

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:

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| 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