



**MONTANA
Natural Heritage
Program**

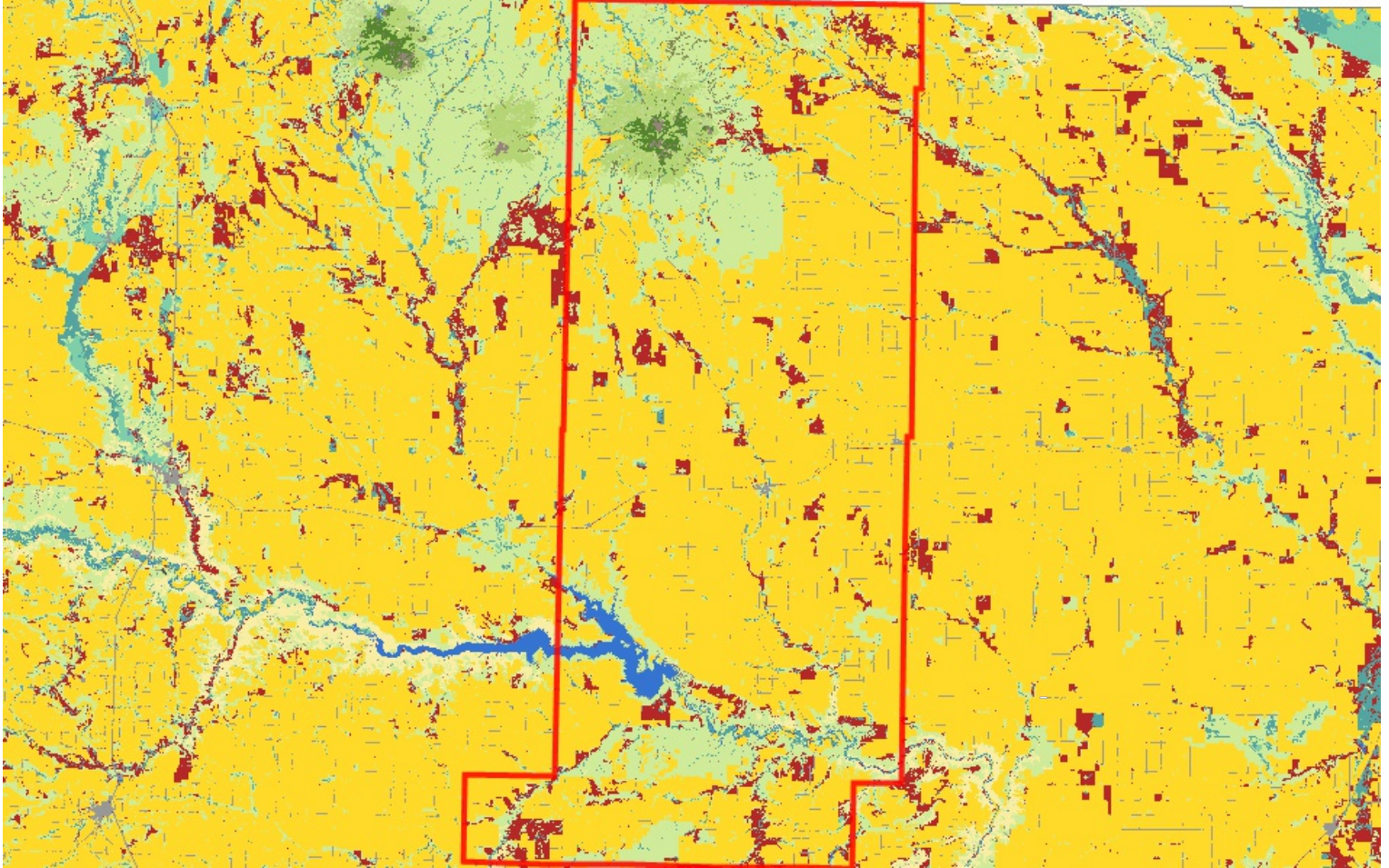
A program of the Montana State Library's
Natural Resource Information System
operated by the University of Montana.



Latitude Longitude
48.12523 -110.74319
49.00389 -111.40873

Land Cover

Summarized by: **Liberty (County)**



**Human Land Use
Agriculture**

Cultivated Crops

65%
**(597,237
Acres)**

These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.



