

# LONG-RANGE PLAN



Photo Credit: Tiffany Salveson

Circle Field Office  
McCone County, Montana



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Natural Resources Conservation Service

# USDA-NRCS Circle Field Office Long-Range Plan - 2020

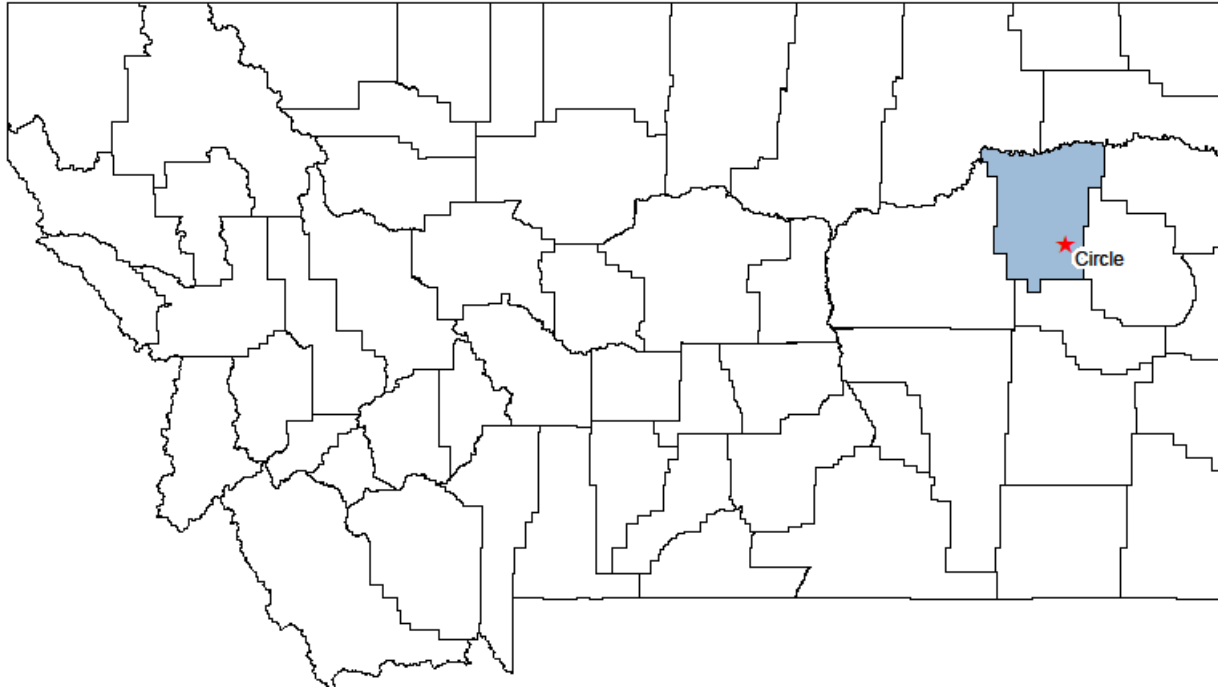
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## USDA-NRCS Circle Field Office Long-Range Plan - 2020



### Foreword

The Long-Range Plan for the USDA-NRCS Circle Field Office is a guide to direct Natural Resources Conservation Service (NRCS) conservation planning in McCone County, Montana. This plan was prepared by NRCS staff, with input from the McCone County Conservation District (MCCD), the Local Work Group (LWG), and other very valuable partners.

This Long-Range Plan:

1. Considers public input and established policy;
2. Considers natural resource inventory and analysis;
3. Considers the natural resource conservation goals of NRCS, MCCD, and associated partners as well as the local culture, economy, and people;
4. Establishes conservation planning priorities in order to facilitate a focused approach to the implementation of conservation efforts;
5. Recognizes problems and opportunities for the wise use and development of natural resources in McCone County;
6. May be used to coordinates the efforts of local producers, NGO's and agencies;
7. Considers potential financial and technical resources;
8. Is adaptive by nature, changing and updating to reflect current and/or future situations.
9. Considers both private and public lands.

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**Section I - Introduction** – Provides information regarding this plan’s vision, mission, purpose, participating entities, and time frame.

**Section II – Natural Resource Inventory** - Includes an inventory of the known resources within the boundaries of McCone County.

**Section III - Analysis of Existing Conservation Activity** – Includes recent NRCS conservation data, recent data and a summary of past knowledge of NRCS planning activity in McCone County.

**Section IV - Natural Resource Problems and Desired Future Outcomes** – Includes a summary of resource concerns identified within McCone County and outlines desired outcomes with the application of conservation measures.

**Section V - Prioritization of Natural Resource Problems and Desired Outcomes**



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## Section I. Introduction

**Local Vision Statement:** Empowering land managers and communities by improving ecological and economic resiliency and soil health within McCone County, with an emphasis on the regeneration of working agricultural lands.

**Local Mission Statement:** To build partnerships and strategically invest for long-term solutions and behaviors that will address the identified priority natural resource concerns in McCone County.

### **Natural Resources Conservation Service**

**AGENCY MISSION STATEMENT:** We deliver conservation solutions so agricultural producers can protect natural resources and feed a growing world.

**AGENCY VISION STATEMENT:** A world of clean and abundant water, healthy soils, resilient landscapes, and thriving agricultural communities through voluntary conservation

**Purpose of the Plan:** The Long-Range Plan is a living document intended to continually guide strategic and focused investment of conservation resources across the landscape to more effectively conserve and regenerate the working lands of McCone County - including the soil, water, air, plants, animals, and human resources dependent on the landscape. The USDA-NRCS Circle Field Office Long-Range Plan will identify, document, and prioritize the resource concerns and opportunities within McCone County recognized by NRCS, MCCD, cooperating agencies, the LWG, advisory groups, and local organizations. The plan will outline conservation measures to address local resource concerns and associated long-term solutions for the sustainable and regenerative use of McCone County's natural resources.

**Entities:** The following is a list of entities in which informal working relations have been established, or may be desired, in order to work towards the vision laid out by this Long-Range Plan.

American Bird Conservancy  
Bird Conservancy of the Rockies  
Circle Elementary & High School  
The Cities of Brockway, Circle, Richey, and Vida  
Dry Redwater Regional Water Authority  
Ducks Unlimited  
McCone County Conservation District  
McCone County Board of Commissioners  
Missouri River Conservation Districts Council  
Montana Department of Environmental Quality  
Montana Department of Natural Resources & Conservation  
Montana Grain Growers  
Montana Fish, Wildlife & Parks  
Montana State University & MSU Extension  
Montana Sage Grouse Oversight Team  
Montana Stockgrowers

Montana Woolgrowers  
Mule Deer Foundation  
Northern Great Plains Joint Venture  
Pheasants Forever  
Public Lands Commission  
Richey High School  
Ranchers' Stewardship Alliance  
Rocky Mountain Elk Foundation  
State of Montana  
Turtle Mountain Tribe  
University of Montana  
U.S. Army Corps of Engineers  
U.S. Environmental Protection Agency  
U.S. Fish & Wildlife Service  
USDA – Fort Keogh  
USDI - Bureau of Land Management

**Timeframe of Plan:** This is 5-year plan covering the years 2020 – 2025. The plan will be reviewed biannually, specifically in November and April, may be modified at any time, and adapted as needed.

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## Section II: Natural Resource Inventory

### General Information

McCone County encompasses 2,683 square miles or a little over 1.717 million acres in central north-eastern Montana. It shares borders with Roosevelt, Valley, Garfield, Prairie, Dawson, and Richland Counties. Elevation ranges from 1,896 feet above sea level in the Missouri River Valley near the Richland County Border to 3,442 feet at the high point on the Divide shown in Appendix A-1.

