

## Shrub Grassland Ecotype



Figure 29. Shrub Grassland Ecotype

Montana's important, yet sporadic, shrub grasslands are found across the southern half of Montana in high-elevation valleys and along grassy slopes. The junipers and sagebrushes that characterize these generally dry slopes occupy only 8 percent of Montana. Typically interspersed with low-cover grasslands, the shrub grassland ecotype offers a unique transition area that supports many of Montana's species of greatest conservation need. More than half of Montana's shrub grasslands are privately owned. Increasingly, the high and flat benches that traditionally provided grazing lands for wildlife and livestock are prized for residential development because of their easy access with 100-mile views. In the coming years, long-term partnerships with landowners will be a crucial component of shrub grassland conservation.

### Landscape Characteristics

The shrub grassland ecotype includes 7,240,566 acres and represents 7.7 percent of Montana. The southwestern segment of the shrub grassland ecotype is situated in high mountain valleys and on nonforested mountain slopes at elevations from 5,500 feet to 8,000 feet. Slopes vary from nearly level in valleys to sometimes more than 45 degrees on some mountainsides. Mountain valleys and drainages associated with this segment include the Centennial, Big Hole, upper Beaverhead, and the valley between the Butte Highlands and Fleecer Mountain. Shrub grasslands are found on slopes of the Centennial, Snowcrest, Beaverhead, Pintler, Highland, Ruby, south Bitterroot, Tendoy, and Tobacco Root mountains. A segment of shrub grassland occupies the valleys of the upper Shields and Smith rivers at elevations from 4,500 to 6,500 feet. These slopes are predominantly level or gently sloped. Other areas of shrub grassland are found in the north-central and southern plains region on mostly level or gentle slopes,

although where this ecotype occupies dissected river breaks, slopes can be locally steep. Major drainages where these shrub grasslands are located include the Clark Fork of the Yellowstone, upper Tongue, upper Powder, Bighorn, Musselshell, Milk, central Missouri, and Missouri rivers above Fort Peck Dam, and Dry Creek. Most are located in elevations ranging from 2,000 to 3,500 feet.

## **Soils**

Land occupied by this ecotype in the southwest is geologically the same as the adjacent grasslands or forest. Shrub grasslands in the plains dominated by Wyoming big sagebrush most commonly occur on Cretaceous shales (Colorado Shale, Montane Group, and Pierre Shale) in the sedimentary plains area. Other shrub grasslands occupy a variety of geological substrates. Very little shrub grassland is found in the glaciated plains.

As well as being highly variable in terms of vegetation composition, geographic location, and geology, the shrub grassland ecotype is variable in terms of soil characteristics. Most of the major soil categories found in Montana, except for those of alpine and subalpine situations, are represented in this ecotype (Montagne et al. 1978).

## **Climate**

Mean annual temperature in the intermountain/foothill segment of the ecotype varies from 36 to 40 degrees F. In the plains shrub grasslands, mean annual temperatures range from 43 to 45 degrees F.

Because this ecotype occurs as widely separated segments across most of the southern half of the state, temperatures at a given time of year vary broadly. Due to the relatively high elevations where shrub grassland is found in the intermountain region, January daily temperatures are comparatively cold for that part of the state (12 to 19 degrees F). January temperatures in the plains segments are typical for whichever area of the state they are in and range from 10 to 20 degrees F. July daily temperatures in the southwest segment range from 57 to 63 degrees F, and on the plains they vary from 64 to 66 degrees F. Mean annual extreme minimum temperatures across the ecotype vary from minus 24 to minus 31 degrees F, putting most of the area into the cold side of plant hardiness zone 4. Mean annual maximum temperatures may be anywhere from less than 85 degrees F in the southwest to over 102 degrees F in the southeast.

Average length of time without frost is shortest in the southwest and may only be 30 days in some places. The frost-free period is the greatest in those segments near the lower Yellowstone and Missouri rivers, where it may range from 115 to 130 days.

The percentage of precipitation received during the growing season is highly variable within the southwest segment, ranging from 35 to 60 percent depending on the shrub and grassland. The shrub and grassland around White Sulphur Springs receives 40 to 45 percent of its moisture in the growing season. In other segments of the shrub grassland ecotype, 50 to 62 percent of moisture falls during the growing season.

