the range and no migration is possible. This species previously made mass migrations across the prairie in spring and fall, with mountain populations moving to lower elevations in valleys.

Taxonomists recognize two subspecies of bison—the plains and the woodland bison—which have distinct differences in habitat preference and historical range.

Habitat

Because of restrictions, currently occupied habitat does not reflect the full natural range for American bison. Throughout their range, American bison inhabit woodlands and open plains and grasslands. Woodlands and openings in boreal forests, meadows, and river valleys are used in the northern parts of their range. Like other large grazers, they are attracted to burn areas the next growing season (Shaw and Carter 1990). During the growing season at the Konza Prairie in northeastern Kansas, they preferred areas that had been burned in spring. Summer grazing was concentrated in a large watershed area (79 to 119 hectares) dominated by warm-season, perennial C4 grasses. In fall and winter they grazed both burned and unburned watersheds more uniformly, but grazed most intensively in areas with large stands of cool-season, C3 grasses (Vinton et al. 1993).

Management

Management of free-ranging American bison in Montana has been controversial. The presence of brucellosis in these animals and their migration out of Yellowstone National Park into adjacent public and private lands has led to conflicts between private landowners, citizens, public administrative agencies, and public land management agencies. Free-ranging herds in Montana are currently managed under the Interagency Bison Management Plan. The current distribution of Yellowstone National Park bison and the management potential of this herd is limited to several very small areas outside of Yellowstone National Park where they can be tolerated and will not pose a disease risk to cattle grazing on surrounding habitats. It is unlikely that the distribution of bison in the Greater Yellowstone area will dramatically change until brucellosis is eliminated from the herd. Efforts are currently being explored to isolate a brucellosis-free population with acceptable genetics in order to establish free-ranging herds outside Yellowstone National Park. Establishing this type of herd would require extensive cooperation from various federal and state agencies and private partners. If successful, these herds could serve to help restore the ecology of many community types in greatest need of conservation, such as grassland complexes, mixed shrub/grass associations, woody draws, and mixed broadleaf forests. Along with the restoration of these community types, many associated species in greatest need of conservation could benefit (e.g., prairie dogs, blackfooted ferrets, and swift foxes).

Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Disease (brucellosis)	Brucellosis control
Control issues for bison moving in and out of Yellowstone National Park	Continue development of working relationships with landowners

The American bison is ecologically extinct outside Yellowstone National Park and has a very reduced range of free-roaming herds	Establish free-ranging, disease-free American bison populations in suitable grassland habitats outside Yellowstone National Park where they can function ecologically and operate as keystone species to restore grassland systems
Bison genome has been eroded by unnatural management practices and introgression with domestic cattle genes	Preserve wild bison genome through herd expansion and restoration projects in North America
Exclusion of American bison from management plans as part of the natural mammalian fauna in Montana eligible for regulated harvest	Create populations of wild bison that can be harvested and provide economic and social benefits to Montana

Management Plan

Montana Department of Livestock and Montana Fish, Wildlife & Parks. 1996. Interim bison management plan. 70 pp.

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