The climate is typical of northeastern Montana with hot, dry summers, relatively low precipitation, and cold, dry winters. Average annual precipitation ranges from 11 to 15 inches across the county, see Appendix A-2. Countywide, the average annual precipitation is 13.34 inches. The Relative Effective Annual Precipitation (REAP) model correlates extrapolated annual precipitation with slope and aspect to predict effective (or available) rainfall for plant consumption. REAP values varies greatly across the landscape, as shown in Appendix A-3. Most of the precipitation falls as rain between April and July, with convective storms common during the summer. Average high temperatures around 87°F occur in August; lows average around 8 or 9°F in December and January (US Climate Data, 2019).

The Redwater River Valley and the valleys of major tributaries of the Missouri River are mapped as USDA Plant Hardiness Zone 4a; low temperatures usually range from -25°F to -30°F. The higher elevations across the rest of the county are in Zone 3b, which indicates that winter low temperatures can fall between 30°F and -35°F.

### People

According to the United States Census Bureau the population of the McCone County was 1,675 on July 1, 2018, a decrease of 3.4 % from the 2010 Census. About 614 people live in the town of Circle; the population of Brockway is between 15 and 20. There are several households in the town of Vida and a few more than 200 people in the surrounding community. Most of the residents in McCone County live on farms and ranches. Locations of communities are shown in Appendix A-1.

In 2019, unemployment was very low, at around 2.3%. However, the Census Bureau reports that nearly one in six people in the county live in poverty. Most adults, nearly 94%, have graduated from high school. Over seventeen percent of adults have a bachelor's degree or higher. The median age of county residents is 49.1 years; 26.1% of the population is age 65 or older, and nine % of the people in the county are 81 years or older (US Census, 2019).

There are 575 principal agricultural producers in the county and another 176 non-principal operators. The figure below illustrated the age demographics of all operators in the county. The first number in each data label is the age group of the producers, the second is the actual number of producers in the age group, and finally, the percent of total. The average age of producers in McCone County is 58.2 years.

Most of the principal operators are men, and most of them are engaged in farming as their primary occupation. Just over 27% of primary operators are women. Most operators have lived on their present farm for more than ten years and most have been in the business for ten years or more as well.

Forty-eight of the principal producers are considered young farmers (age 35 or younger), operating 56 farms. Another eighty young farmers are other than the principal operator. One hundred-ten producers are considered beginning farmers or ranchers.

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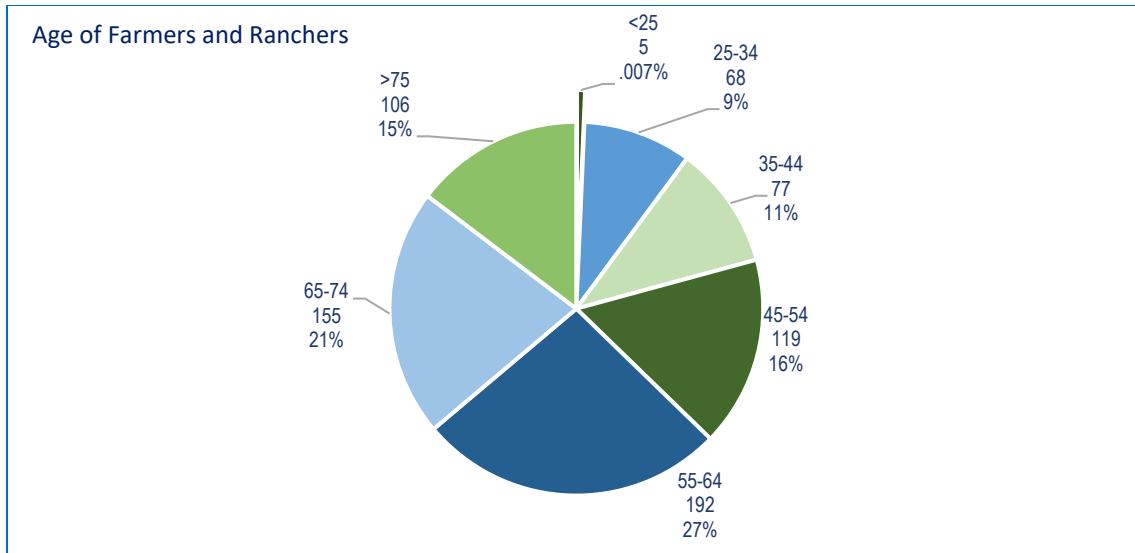


Figure 1. Age Groups of Agricultural Producers in McCone County

### Agriculture

The census definition of a farm is any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. The term is used to include all crop and livestock operations. There are 437 farms in McCone County on over 1.34 million acres. Average farm size is 1,694 acres; about 60% of the farms are 1,000 acres or more. In calendar year 2017, 229 farms harvested crops on 320,000 acres (USDA NASS, 2019).

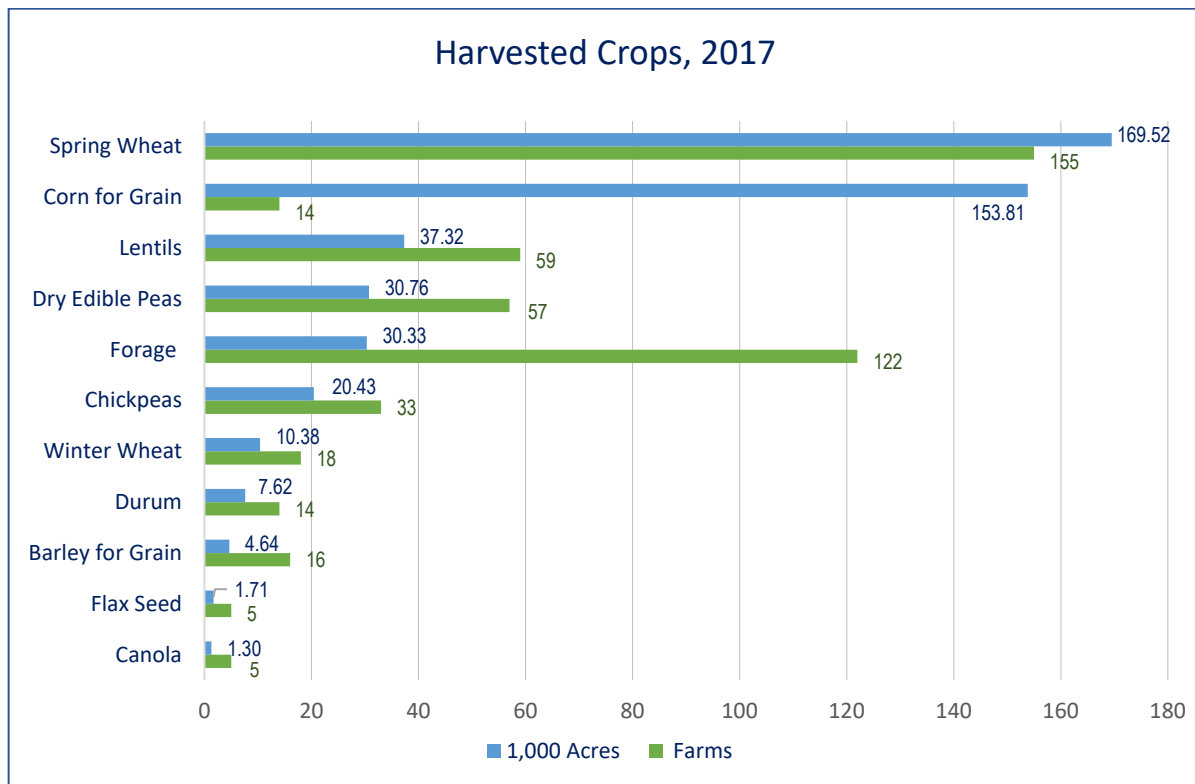


Figure 2. Crops Harvested in McCone County, 2017 (USDA NASS, 2019).



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Data from the census are shown for several conservation practices in the table below.