Snowfall for the shrub grassland areas in or near the mountains, except for the segment south of the Pryor Mountains, generally ranges from 31 to 90 inches each year. Mean number of days with snow cover in these areas varies from 90 to 160 days. An area of shrub grassland south of the Pryor Mountains averages less than 30 inches of mean annual snowfall and generally has snow on the ground for less than 60 days. The other areas generally average between 20 and 50 inches of snowfall with 60 to 100 days of snow cover.

### **Anthropogenic Uses**

The shrub grassland ecotype is some of the most undeveloped habitat in the state. Recreationalists and agriculturalists enjoy and appreciate it. The breakdown of land stewardship for the shrub grassland ecotype is as follows:

U.S. Federal Agencies:	1,851,561 acres, or 25.7% of total area, which include:
BLM:	1,574,556 acres, or 21.8% of total area
USFS:	228,634 acres, or 3.2% of total area
USFWS:	42,008 acres, or 0.6% of total area
NPS:	1,977 acres, or less than 0.1% of total area
State Agencies:	668,049 acres, or 9.2% of total area
Tribal Lands:	260,264 acres, or 3.6% of total area
Private:	4,431,526 acres, or 61.5% of total area

### **Vegetation**

In areas of the shrub grassland ecotype that has fine-textured soils and receives 10 to 14 inches of annual precipitation, the predominant species of vegetation is the big sagebrush (*Artemisia tridentata* ssp). Big sagebrush-dominated communities in this area normally are found on fine-textured to very fine textured soils. Such areas are estimated to cover 65 percent of the ecotype. Where there is more available moisture due to run-in or a high water table, silver sagebrush (*Artemisia cana*) or greasewood (*Sarcobatus vermiculatus*) may be abundant. Silver sagebrush is favored by medium-textured nonsaline soils; greasewood is usually found on dense clay saline and/or alkaline soils. Silver sagebrush bottomlands in Theodore Roosevelt National Park described by Hansen et al. (1988) are probably similar to such communities in eastern Montana. Dominant species in these areas are silver sagebrush, western wheatgrass (*Agropyron smithii*), and green needlegrass (*Stipa viridula*). The dominant understory species under big sagebrush in eastern areas are western wheatgrass, prairie junegrass

(*Koeleria macrantha*), and green needlegrass. Other common species include Nuttall saltbush (*Atriplex nuttallii*), bluebunch wheatgrass (*Agropyron spicatum*), and various milkvetches (*Astragalus* spp.). In the west, dominant grasses are bluebunch wheatgrass, western wheatgrass, and prairie junegrass. Common forbes are milkvetches, American vetch (*Vicia Americana*), and biscuitroot (*Lomatium* spp.).

Where big sagebrush is the dominant species on silty soils in the 10- to 14-inch precipitation zone, the most abundant grasses are needle-and-thread (*Stipa comata*) and western wheatgrass in the east and bluebunch wheatgrass in the west (Ross et al. 1976) (Mueuggler et al. 1980). On limy, shallow, and very shallow soils, bluebunch wheatgrass is typically dominant. Communities containing both low sagebrush (*Artemisia arbuscula*) and big sagebrush are found in some areas of extreme southwest Montana east of the Continental Divide. These sites are often on limestone. Subdominant grasses include prairie junegrass and sandberg bluegrass (*Poa secunda*). Common forbs are hood's plox (*Phlox hoodii*) and blue flax (*Linum perenne*). Curleaf mountain mahogany (*Cercocarpus ledifolius*) is another shrub restricted to the extreme southwestern part of the state. A bitterbrush (*Purshia tridentata*)/bluebunch wheatgrass habitat type is recognized west of the divide, and an aromatic sumac (*Rhus aromatica*)/bluebunch wheatgrass type occurs in south-central Montana. Other shrubs such as big sagebrush, rubber rabbitbrush (*Chrysothamnus nauseosus*), and Rocky Mountain juniper (*Juniperus scopulorum*) may be an important component of these habitat types. Finally, on saline lowlands, a greasewood/western wheatgrass habitat is recognized, and on uplands a greasewood/basin wildrye (*Elymus cinereus*) type.