Grassland Systems Lowland/Prairie Grassland

Great Plains Mixedgrass Prairie

20%
(184,802
Acres)

The system covers much of the eastern two-thirds of Montana, occurring continuously for hundreds of square kilometers, interrupted only by wetland/riparian areas or sand prairies. Soils are primarily fine and medium-textured. The growing season averages 115 days, ranging from 100 days on the Canadian border to 130 days on the Wyoming border. Climate is typical of mid-continental regions with long severe winters and hot summers. Grasses typically comprise the greatest canopy cover, and western wheatgrass (*Pascopyrum smithii*) is usually dominant. Other species include thickspike wheatgrass (*Elymus lanceolatus*), green needlegrass (*Nassella viridula*), blue grama (*Bouteloua gracilis*), and needle and thread (*Hesperostipa comata*). Near the Canadian border in north-central Montana, this system grades into rough fescue (*Festuca campestris*) and Idaho fescue (*Festuca idahoensis*) grasslands. Remnants of shortbristle needle and thread (*Hesperostipa curtisetata*) dominated vegetation are found in northernmost Montana and North Dakota, and are associated with productive sites, now mostly converted to farmland. Forb diversity is typically high. In areas of southeastern and central Montana where sagebrush steppe borders the mixed grass prairie, common plant associations include Wyoming big sagebrush-western wheatgrass (*Artemisia tridentata* ssp. *wyomingensis*/ *Pascopyrum smithii*). Fire and grazing are the primary drivers of this system. Drought can also impact it, in general favoring the shortgrass component at the expense of the mid-height grasses. With intensive grazing, cool season exotics such as Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), and Japanese brome (*Bromus japonicus*) increase in dominance; both of these rhizomatous species have been shown to markedly decrease species diversity. Previously cultivated acres that have been re-vegetated with non-native plants have been transformed into associations such as Kentucky bluegrass (*Poa pratensis*)/western wheatgrass (*Pascopyrum smithii*) or into pure crested wheatgrass (*Agropyron cristatum*) stands.



Recently Disturbed or Modified Introduced Vegetation

Introduced Upland Vegetation - Annual and Biennial Forbland

5% (50,857
Acres)

Land cover is significantly altered/disturbed by introduced annual and biennial forbs. Natural vegetation types are no longer recognizable. Typical species that dominate these areas are knapweed, oxeye daisy, Canada thistle, leafy spurge, pepperweed, and yellow sweetclover.



Grassland Systems Montane Grassland

Rocky Mountain Lower Montane, Foothill, and Valley Grassland

2% (16,226
Acres)

This grassland system of the northern Rocky Mountains is found at lower montane to foothill elevations in mountains and valleys throughout Montana. These grasslands are floristically similar to Big Sagebrush Steppe but are defined by shorter summers, colder winters, and young soils derived from recent glacial and alluvial material. They are found at elevations from 548 - 1,650 meters (1,800-5,413 feet). In the lower montane zone, they range from small meadows to large open parks surrounded by conifers; below the lower treeline, they occur as extensive foothill and valley grasslands. Soils are relatively deep, fine-textured, often with coarse fragments, and non-saline. Microphytic crust may be present in high-quality occurrences. This system is typified by cool-season perennial bunch grasses and forbs (>25%) cover, with a sparse shrub cover (<10%). Rough fescue (*Festuca campestris*) is dominant in the northwestern portion of the state and Idaho fescue (*Festuca idahoensis*) is dominant or co-dominant throughout the range of the system. Bluebunch wheatgrass (*Pseudoroegneria spicata*) occurs as a co-dominant throughout the range as well, especially on xeric sites. Western wheatgrass (*Pascopyrum smithii*) is consistently present, often with appreciable coverage (>10%) in lower elevation occurrences in western Montana and virtually always present, with relatively high coverages (>25%), on the edge of the Northwestern Great Plains region. Species diversity ranges from a high of more than 50 per 400 square meter plot on mesic sites to 15 (or fewer) on xeric and disturbed sites. Most occurrences have at least 25 vascular species present. Farmland conversion, noxious species invasion, fire suppression, heavy grazing and oil and gas development are major threats to this system.