Table 1. Common Conservation Practices in McCone County (USDA NASS, 2019).

| <i>Practice</i>                  | <i>Farms<br/>2017</i> | <i>Acres<br/>2017</i> | <i>Acres<br/>2012</i> | <i>% Change<br/>In Acres</i> |
|----------------------------------|-----------------------|-----------------------|-----------------------|------------------------------|
| Land Under Conservation Easement | 4                     | 3,080                 | 10,528                | -70.7%                       |
| No Till                          | 172                   | 364,242               | 321,288               | 13.4%                        |
| Reduced Till                     | 54                    | 69,994                | 82,040                | -14.7%                       |
| Intensive Tillage                | 28                    | 10,090                | 41,444                | -75.6%                       |
| Cover Crops                      | 7                     | 788                   | 6,958                 | -88.7%                       |
| Irrigation                       | 19                    | 112,367               | 247,173               | -54.5                        |

## Landcover and Land use

Land Resource Regions (LRR) are large geographic areas that are characterized by a pattern of soils, climate, water resources and land uses. Major Land Resource Areas (MLRAs) are subregions of the land Resource Regions and comprise smaller, homogeneous areas. MLRAs represent landscape-level areas with distinct physiography, geology, climate, water, soils, biological resources and land uses. These features are incorporated into the distinctions between ecological sites.

LRR Western Great Plains Range and Irrigated Region is shown in yellow on the map in Figure 3. LRR Northern Great Plains Spring Wheat Region is indicated in lilac in Figure 4. McCone County contains parts of three Major Land Resource Areas. MLRA 58A, Northern Rolling Plains, High Part, is a component of the Western Great Plains Range and Irrigated Region. MLRAs 52 Brown Glaciated Plains and 53A Northern Dark Brown Glaciated Plains occur LRR Northern Great Plains Spring Wheat Region. Appendix A-4 illustrates the locations and extents of the MLRAs in the county (NRCS, 2006).

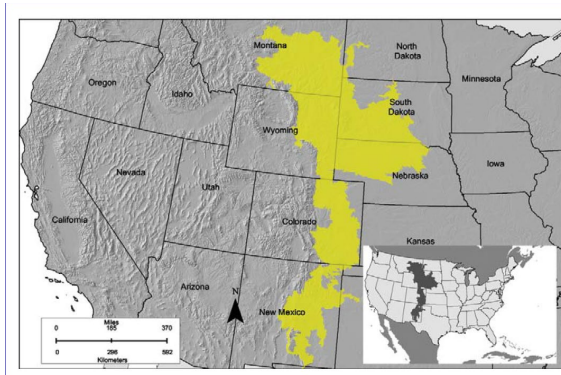


Figure 3. Western Great Plains Range and Irrigated LRR.

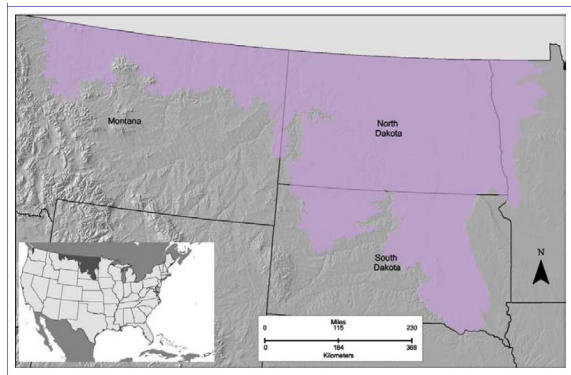


Figure 4. Great Plains Spring Wheat LRR.

## Landcover Types

Montana Natural Heritage Program (NHP) is a program of the Montana State Library's Natural Resource Information System, operated by the University of Montana. NHP's Land Cover Report for McCone County describes seven landcover types in the county (MTNHP, 2019). The relative proportions of these systems are shown in Figure 5.

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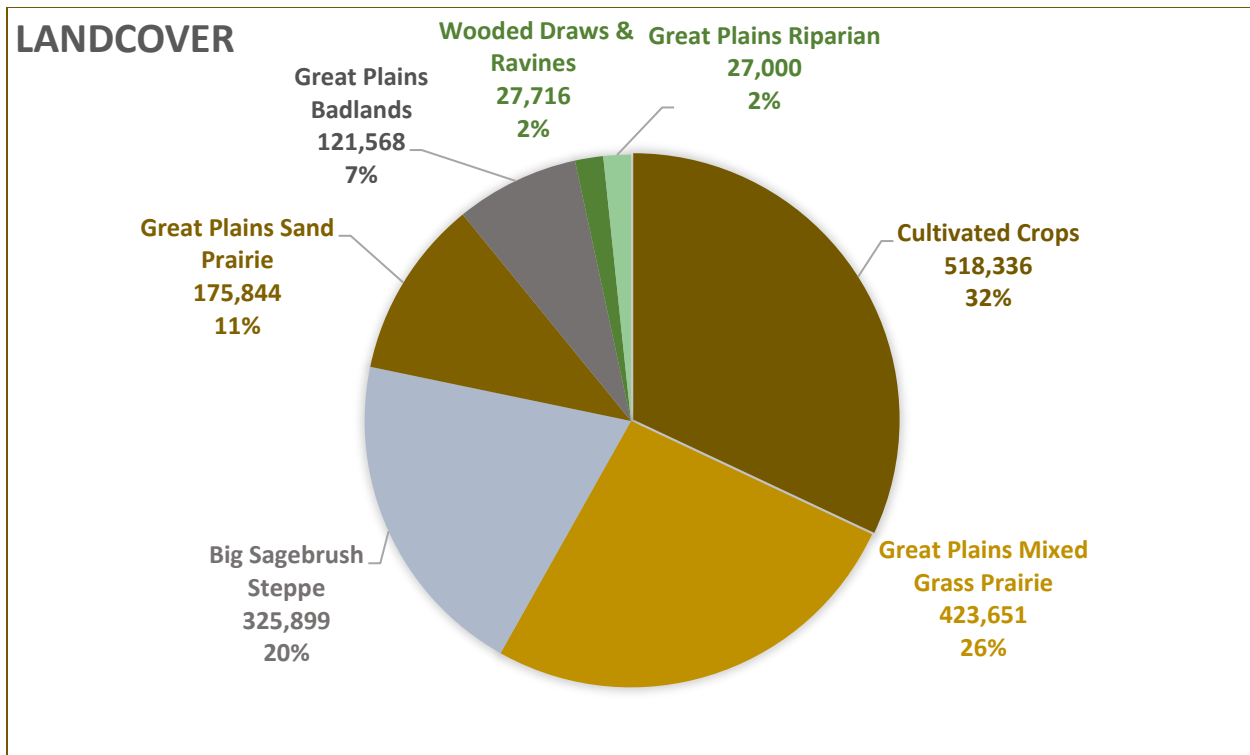


Figure 5. Landcover Types in McCone County.

Cultivated cropland is areas used to produce crops, such as corn, wheat, pulse crops and forage crops, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming (MTNHP, 2019). Cropland provides important habitat for a variety of species including whitetail deer, mule deer, pronghorn, waterfowl, pheasants, sharp-tail grouse, raptors, owls, and birds such as meadowlarks, bobolinks, mourning doves, and common nighthawks (MTNHP, 2019).

Great Plains Mixedgrass Prairie ecosystem covers much of the eastern two-thirds of Montana. Soils are primarily fine and medium-textured. Canopy cover is typically mostly grass; 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*). Forb diversity is typically high. In areas where sagebrush steppe borders the mixed grass prairie, common plant associations include Wyoming big sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*)—western wheatgrass. Fire, grazing, and climate cycles are the primary drivers of this system. Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), and field brome (*Bromus arvense*) are common cool season introduced invaders to the native plant community. Species including pronghorn, mule deer, sage-grouse, sharp-tail grouse, a large array of grassland birds, raptors, waterfowl, and a large variety of other prairie species inhabit this land use type (MTNHP, 2019).