The areas of the shrub grassland ecotype where annual precipitation is from 15 to 19 inches are usually higher in elevation than those with annual precipitation between 10 to 14 inches. The most abundant shrub species is generally mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), although there may be some Wyoming big sagebrush, rubber rabbitbrush, and bitterbrush. Where these shrub grasslands occur in southwestern Montana, bluebunch wheatgrass is still an important grass species as in the 10- to 14-inch precipitation areas, but Idaho fescue is considered to be dominant. North of the 46th parallel, Idaho fescue is replaced by rough fescue (*Festuca scabrella*) as the dominant grass. These sites generally have more abundant and diverse forbs than the drier areas. In the higher precipitation areas that are well drained, typically with steep slopes, coarse-textured shallow soils, and often southerly exposures, the most abundant species is generally bitterbrush. West of the divide and north of the 47th parallel, rough fescue is the most productive grass. South of that Idaho fescue or Idaho fescue and bluebunch wheatgrass are the most productive. On some sites mountain big sagebrush may be as abundant as bitterbrush. Arrowleaf balsamroot (*Balsamorhiza sagittata*) and silky lupine (*Lupinus sericeus*) are very common both north and south of the 47th parallel.

## Terrestrial Conservation Focus Areas in Greatest Need (Tier I)

### Bighorn Intermontane Basin (290,287 acres)



Figure 30. Bighorn Intermontane Basin Focus Area

The Bighorn Intermontain Basin area protrudes across Montana's border from Wyoming and sits in the rain shadow of the Beartooth Range. The area is home to a very diverse wildlife community and represents a limited geographic area at the end of its range that resembles communities more typical of the Great Basin and Colorado Plateau than Montana. Riparian areas are limited minor drainages, and it is the driest area in Montana, typically receiving only 6 inches of precipitation annually. Snow seldom lasts long due to the predominant and seemingly ever present southwest winds. Native vegetation is generally dominated by shrubs, primarily black sagebrush, Wyoming big sagebrush, and greasewood. Understory grasses are generally sparse, with invading annuals such as cheatgrass often dominating. This is the home of the prairie rattlesnake as well as the sagebrush and greater short-horned lizards. Greater sage-grouse are abundant as are gray partridges. This is the only habitat in Montana that supports the chukar partridge. However, given the desert nature of the habitat, mule deer and pronghorn antelope can exist only in low densities.

#### Landscape Characteristics

This subsection consists of dissected plains, hills, terraces, and fans that formed in shale, siltstone, and sandstone overlain by some alluvium and lacustrine sediment. Elevations range from 3,700 to 4,700 feet. Drainage density is moderate. Mean annual precipitation ranges from 5 to 12 inches. The soil temperature and moisture regimes are mesic and aridic ustic. Winters are very dry. The primary natural disturbance is drought. Another important natural disturbance regime is prairie dog complexes. Land use is predominantly livestock

grazing and irrigated cropland. The breakdown for land stewardship in the Bighorn Intermontane Basin area is as follows:

U.S. Federal Agencies: 163,275 acres, or 56.2% of total area, which include:  
 BLM: 157,097 acres, or 54.1% of total area  
 USFS: 3,707 acres, or 1.3% of total area  
 NPS: 2,471 acres, or 0.8% of total area  
 State Agencies: 14,517 acres, or 5% of total area  
 Tribal Lands: 4,819 acres, or 1.7% of total area  
 Private: 107,676 acres, or 37.1% of total area

**Associated Habitats**

Habitat	Habitat Tier	Percentage of Area
Agricultural Lands - Irrigated	III	2.46
Low/Moderate Cover Grasslands	I	3.44
Utah Juniper	III	3.73
Xeric Shrub Grassland Associations	I	5.67
Badlands	II	17.19
Very Low Cover Grasslands	I	28.28
Sagebrush	I	33.78

Note: A total of 94.55% of the Bighorn Intermontane Basin area is represented; 5.45% is made up of a combination of other habitat types.

**Associated Species of Greatest Conservation Need (Tier I Species)**

There are a total of 174 terrestrial vertebrate species that are found within the Bighorn Intermontane Basin Focus Area. Tier I species are listed below. All associations can be found in Table 33.

**Amphibians:** Northern Leopard Frog

**Reptiles:** Western Hog-nosed Snake and Milksnake

**Birds:** Bald Eagle, Greater Sage-Grouse, Mountain Plover, Long-billed Curlew, and Burrowing Owl

**Mammals:** Spotted Bat, Pallid Bat, Black-tailed Prairie Dog, White-tailed Prairie Dog, Gray Wolf, and Black-footed Ferret

## Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Loss of habitat due to conversion agriculture	Policy-based approaches that encourage the conservation of natural communities, rather than support their conversion
	Support public and private conservation programs/activities that encourage and support private land use stewardship
Drainage of natural wetlands	Participate in government and private conservation partnerships to reduce the loss of wetland habitat and restore lost wetlands
Invasive or exotic plant species	Cooperative efforts to reduce the abundance of exotic plant species
Disruption of natural disturbance processes, especially fire	Work with other agencies, tribes and private organizations to restore the natural disturbance processes
Fragmentation of habitat due to fossil fuel exploration and development activities	Work with corporations, land owners and other agencies to reduce impacts of exploration
	Education and research on fossil fuel development and its impacts on natural landscape

## References

A Biological Conservation Assessment for the Utah-Wyoming Rocky Mountain Ecoregion: Report to the Nature Conservancy. 2001. R. Noss, G. Wuerthner, K. Vance-Borland, and C. Carroll. Conservation Science, Inc. 125 pp. + Executive Summary and Appendix D.

U.S. Fish and Wildlife Service. 2004. Conservation Focus Areas of the Great Divide: a vast region encompassing the Upper Missouri, Yellowstone and upper Columbia watersheds. Publisher: USFWS, Benton Lake Wildlife Refuge, Great Falls, MT. 77 pp.

## Montana Glaciated Plains (17,806,106 acres)



Figure 31. Montana Glaciated Plains Focus Area

The Montana Glaciated Plains area is dominated by level to rolling till plains covered by sagebrush grasslands and mixed short-grass prairie and croplands. This area also encompasses two island mountain ranges: the Bears Paw and Highwood mountains. The major river drainages of the area include the Milk, Missouri, Marias, and Musselshell. In the east, this focus area is characterized by prairie that is dissected by badlands of the major tributaries to the Milk, Missouri, Marias, and Musselshell drainages. From the bluffs dotted with ancient tepee rings, one can observe numerous prairie wildlife species. To the west, the area is characterized by the numerous rugged breaks that support diverse assemblages of ponderosa pine and cottonwoods depending on the availability of moisture. This area also is considered very fertile wheat growing country, most notable in the Golden Triangle to the west.

### Landscape Characteristics

This area consists of plains, terraces, fans, and floodplains that formed in glacial till, gravel deposits, and alluvium over clay shale, sandstone, and siltstone. Elevations range from 1,800 to 7,500 feet in the Highwood and Bears Paw mountains. Drainage density is moderate and glacial potholes are common, especially in the northern part of the subsection. Mean annual precipitation ranges from 10 to 15 inches, with about 20 to 30 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Primary natural disturbances are drought and fire. Another important natural disturbance regime is prairie dog complexes. Land use is predominantly livestock grazing and dryland farming. The breakdown for land stewardship in the Montana Glaciated Plains area is as follows:



U.S. Federal Agencies: 3,394,302 acres, or 19.1% of total area, which include:  
 BLM: 3,003,010 acres, or 16.9% of total area  
 USFS: 62 acres, or less than 0.1% of total area  
 USFWS: 283,492 acres, or 1.6% of total area  
 NPS: 247 acres, or less than 0.1% of total area  
 State Agencies: 1,253,566 acres, or 7% of total area  
 Tribal Lands: 1,141,133 acres, or 6.4% of total area  
 Private: 11,995,485 acres, or 67.4% of total area  
 County and City: 494 acres, or less than 0.1% of total area

**Associated Habitats**

Habitat	Habitat Tier	Percentage of Area
Wetland and Riparian	I	3.22
Moderate/High Cover Grasslands	I	3.38
Altered Herbaceous	II	4.33
Sagebrush	I	4.67
Very Low Cover Grasslands	I	4.79
Agricultural Lands - Irrigated	III	13.87
Agricultural Lands - Dry	III	20.19
Low/Moderate Cover Grasslands	I	33.66

Note: A total of 88.11% of the Montana Glaciated Plains area is represented; 11.89% is made up of a combination of other habitat types.

**Associated Species of Greatest Conservation Need (Tier I Species)**

There are a total of 364 terrestrial vertebrate species that are found within the Montana Glaciated Plains Focus Area. Tier I species are listed below. All associations can be found in Table 34.