Additional Limited Land Cover

- 1% (11,661 Acres) ■ [Great Plains Riparian](#)
- 1% (10,872 Acres) ■ [Other Roads](#)
- 1% (10,834 Acres) ■ [Open Water](#)
- 1% (6,754 Acres) ■ [Pasture/Hay](#)
- 1% (5,334 Acres) ■ [Great Plains Shrubland](#)
- 1% (5,056 Acres) ■ [Great Plains Sand Prairie](#)
- <1% (4,559 Acres) ■ [Great Plains Badlands](#)
- <1% (3,967 Acres) ■ [Great Plains Wooded Draw and Ravine](#)
- <1% (3,940 Acres) ■ [Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest](#)
- <1% (2,237 Acres) ■ [Great Plains Floodplain](#)
- <1% (1,736 Acres) ■ [Major Roads](#)
- <1% (1,584 Acres) ■ [Greasewood Flat](#)
- <1% (824 Acres) ■ [Great Plains Cliff and Outcrop](#)
- <1% (823 Acres) ■ [Rocky Mountain Cliff, Canyon and Massive Bedrock](#)
- <1% (816 Acres) ■ [Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland](#)
- <1% (786 Acres) ■ [Emergent Marsh](#)

- <1% (767 Acres) ■ [Rocky Mountain Montane-Foothill Deciduous Shrubland](#)
- <1% (742 Acres) ■ [Great Plains Closed Depressional Wetland](#)
- <1% (707 Acres) ■ [Low Intensity Residential](#)
- <1% (670 Acres) ■ [Great Plains Prairie Pothole](#)
- <1% (403 Acres) ■ [Great Plains Saline Depression Wetland](#)
- <1% (362 Acres) ■ [Railroad](#)
- <1% (268 Acres) ■ [Rocky Mountain Foothill Limber Pine - Juniper Woodland](#)
- <1% (208 Acres) ■ [Big Sagebrush Steppe](#)
- <1% (206 Acres) ■ [Great Plains Open Freshwater Depression Wetland](#)
- <1% (131 Acres) ■ [Commercial / Industrial](#)
- <1% (125 Acres) ■ [Developed, Open Space](#)
- <1% (61 Acres) ■ [Gas and Gas Storage](#)
- <1% (37 Acres) ■ [High Intensity Residential](#)
- <1% (36 Acres) ■ [Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland](#)
- <1% (29 Acres) ■ [Oil and Oil / Gas](#)
- <1% (9 Acres) ■ [Rocky Mountain Foothill Woodland-Steppe Transition](#)
- <1% (8 Acres) ■ [Rocky Mountain Subalpine-Montane Riparian Shrubland](#)
- <1% (6 Acres) ■ [Injection](#)
- <1% (4 Acres) ■ [Introduced Riparian and Wetland Vegetation](#)

Introduction to Land Cover

Land Use/Land Cover is one of 15 [Montana Spatial Data Infrastructure](#) framework layers considered vital for making statewide maps of Montana and understanding its geography. The layer records all Montana natural vegetation, land cover and land use, classified from satellite and aerial imagery, mapped at a scale of 1:100000, and interpreted with supporting ground-level data. The baseline map is adapted from the Northwest ReGAP (NWGAP) project land cover classification, which used 30m resolution multi-spectral Landsat imagery acquired between 1999 and 2001. Vegetation classes were drawn from the Ecological System Classification developed by NatureServe (Comer et al. 2003). The land cover classes were developed by Anderson et al. (1976). The NWGAP effort encompasses 12 map zones. Montana overlaps seven of these zones. The two NWGAP teams responsible for the initial land cover mapping effort in Montana were Sanborn and NWGAP at the University of Idaho. Both Sanborn and NWGAP employed a similar modeling approach in which Classification and Regression Tree (CART) models were applied to Landsat ETM+ scenes. The Spatial Analysis Lab within the Montana Natural Heritage Program was responsible for developing a seamless Montana land cover map with a consistent statewide legend from these two separate products. Additionally, the Montana land cover layer incorporates several other land cover and land use products (e.g., MSDI Structures and Transportation themes and the Montana Department of Revenue Final Land Unit classification) and reclassifications based on plot-level data and the latest NAIP imagery to improve accuracy and enhance the usability of the theme. Updates are done as partner support and funding allow, or when other MSDI datasets can be incorporated. Recent updates include fire perimeters and agricultural land use (annually), energy developments such as wind, oil and gas installations (2014), roads, structures and other impervious surfaces (various years): and local updates/improvements to specific ecological systems (e.g., central Montana grassland and sagebrush ecosystems). Current and previous versions of the Land Use/Land Cover layer with full metadata are available for download at the Montana State Library's [Geographic Information Clearinghouse](#).

Within the report area you have requested, land cover is summarized by acres of Level 1, Level 2, and Level 3 Ecological Systems.

Literature Cited

- Anderson, J.R. E.E. Hardy, J.T. Roach, and R.E. Witmer. 1976. A land use and land cover classification system for use with remote sensor data. U.S. Geological Survey Professional Paper 964.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological systems of the United States: A working classification of U.S. terrestrial systems. NatureServe, Arlington, VA.