Big Sagebrush Steppe occurs throughout much of central and eastern Montana. The system is characterized by soils that are typically deep and non-saline and dominated by perennial grasses and forbs with a shrub cover of less than 10 %. Wyoming big sagebrush is the most common shrub component. “he sagebrush steppe shares many of the same wildlife species as the mixed grass prairie, but is vitally important to greater sage-grouse, Brewer’s sparrows, sagebrush sparrows, sage thrashers, and loggerhead shrikes; all of which are designated as Species of Concern. This land use type also provides important winter range for mule deer and pronghorn (MTNHP, 2019).

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Great Plains Sand Prairie is considered a unique ecological system due to coarse textured soils with exposed caprock sandstone formations occurring across the landscape. Native plant communities are dominated by needle and thread. Little bluestem (*Schizachyrium scoparium*) and threadleaf sedge (*Carex filifolia*) are common and rhizomatous warm season grasses prairie sandreed (*Calamovilfa longifolia*), sand bluestem (*Andropogon hallii*), and big bluestem (*Andropogon gerardii*) occur intermittently (MTNHP, 2019). “The sand prairies provide important habitat for hoary, pallid, and spotted bats, Baird’s sparrow, short-eared owls, loggerhead shrikes, and chestnut-collared longspurs.

Great Plains Badlands are areas containing highly eroded, rugged, and often colorful landforms with sparse vegetation. Soils formed from highly erosive parent material often contain marine and other fossils. Badlands areas provide habitat for mule deer and other wildlife, such as black tailed prairie dogs and burrowing owls. Though grazing is the dominate agricultural use of these areas, forage is limited (MTNHP, 2019).

Wooded draws occur on steeper slopes or in canyon bottoms where deep loamy soils and higher moisture levels support Rocky Mountain juniper (*Juniperous scopulorum*) and deciduous trees such as green ash (*Fraxinus pennsylvanicus*) and chokecherry (*Prunus virginiana*) (MTNHP, 2019). Although they are relatively few and scattered, wooded draws are valuable habitat for many species of birds, small mammals and mule deer. Notable inhabitants include veerys, broadtailed hummingbirds, eastern screech owls, red-headed woodpeckers, blackbilled cuckoos, and green-tailed towhees (Kilwine, 2020).

Areas of the Great Plains Riparian system occur along the Redwater and Missouri Rivers, Prairie Elk Creek, and other major drainages. Plains cottonwood (*Populus deltoides*) and willow (*Salix spp.*) are the most common woody species where trees are present. While riparian areas cover relatively small areas of the land in the county, they are considered important for hay production as well as wildlife cover and habitat. Great blue herons, white-faced ibis, golden and bald eagles, whooping cranes, American bitterns name just a few that depend on McCone County’s riparian areas (MTNHP, 2019).

Appendix A-5: Landcover, shows the county landcover with data provided by the Montana Digital Library. Many other landcover types appear in this more sophisticated depiction. The scale of the map makes it difficult to discern small areas of certain types such as Great Plains Floodplains and Greasewood Flats. However, the map provides a clear visual of the extent of cultivated land throughout the county, and the location of the grasslands, badlands and introduced vegetation.

### Land Ownership

A little under one-third of the land in McCone County is public land. The Department of the Interior Bureau of Land Management (BLM) controls 240,524.7 acres, the Montana Department of Natural Resources and Conservation (DNRC) administers 92,296.18 acres and the U.S. Fish & Wildlife Service (USFWS) holds 203,727 acres. The locations of public lands are shown in Appendix A-6, Land Ownership.

### Geology

Geologic formations underlying McCone County are shown in Appendix A-7, Geology. A formation in this context is a rock unit that has a distinctive appearance compared to surrounding layers and is of enough thickness and extension to be plotted on a map. Formations often contain a variety of related or interlayered rock types and are sometimes divided into smaller units called members.

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The ten formations that cover nearly all the county are shown in the graph below, labeled with acres. Descriptions follow.

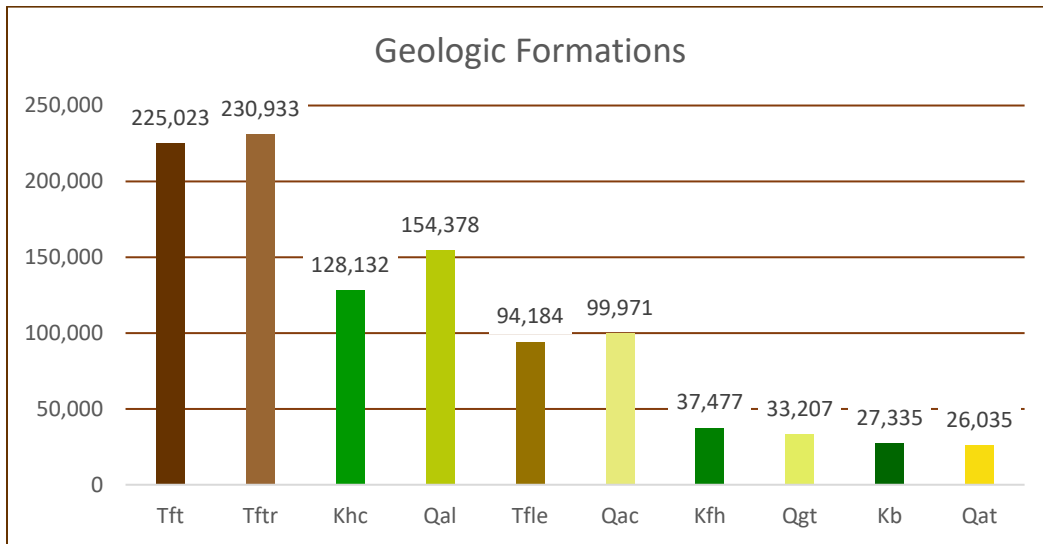


Figure 6. Geologic Formations Underlying McCone County (Vuke, 2007).

Tft. Tullock Member of the Fort Union Formation is yellowish-gray, fine- to medium-grained, trough-cross-bedded to planar-bedded or massive appearing sandstone interbedded with brownish-gray or purplish-gray claystones, dark-gray carbonaceous shale, and thin lenticular coal beds. Its origin is the Paleocene era; the member is about 200 feet thick. The Tullock member was formed in broad alluvial systems consisting of dominant flood plains with swamps and few stream channels. Numerous vertebrate fossils are found throughout.

Tfr. Tongue River Member of Fort Union Formation. This member is composed of yellowish orange sandstone, sandy and silty carbonaceous shale, and coal from ancient alluvial plains. Thickness can be as much as 984 feet.

Khc. Hell Creek Formation. Light gray bentonitic clay stone that alternates with gray to brown sandstone interbedded with carbonaceous shale found on fluvial and flood plains under the Fort Union Formation and above the Fox Hills Formation. Thickness as much as 1,100 feet. The Hell Creek Formation was deposited by streams on a coastal plain along the edge of the Western Interior Seaway at the end of the Cretaceous period. It is known for an incredible variety of dinosaur, fish, plant, amphibian and other fossils.

Qal. Alluvium. Sedimentary. Gravel, sand, silt, and clay deposits of stream and river channels, and floodplains.

Tfle. Lebo Member of Fort Union Formation. The Lebo Member is dark gray carbonaceous shale, bentonitic claystone, sandstone, and coal deposited on alluvial plains. Thickness is as much as 607 feet.

Qac. Alluvium and colluvium (Holocene And Pleistocene epochs). Brown to gray, poorly stratified clay, silt, and sand deposited by sheet-wash on slopes. Color and texture of colluvium reflect parent sediment. Thickness as much as thirty-five feet but generally less than fifteen feet.