**Amphibians:** Northern Leopard Frog

**Reptiles:** Snapping Turtle, Spiny Softshell, Western Hog-nosed Snake, and Milksnake

**Bird:** Common Loon, Bald Eagle, Greater Sage-Grouse, Yellow Rail, Whooping Crane, Piping Plover, Mountain Plover, Long-billed Curlew, Interior Least Tern, Black Tern, and Burrowing Owl

**Mammals:** Spotted Bat, Townsend’s Big-eared Bat, Black-tailed Prairie Dog, Black-footed Ferret, and American Bison

## Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Conversion of native prairie to small grain production	Policy-based approaches that encourage the conservation of natural communities, rather than support their conversion
	Support public and private conservation programs/activities that encourage and support private land use stewardship
	Increased cooperative efforts to maintain ecological features or processes on public, private, and tribal lands
	Implement practices (economic and ecological) that sustain ranching profitability and promote public access
Petroleum exploration and development impacts	Work with corporations, land owners and other agencies to reduce impacts of exploration
	Education and research on fossil fuel development and its impacts on natural landscape
	Evaluate ecological implications of road development as well as reservoir and pit retention construction related to petroleum development
Invasive or exotic plant species	Cooperative efforts to reduce the abundance of exotic plant species
Disruption of natural fire disturbance processes and hydrologic regimes	Work with other agencies, tribes and private organizations to restore the natural disturbance processes
Loss of natural wetlands	Maintain existing structure and functional uses of wetlands on private and federally managed lands

## References

The Nature Conservancy. 2005. Unpublished report.

The Nature Conservancy. 1999. Ecoregional Conservation in the Northern Great Plains Steppe. Northern Great Plains Steppe Ecoregional Planning Team. 76 pp.

U.S. Fish and Wildlife Service. 2004. Conservation Focus Areas of the Great Divide: a vast region encompassing the Upper Missouri, Yellowstone and upper

Columbia watersheds. Publisher: USFWS, Benton Lake Wildlife Refuge, Great Falls, MT. 77 pp.

Whitewater Wetlands Conservation Area Plan. 2004. B. Martin and J. Stutzman. 16 pp + appendices.

## Montana Shale Plains (2,403,965 acres)



Figure 32. Montana Shale Plains Focus Area

Much of the Montana Shale Plains area can be considered mountain foothill terrain that contains many woody draws with ponderosa pine and cedar stands throughout.

### Landscape Characteristics

This subsection consists of dissected plains, hills, terraces, fans, and floodplains that formed in shale, siltstone, and sandstone. Elevations range from 1,500 to 3,500 feet. Drainage density is moderate to high. Mean annual precipitation ranges from 10 to 14 inches, with about 30 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Summers are dry. Primary natural disturbances are drought and erosion. Another important natural disturbance regime is prairie dog complexes. Land use is predominantly livestock grazing with some dryland farming. The breakdown for land stewardship in the Montana Shale Plains area is as follows:

U.S. Federal Agencies:	278,550 acres, or 11.6% of total area, which include:
BLM:	275,461 acres, or 11.5% of total area
USFWS:	3,089 acres, or 0.1% of total area
State Agencies:	158,889 acres, or 6.6% of total area
Private:	1,965,538 acres, or 81.8% of total area

**Associated Habitats**

Habitat	Habitat Tier	Percentage of Area
Wetland and Riparian	I	2.46
Agricultural Lands - Dry	III	4.66
Xeric Shrub Grassland Associations	I	4.68
Moderate/High Cover Grasslands	I	5.04
Very Low Cover Grasslands	I	6.45
Badlands	II	8.04
Sagebrush	I	8.48
Mixed Xeric Shrubs	I	16.51
Low/Moderate Cover Grasslands	I	36.35

Note: A total of 92.67% of the Montana Shale Plains area is represented; 7.33% is made up of a combination of other habitat types.

**Associated Species of Greatest Conservation Need (Tier I Species)**

There are a total of 307 terrestrial vertebrate species that are found within the Montana Shale Plains Focus Area. Tier I species are listed below. All associations can be found in Table 35.

**Amphibians:** Northern Leopard Frog

**Reptiles:** Spiny Softshell, Western Hog-nosed Snake, and Milksnake

**Birds:** Common Loon, Bald Eagle, Greater Sage-Grouse, Whooping Crane, Mountain Plover, Long-billed Curlew, Black Tern, and Burrowing Owl,

**Mammals:** Townsend’s Big-eared Bat, Black-tailed Prairie Dog, Meadow Jumping Mouse, Black-footed Ferret, Canada Lynx, and American Bison

**Conservation Concerns & Strategies**

Conservation Concerns	Conservation Strategies
Invasive or exotic plant species	Cooperative efforts to reduce the abundance of exotic plant species
Disruption of natural disturbance processes or fire regimes	Work with other agencies, tribes and private organizations to restore the natural disturbance processes
Conversion of natural habitat to croplands	Policy-based approaches that encourage the conservation of natural communities, rather than support their conversion

	Support public and private conservation programs/activities that encourage and support private land use stewardship
	Increased cooperative efforts to maintain ecological features or processes on public, private, and tribal lands
Range or forest management practices	Support government and private conservation activities that encourage and support sustainable land management practices (example; rest and rotation schedules)

### References

The Nature Conservancy. 1999. Ecoregional Conservation in the Northern Great Plains Steppe. Northern Great Plains Steppe Ecoregional Planning Team. 76 pp.