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Kfh. Fox Hills Formation. Cretaceous. Yellowish orange to gray, fine to medium grained non-calcareous sandstone in the upper part and interbedded sandstone, siltstone and black shale with calcareous concretion zone in the lower part. Marginal marine. Thickness 98-148 feet.

Qgt. Gravel terraces.

Kb. Bear Paw Formation. Dark gray shale with several zones of calcareous concretions, a basal zone of ferruginous concretions and numerous thin bentonite beds. Marine origin; can be as much as 984 feet thick.

Qat. Light gray to light brown, stratified, moderately well-sorted sand and gravel at elevations above the present floodplain. Thickness as much as 100 feet in alluvial fill terrace deposit south of the Yellowstone River in the Terry and Fallon area, but generally less than 30 feet.

Qls. Landslide, eolian (wind-deposited) material.

### Soil Associations

A soil association is a landscape that has distinctive proportions and patterns of soils. Soil associations are made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the time and effort of delineating them separately cannot be justified. They usually consist of one or more major soils and at least one minor soil and are named for the major soil(s). Soils in one association may occur in another, but in a different pattern. The Soil Survey of McCone County has grouped soils into five general landscapes and twenty-two soil associations, referred to as general map units in the survey (SCS, 1984).

*Dominantly nearly level alluvial soils that are deep and well drained; found on terraces and flood plains.*

This group makes up about 9.5% of the county. Soils are deep and well drained, having formed in alluvium along the Missouri and Redwater Rivers, Prairie Elk Creek, Timber Creek and their tributaries.

- Cherry-Havrelon-Trembles are loamy, moist soils that are nearly level and gently sloping; these are subject to flooding. They occur on smooth terraces and flood plains along the Redwater River and its tributaries, making up about 3.5 % of the soils in the county. These soils are highly susceptible to wind erosion. Both irrigated and dryland crops are grown.
- Harlem-Havre-Glendive soils are clayey and loamy dry soils that are found on smooth terraces and flood plain of the Missouri River. They are nearly level and are protected from flooding by Fort Peck Dam. Most areas have been cleared of trees and now support irrigated crops systems. The hazard of wind erosion is the major limitation for cropland.
- Lonna-Havre-Glendive association is composed of loamy, dry soils that are nearly level and are subject to flooding. These soils are found on smooth terraces and flood plains along Timber and Prairie Elk Creeks; most areas are used for dryland crops. Soils are susceptible to wind erosion.

*Dominantly undulating to hilly soils that are deep and well drained; found on glaciated plains.*

This group consists of deep and well drained soils formed in glacial till and alluvium. It makes up about 16% of the county.

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- Williams-Zahill. Soils in this association are loamy and moist. They are nearly level to strongly rolling and formed in glacial till; they occur in the northeastern part of the county and are mostly used for dryland crop production.
- Zahill-Vida association contains loamy, moist soils that are undulating to hilly; these were formed in glacial till. They are found on hills and east-west ridges and in swales and valleys in the northeastern part of the county. About half of this unit is used to grow dryland crops; the remainder is rangeland.
- Telstad-Hillon soils are loamy, dry soils that are undulating to strongly rolling and formed in glacial till. Found in the northwestern part of the county on undulating uplands and hills, in swales and on low ridges. About half of this unit is used to grow dryland crops, the remainder is rangeland.
- Gerdrum-Hillon includes loamy, dry soils that are nearly level to hilly in the west-central part of the county. These were formed in salt and sodium affected alluvium and in glacial till. This soil association is used mostly for rangeland.

*Dominantly strongly rolling to steep soils that are shallow to deep and well drained and somewhat excessively drained; on glaciated plains.*

This group of soil associations makes up around 16.5% of the county.

- Zahill-Cabba are loamy, moist soils that are deep and shallow, strongly rolling to steep. They formed in glacial till and material derived from weakly consolidated, sand and silty sedimentary beds. This group is in the northeastern part of the county on strongly rolling uplands dissected by deep coulees. Some areas are on smooth benches and terraces. Most of the unit is used for grazing.
- Zahill-Badland are loamy, moist soils that are deep, hilly to very steep and formed in glacial till, and Badlands soils. These are found on high, narrow hills and ridges in areas dissected by streams and on small rolling upland benches between coulees. Located in the northeast, nearly all this unit is grazed.
- Sunburst-Fleak-Busby soils support rangeland in the northwestern part of the county. They are loamy and sandy, dry soils that are deep and shallow, hilly and steep. They were formed in glacial till in material derived from weakly consolidated sandy sedimentary beds and in alluvium.
- Hillon soils are loamy dry soils that are deep, strongly rolling to steep and formed in glacial till. These are found in the northwestern part of the county on high hills and ridges and in deeply entrenched areas. Because of the steep slopes, this unit is used for grazing.
- Hillon-Badland: Hillon-Badland soils are loamy, dry soils that are deep, hilly to very steep and formed in glacial till, and Badlands soils. This unit is mainly grazed. It is in the north-central part of the county on high narrow hills and ridges and areas that are dissected and eroded by streams.

*Dominantly gently sloping to moderately steep soils that are shallow to deep and are well drained; found on sedimentary uplands.*

This group makes up about 36% of soils in the county.

- Cambert-Bryant association consists of soils that are loamy, moist, moderately deep and deep. They are nearly level to strongly sloping and were formed in alluvium and in material derived from weakly consolidated, silty sedimentary beds. This unit is found in the southeastern part of the county on fans, hills and ridges in the uplands. About 60% of the areas are used for dryland crops.
- Cabba-Cambert are loamy, moist soils that are shallow and moderately deep, gently sloping to moderately steep and formed in material derived from weakly consolidated, sandy and silty sedimentary beds. These are found in the southeastern part of the county on side slopes of fans and on hills and ridges in the uplands. Dryland crops and cattle are grown in these areas.



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- Cabba-Busby soils are loamy, dry, shallow and deep, moderately sloping to moderately steep. They were formed in material derived from weakly consolidated, sandy and silty sedimentary beds and in alluvium. This map unit is mainly on fans, hills and ridges on uplands in the west-central part of the survey area. Most of the unit is used as rangeland.
- Cambeth-Floweree: This unit is in the southwestern part of the county. It is on smooth fans and terraces and on hills and ridges on the uplands of Timber Creek. Soils are loamy, dry, moderately deep and deep, gently sloping to strongly sloping, formed in local alluvium and in material derived from weakly consolidated, silty sedimentary beds. About 40% of this unit supports cropland.
- Gerdrum-Busby-Yamac are loamy, dry soils that are deep, moderately sloping to moderately steep and formed in alluvium. Located in the west-central part of the county on long, smooth fans and terraces, low hills and narrow ridges, and in deep coulees that flow into Rock Creek and Fort Peck Lake. Most of the unit is used for grazing.

*Dominantly strongly sloping to steep soils that are shallow to deep and well drained to excessively drained; found on sedimentary uplands.*

This group makes up about 20% of the county.

- Cabba-Dast-Wabek soils are found in the southeastern part of the county on long, high hills and ridges between creeks. These soils are loamy, moist, shallow to deep and strongly sloping to steep. They formed in material derived from weakly consolidated, silty and sand sedimentary beds and in gravelly alluvium. Some small areas on benches are farmed, but most of this unit is rangeland.
- Cabba-Badland soils are loamy, moist soils that are shallow, are moderately steep to steep and were formed in material derived from weakly consolidated, sand and silty sedimentary beds and Badlands. Located in the southeastern part of the county, these soils are found on high hills and ridges, on isolated buttes and in deep coulees. This unit is suited to use as rangeland.
- Badland-Gerdrum-Cabbart. This unit is in deep coulees, on isolated buttes and ridges on long smooth fans in the uplands mainly in the western part of the county. Soils are Badland and loamy, dry soils that are deep and shallow, strongly sloping to steep. These soils formed in salt-and sodium-affected alluvium and in material derived from weakly consolidated, sandy and silty sedimentary beds. Most of this unit is unsuited to crop production.
- Cabbart-Busby-Badland soils occur in the western part of the county. They are loamy, dry soils that are shallow and deep, are moderately steep and steep. They were formed in material derived from weakly consolidated sand and silty sedimentary beds and in alluvium and Badlands. Nearly all of this is rangeland.
- Neldore-Bascovy-Badland: Clayey, dry soils that are shallow and moderately deep, are moderately steep and steep and formed in material derived from consolidated shale and Badlands. This map unit is found on low to high, smooth hills and on hilltops and the sides of coulees. It is in the northwestern part of the county and is nearly all rangeland (SCS, 1984).

### Highly Erodible Soils

Soils are designated as highly erodible (HEL) based on their susceptibility to movement caused by the actions wind or water. According to the McCone County Frozen Soils list, 129 or 53.3% of the 242 soils on the list are highly susceptible to wind erosion; of these, thirty (12.4% of all soils) are also highly vulnerable to water erosion.

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### Prime Farmland, Soils of Statewide Importance, Prime if Irrigated, Prime if Irrigated and the Product of the Soil Erodibility X Climate Factor is Less than 60 Soils.

See Appendix A-7 for location and extent of these soils. Prime farmland is a designation assigned by U.S. Department of Agriculture defining land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these land uses. There are no soils designated as Prime Farmland in McCone County.

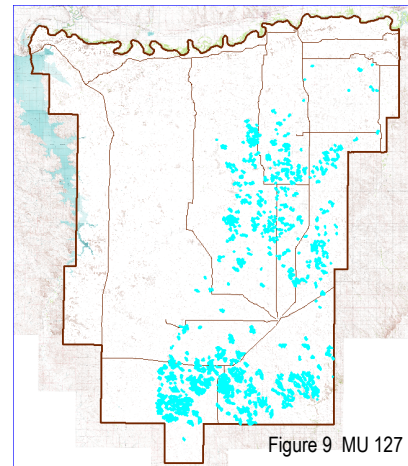
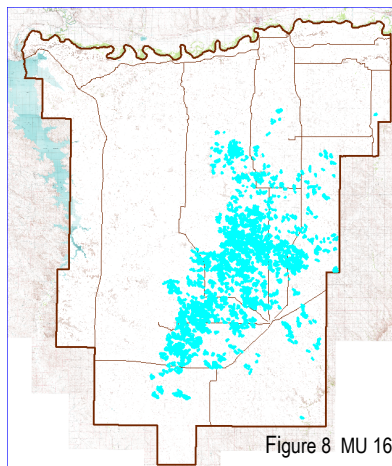
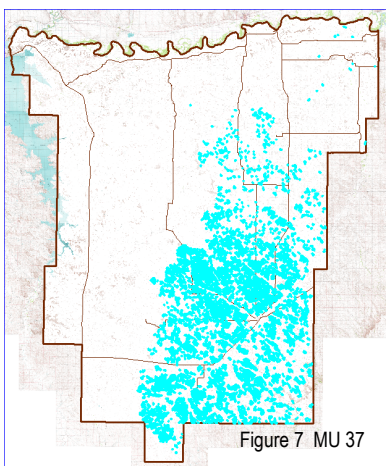
#### Soils of Statewide Importance

These are soils that have been determined to be of significance for production of food, feed, fiber, forage, and oilseed crops. These soils have an adequate and dependable water supply from precipitation or irrigation, favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air, are not excessively erodible or saturated with water for a long period of time, and either do not flood frequently or are protected from flooding. They are available for farming, but could currently be cropland, pastureland, rangeland, forestland, or other land.

McCone County has twenty-four soils designated as Farmland of Statewide Importance covering about 15.7% of the county. Three soils make up nearly 66% of the total acres of these soils. These are shown in Table 2.

Table 2. Farmland of Statewide Importance Soils.

| Map Unit<br>Symbol | Name                                | Acres  | % of Soils of<br>Statewide Importance<br>In McCone County |
|--------------------|-------------------------------------|--------|-----------------------------------------------------------|
| 37                 | Cambert Loam, 2-8% slopes           | 89,669 | 33%                                                       |
| 16                 | Shambo Cambert Loam, 2-8% slopes    | 35,591 | 19.7%                                                     |
| 127                | Bryant-Cambert Complex, 2-8% slopes | 52,291 | 13.23%                                                    |



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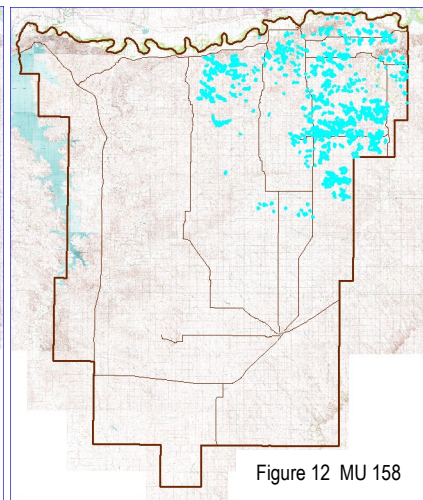
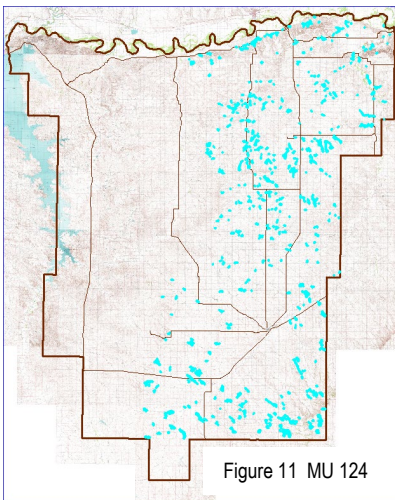
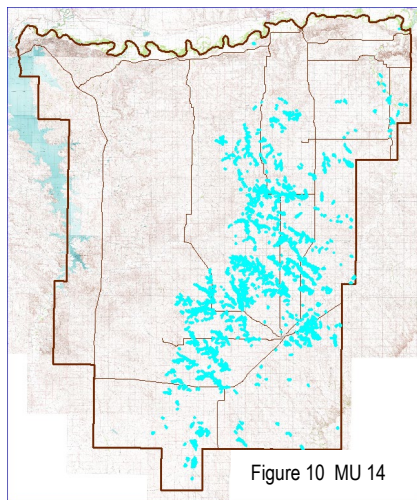
The images above show the relative locations of these three soils highlighted in turquoise. A Comparison of Appendix A-7: McCone Prime Soils to Appendix A-4: Landcover shows that these soils are extensively farmed; most of the cropland in the county occupies the areas in the images above.

### Prime Farmland if Irrigated

Prime if irrigated soils are those with the best combination of physical and chemical characteristics for agriculture such as the soil quality and adequate growing season necessary to produce high yields of crops suited to the region but occur in areas of limited rainfall. There are 15 Prime if Irrigated Soils in the county on about 7.6 % of the land. The three most common make up nearly 57 % of all soils with this designation. These are listed in the Table. Except for the fields adjacent to the Missouri River, there are few irrigated cropland acres in McCone County. Most of the areas highlighted in Figures 10, 11 and 12 are grazed or support dryland crop systems.

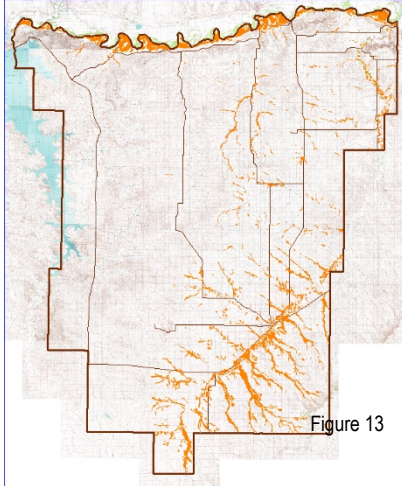
Table 3. Prime if Irrigated Soils

| Name                              | Acres  | % of Prime if Irrigated Soils In McCone County |
|-----------------------------------|--------|------------------------------------------------|
| Bryant Silt Loam, 0-4% slope      | 33,616 | 25.9%                                          |
| Williams-Vida Complex, 2-4% slope | 25,760 | 19.9%                                          |
| Sunburst Clay Loam, 2-8% slope    | 15,258 | 11.8%                                          |



Prime if Irrigated and the Product of the Soil Erodibility X Climate Factor is Less than 60 Soils.