U.S. Fish and Wildlife Service. 2004. Conservation Focus Areas of the Great Divide: a vast region encompassing the Upper Missouri, Yellowstone and upper Columbia watersheds. Publisher: USFWS, Benton Lake Wildlife Refuge, Great Falls, MT. 77 pp.

## Powder River Basin/Breaks/Scoria Hills (2,095,021 acres)



Figure 33. Powder River Basin/Breaks/Scoria Hills Focus Area

Much of this unglaciated area extends across Montana's border into Wyoming. The flat to rolling mixed-grass prairie contains considerable areas of sagebrush grassland as well as ponderosa pine and juniper woodlands that are broken by occasional rugged breaks. The Powder River cutting through the area provides significant riparian habitat for many species. This area supports irrigated and dryland crops.

### Landscape Characteristics

This subsection consists of dissected plains and hills, terraces, and fans with some river breaks and badlands that formed in alluvium and colluvium from sandstone, shale, and siltstone. Elevations range from 2,100 to 4,980 feet. Drainage density is moderate to high. Mean annual precipitation ranges from 10 to 14 inches, with about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Summers are dry. Primary natural disturbances are drought and erosion. Another important natural disturbance regime is prairie dog complexes. Land use is predominantly livestock grazing and irrigated and dryland crops. The breakdown for land stewardship in the Powder River Basin/Breaks/Scoria Hills area is as follows:

U.S. Federal Agencies:	503,292 acres, or 24% of total area, which include:
BLM:	197,993 acres, or 9.5% of total area
USFS:	304,928 acres, or 14.5% of total area
NPS:	371 acres, or less than 0.1% of total area
State Agencies:	90,873 acres, or 4.3% of total area
Tribal Lands:	313,824 acres, or 15% of total area
Private:	1,186,909 acres, or 56.7% of total area

## Associated Habitats

Habitat	Habitat Tier	Percentage of Area
Very Low Cover Grasslands	I	2.70
Mixed Mesic Shrubs	II	3.31
Sagebrush	I	5.30
Wetland and Riparian	I	6.21
Mesic Shrub Grassland Associations	I	7.42
Low Density Xeric Forest	II	8.15
Mixed Xeric Shrubs	I	10.04
Ponderosa Pine	II	11.60
Low/Moderate Cover Grasslands	I	31.86

Note: A total of 86.59% of the Powder River Basin/Breaks/Scoria Hills area is represented; 13.41% is made up of a combination of other habitat types.

## Associated Species of Greatest Conservation Need (Tier I Species)

There are a total of 299 terrestrial vertebrate species that are found within the Powder River Basin/Breaks/Scoria Hills Focus Area. Tier I species are listed below. All associations can be found in Table 36.

**Amphibians:** Northern Leopard Frog

**Reptiles:** Snapping Turtle, Spiny Softshell, Western Hog-nosed Snake, and Milksnake

**Birds:** Common Loon, Trumpeter Swan, Bald Eagle, Greater Sage-Grouse, Whooping Crane, Long-billed Curlew, Black Tern, and Burrowing Owl,

**Mammals:** Spotted Bat, Townsend's Big-eared Bat, Black-tailed Prairie Dog, Meadow Jumping Mouse, Black-footed Ferret, and American Bison

## Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Loss of habitat as a result of conversion of native habitat to agriculture	Policy-based approaches that encourage the conservation of natural communities, rather than support their conversion
	Support public and private conservation programs/activities that encourage and support private land use stewardship



	Increased cooperative efforts to maintain ecological features or processes on public, private, and tribal lands
Fragmentation of habitat due to fossil fuel exploration and development activities	Education and research on fossil fuel development and its impacts on natural landscape
	Work with corporations, land owners and other agencies to reduce impacts of exploration
	Careful study impacts of road development and retention pond construction as a result of coal bed methane development in both Montana and Wyoming
Invasive or exotic plant species	Cooperative efforts to reduce the abundance of exotic plant species
Range or forest management practices	Support government and private conservation activities that encourage and support sustainable land management practices (example; rest and rotation schedules)
Disruption of natural disturbance processes, especially fire	Work with other agencies, tribes and private organizations to restore the natural disturbance processes

## References

The Nature Conservancy. 1999. Ecoregional Conservation in the Northern Great Plains Steppe. Northern Great Plains Steppe Ecoregional Planning Team. 76 pp.