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These soils are shown in orange in Figure 13 and in Appendix A-8. They occur along the rivers and major tributaries. Very little irrigation takes place along the Redwater River. These soils are farmed extensively where topography allows; other areas are grazed. There are over 85,000 acres of these soils, making up just a little less than 5% of all soils in the county. Soil Map Unit 44, Cherry silt loam, 0-4% slopes makes up 45.3% and Map Unit 45, Cherry-Havrelon-Trembles Complex, 0-2% slopes accounts for another 20% of all soils with this designation within the county. See Appendix A-8: Prime Soils.

### Hydric Soils

Hydric soils are characterized by frequent, prolonged saturation and low oxygen content, which lead to anaerobic chemical environments where reduced iron is present. This definition includes soils that developed under anaerobic conditions in the upper part but no longer experience these conditions due to hydrologic alteration such as those hydric soils that have been artificially drained or are protected by ditches or levees. The location and extent of hydric soils is relevant to land use and conservation planners as many of these areas either are not suitable for farming or may provide critical habitat for birds and other wildlife.

There are 29 soils with components that exhibit hydric characteristics under certain conditions in McCone County; together they occur on 22,397 acres. Over 72% of this is soil map unit 144, Typic Fluvaquents, saline, which is found mostly in drainages. Table 3 lists all hydric soils in the county that occur on more than one hundred acres; these add up to 97% of hydric soils county-wide. Hydric criteria definitions are:

- Criteria 2--Map unit components in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, or Andic, Cumulic, Pachic, or Vitrandic subgroups that, based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or show evidence that the soil meets the definition of a hydric soil.
- Criteria 3--Map unit components that are frequently *ponded* for long duration or very long duration during the growing season that, based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States or show evidence that the soil meets the definition of a hydric soil.
- Criteria 4--Map unit components that are frequently *flooded* for long duration or very long duration during the growing season that, based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or show evidence that the soils meet the definition of a hydric soil.



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Table 4. Hydric Soils in McCone County

| Map Unit Symbol | Map Unit Name                                         | Phase             | Acres    | Landform                      | Hydric Criteria |
|-----------------|-------------------------------------------------------|-------------------|----------|-------------------------------|-----------------|
| 144             | Typic Fluvaquents, saline                             | Typic Fluvaquents | 16,202.7 | drainageways                  | 2, 3            |
| 56              | Dimmick silty clay                                    | Dimmick           | 1,360.4  | depressions                   | 2, 3            |
| 151             | Vida-Zahill loams<br>2 to 8 % slopes                  | Nishon            | 1,075.3  | moraines                      | 2, 3            |
| 57              | Dimmick clay, drained                                 | Dimmick           | 872.1    | depressions                   | 2               |
| 106             | Lonna-Havre-Glendive complex<br>0 to 2 % slopes       | Bigsandy          | 421.9    | drainageways,<br>flood plains | 2, 4            |
| 147             | Ustic torriorents-<br>Ustic torrifluvents association | Lallie            | 356.9    | drainageways                  | 2               |
| 45              | Cherry-Havre-Trembles complex<br>0 to 2 % slopes      | Lallie            | 346.5    | drainageways<br>flood plains  | 2, 3, 4         |
| 146             | Typic Ustorthents<br>Typic Ustifluvents association   | Lallie            | 296.2    | drainageways                  | 2               |
| 169             | Zahill-Vida loams<br>4 to 15 % slopes                 | Nishon            | 250.0    | moraines                      | 2, 3            |
|                 | All Others (16 Soil Map Units)                        |                   | 1,215.4  |                               | 2,3,4           |

### Water Resources

#### Ground Water

According to the Ground Water Information Data Center for the Montana Bureau of Mines and Geology, (MBMG) there are 1,792 wells in McCone County. Twenty-seven are unused; 1,186 are for livestock water, and 554 are for domestic use. Twenty-eight wells provide irrigation water, twenty-two are for testing and research, and seventy-three are monitoring wells. Numbers may differ from county total since one well may have several reported water uses. The oldest well on record was drilled in 1902; the deepest well is 1,100 feet. MBMG lists the groundwater sources and depths of for wells in McCone County. No correlation is given between source and depth. See Table 5.

Table 5. Groundwater Well Sources

| Source                                                 | Number of Wells | Percent |
|--------------------------------------------------------|-----------------|---------|
| <i>Tongue River Member of the Fort Union Formation</i> | 116             | 22.1    |
| <i>Alluvium</i>                                        | 86              | 16.4    |
| <i>Fox Hills-Hell Creek Aquifer</i>                    | 81              | 13.3    |
| <i>Fort Union</i>                                      | 70              | 15.4    |
| <i>Tullock Member of the Fort Union Formation</i>      | 46              | 8.8     |
| <i>Hell Creek Formation</i>                            | 44              | 8.4     |
| <i>Lebo Shale Member of the Fort Union Formation</i>   | 31              | 5.9     |
| <i>Other</i>                                           | 51              | 9.7     |

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Total 525

Table 6. Depth Ranges of Groundwater Wells

| Depth    | Number of Wells | Percent |
|----------|-----------------|---------|
| 0-99     | 785             | 43.8    |
| 100-199  | 589             | 23.9    |
| 200-299  | 253             | 14.1    |
| 300-399  | 94              | 5.2     |
| 400-499  | 23              | 1.3     |
| 500-1000 | 31              | 1.7     |
| >1000    | 17              | 0.9     |
| Total    | 1792            |         |

MBMG maintains seven monitoring wells in the county to measure normal water levels in wells, changes in water levels relative to climatic conditions, responses of water levels to development and long-term water-quality trends (MBMG, 2019).

### Surface Water

Figure 14 shows the major streams in McCone County. The Missouri River flows west to east across the north end of the county; the Redwater River flows north-east from the southernmost part of the county all the way to the Missouri River. The confluence is in the very far northeastern corner of the county. Most of the creeks in the county are ephemeral. Horse Creek, East Redwater Creek and a few others flow for most of the year with streams diminishing in late summer.

Montana's State Wildlife Action Plan identifies all streams, rivers, floodplain, and riparian community types across the state as "Community Types of Greatest Conservation Need". The document also identifies the Lower Missouri River as a top "Aquatic Focal Area" (MT FWP, 2015).