U.S. Fish and Wildlife Service. 2004. Conservation Focus Areas of the Great Divide: a vast region encompassing the Upper Missouri, Yellowstone and upper Columbia watersheds. Publisher: USFWS, Benton Lake Wildlife Refuge, Great Falls, MT. 77 pp.

## Shale Scablands (417,176 acres)



Figure 34. Shale Scablands Focus Area

The very dry Shale Scablands area is covered mostly by sagebrush grassland that is intersected by woody draws. The species that make up the woody draws are mostly green ash, buffaloberry, chokecherry, and some juniper.

### Landscape Characteristics

This subsection consists of dissected shale plains formed in calcareous shale, claystone, and sandstone. Elevations range from 2,650 to 4,100 feet. Drainage density is high. Mean annual precipitation ranges from 11 to 15 inches, with about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Primary natural disturbances are drought and fire. Another important natural disturbance regime is prairie dog complexes. Land use is predominantly livestock grazing. The breakdown for land stewardship in the Shale Scablands area is as follows:

U.S. Federal Agencies: 126,889 acres, or 30.4% of total area, which include:  
    BLM: 126,889 acres, or 30.4 of total area  
State Agencies: 21,992 acres, or 5.3% of total area  
Private: 268,295 acres, or 64.3% of total area

### Associated Habitats

Habitat	Habitat Tier	Percentage of Area
Mixed Broadleaf Forest	I	2.22
Mesic Shrub Grassland Associations	I	3.01
Low Density Xeric Forest	II	3.17

Moderate/High Cover Grasslands	I	3.47
Rock	III	4.40
Mixed Mesic Shrubs	II	4.60
Mixed Xeric Shrubs	I	5.42
Very Low Cover Grasslands	I	5.49
Badlands	II	7.60
Wetland and Riparian	I	8.50
Salt-desert Shrub/ Dry Salt Flats	I	8.56
Low/Moderate Cover Grasslands	I	13.01
Sagebrush	I	25.05

Note: A total of 94.52% of the Shale Scablands area is represented; 5.48% is made up of a combination of other habitat types.

### Associated Species of Greatest Conservation Need (Tier I Species)

There are a total of 245 terrestrial vertebrate species that are found within the Shale Scablands Focus Area. Tier I species are listed below. All associations can be found in Table 37.

**Amphibians:** Northern Leopard Frog

**Reptiles:** Snapping Turtle, Spiny Softshell, Western Hog-nosed Snake, and Milksnake

**Birds:** Common Loon, Bald Eagle, Greater Sage-Grouse, Whooping Crane, Mountain Plover, Long-billed Curlew, Black Tern, and Burrowing Owl,

**Mammals:** Townsend's Big-eared Bat, Black-tailed Prairie Dog, Meadow Jumping Mouse, and Black-footed Ferret

### Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Loss of habitat due to conversion of native prairie to crops	Policy-based approaches that encourage the conservation of natural communities, rather than support their conversion
	Support public and private conservation programs/activities that encourage and support private land use stewardship
	Increased cooperative efforts to maintain ecological features or processes on public, private, and tribal lands

Drainage of natural wetlands	Participate in government and private conservation partnerships to reduce the loss of wetland habitat and restore lost wetlands
Invasive or exotic plant species	Cooperative efforts to reduce the abundance of exotic plant species
Disruption of natural disturbance processes, especially fire	Work with other agencies, tribes and private organizations to restore the natural disturbance processes
Range or forest management practices	Support government and private conservation activities that encourage and support sustainable land management practices (example; rest and rotation schedules)

### References

The Nature Conservancy. 1999. Ecoregional Conservation in the Northern Great Plains Steppe. Northern Great Plains Steppe Ecoregional Planning Team. 76 pp.

## Aquatic Conservation Focus Areas in Greatest Need (Tier I)

### Middle Missouri River (540 River Miles)

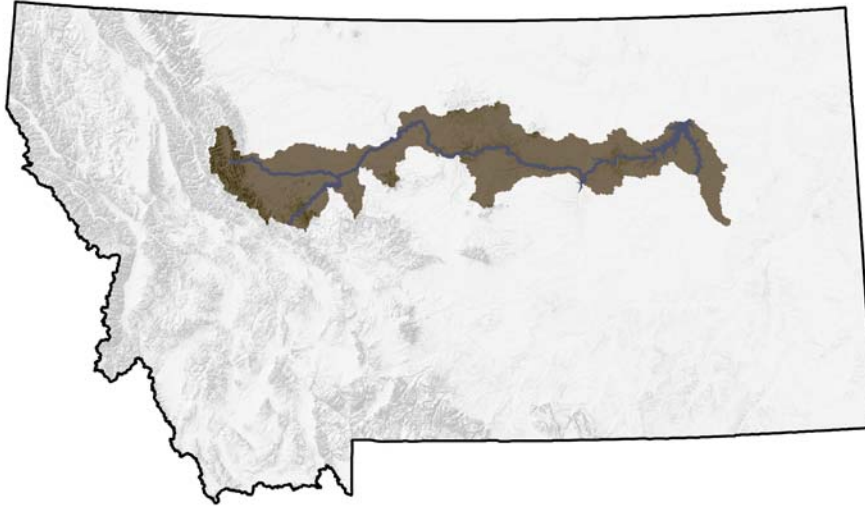


Figure 35. Middle Missouri River and Tributaries Focus Area

Once the Missouri River reaches the confluence with Hardy Creek, it becomes wide and slow for the next 60 miles and then turns into whitewater as it flows over the falls at Great Falls. Although dams have effectively covered the falls, the original cascade posed a tremendous obstacle for Lewis and Clark. From here downstream for more than 200 miles to the Fort Peck Reservoir is the longest free-flowing section of the entire Missouri River. One hundred and fifty miles of this stretch has been designated as Wild and Scenic and flows through cottonwood forests and canyons.

#### Associated Habitats

Habitat Type	Habitat Tier	Acres	Miles
Intermountain Valley Streams	II		2,170
Lowland Lakes	III	281,756	
Lowland Reservoirs	III	4,505	
Mixed Source Rivers (Intermountain and Prairie Flow)	II		438
Mountain Lakes	III	1,139	
Mountain Reservoirs	III	1,445	
Mountain Streams	I		2,289
Prairie Rivers	II		148
Prairie Streams	I		8,909

### Associated Species of Greatest Conservation Need (Tier I Species)

There are a total of 63 aquatic species that are found within the Middle Missouri River and Tributaries Focus Area. Tier I species are listed below. All associations can be found in Table 38.

**Fish:** Pallid Sturgeon, Paddlefish, Sturgeon Chub, Sicklefin Chub, Blue Sucker, Burbot, and Sauger

### Conservation Concerns & Strategies

Conservation Concerns	Conservation Strategies
Culverts, dams, irrigation diversions, and other instream barriers that fully or partially impede fish movement and reduce connectivity of habitat	Removal or modification of barriers in a manner that restores fish passage to ensure full migratory movement
Modification and degradation of stream channels caused by various construction or land management practices	Restoration of stream channels or streambanks to a condition that simulates their natural form and function
Riparian vegetation effected by range and forest management practices and streamside residential development (such activities destabilize streambanks, increase sediment inputs, reduced shading, and remove woody debris)	Support government and private conservation activities that encourage and support sustainable land management practices in riparian areas
	Modification of riparian management practices such that riparian vegetation is allowed to recover
	Develop statewide riparian best management principles
Entrainment of juvenile and adult fishes by irrigation diversions or other water intakes	Screening or modification of irrigation diversions or other water intakes in a manner that prevents entrainment of fishes
Alterations of the quantity or timing of stream flows, causing dewatering or unnatural flow fluctuations that diminish the quantity or quality of essential habitats	Implementation of various water conservation or flow management practices that restore essential habitats and simulate the natural hydrograph
	Protect Instream flow reservations

Water chemistry problems that arise due to municipal discharge, irrigation return water, and other sources	Work with municipal government and private landowners to reduce point source pollutants
Unnatural hydrograph and water temperatures associated with the presence and operations of large dams	Work with appropriate authorities to restore hydrograph that mimics the natural regime
Non-native fish species	Support activities to promote natural habitats that support native species