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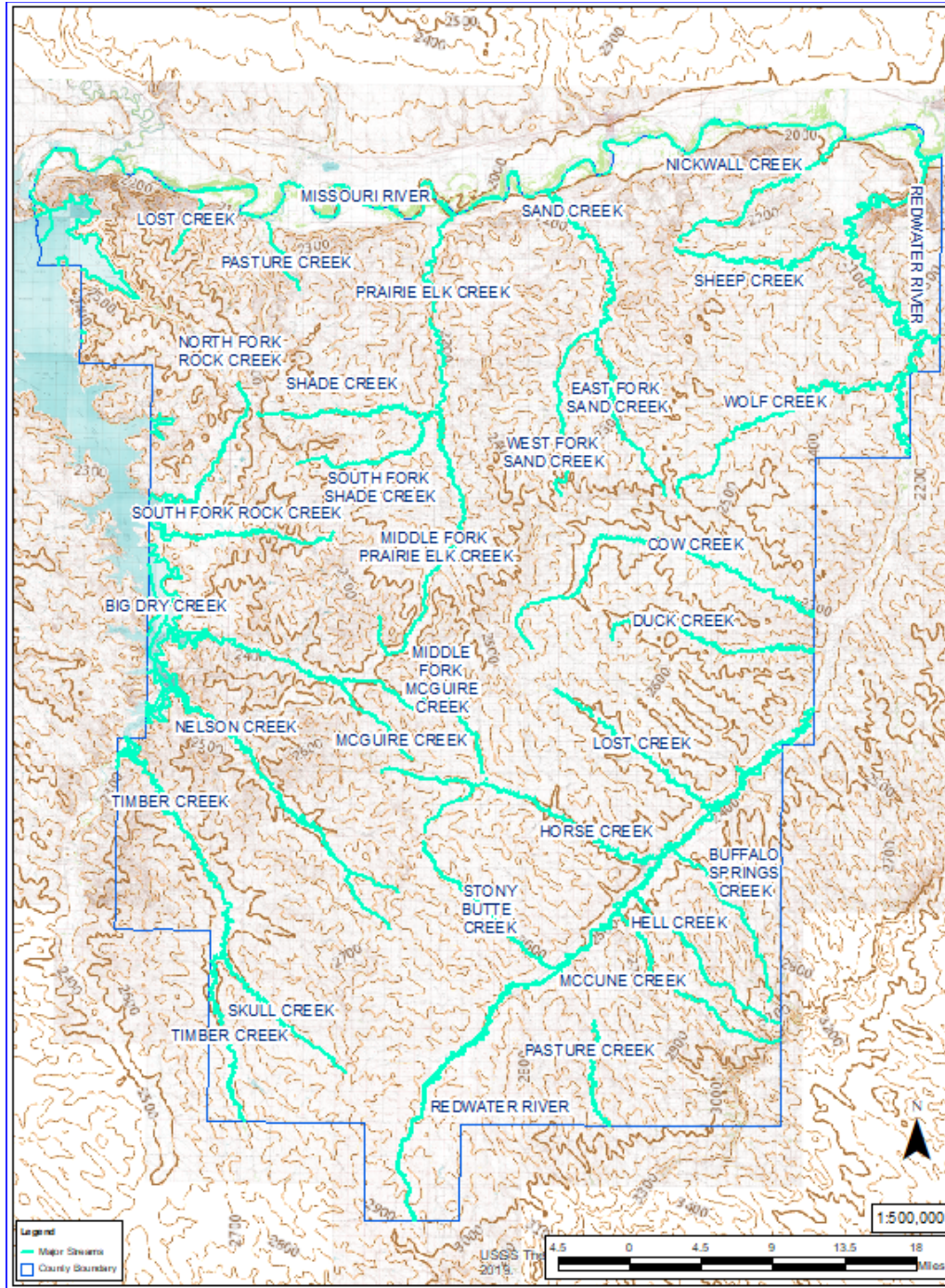


Figure 14. Major Streams, McCone County.

### Stream Gauges

USGS Wyoming-Montana Water Science Center in cooperation with U.S. Army Corps of Engineers maintains four McCone County stream gauges as part of the Groundwater and Streamflow Information Program network of Federal Priority Streamgages (FPS). The stream gauges are located on Nelson Creek near Van Norman, Montana (location is in Garfield County), On the Missouri River below Fort Peck Dam and at Wolf Point, Montana and the Redwater River in Circle.

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Mean Annual output (stream flow) for the four gauging stations is shown on pages 17-20. The highest and lowest values are indicated. Although the records for some of the stations go as far back as the 1930's, records from 1976 to 2018 are displayed in the graphs.

Following each mean annual stream-flow graph is the same gauging station's record for annual peak streamflow. The highest values are labeled, indicating the date of the highest discharge and the amount of water in cubic feet per second (Montana DEQ, 2019).

One cubic foot of water is a little less than 7.5 gallons. One cubic foot per second is a little less than 449 gallons per minute.

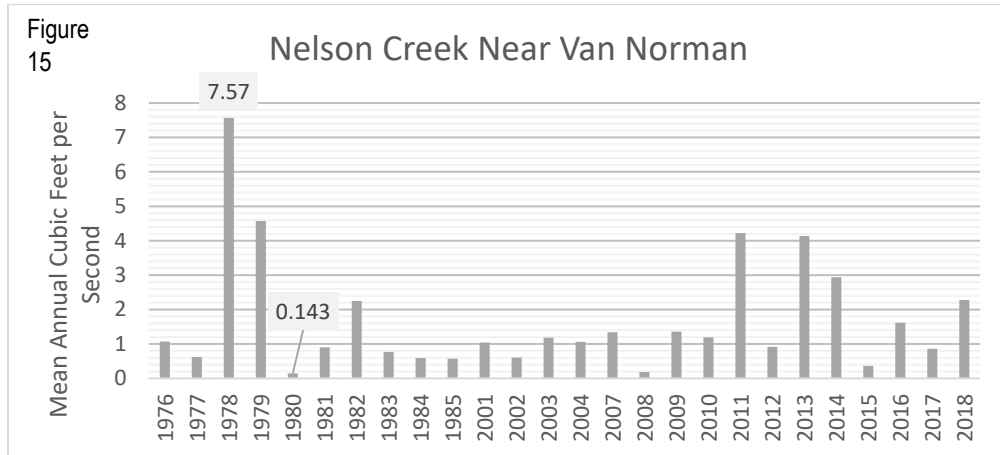


Figure 15. Mean Annual Stream Flow on Nelson Creek

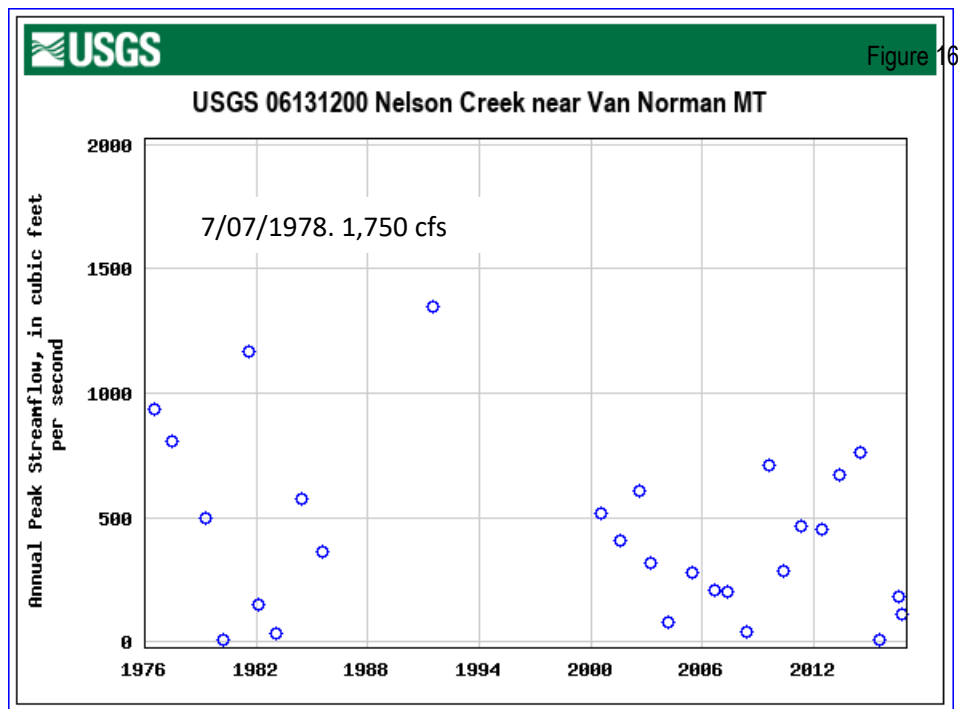


Figure 16. Peak Annual Streamflow on Nelson Creek.

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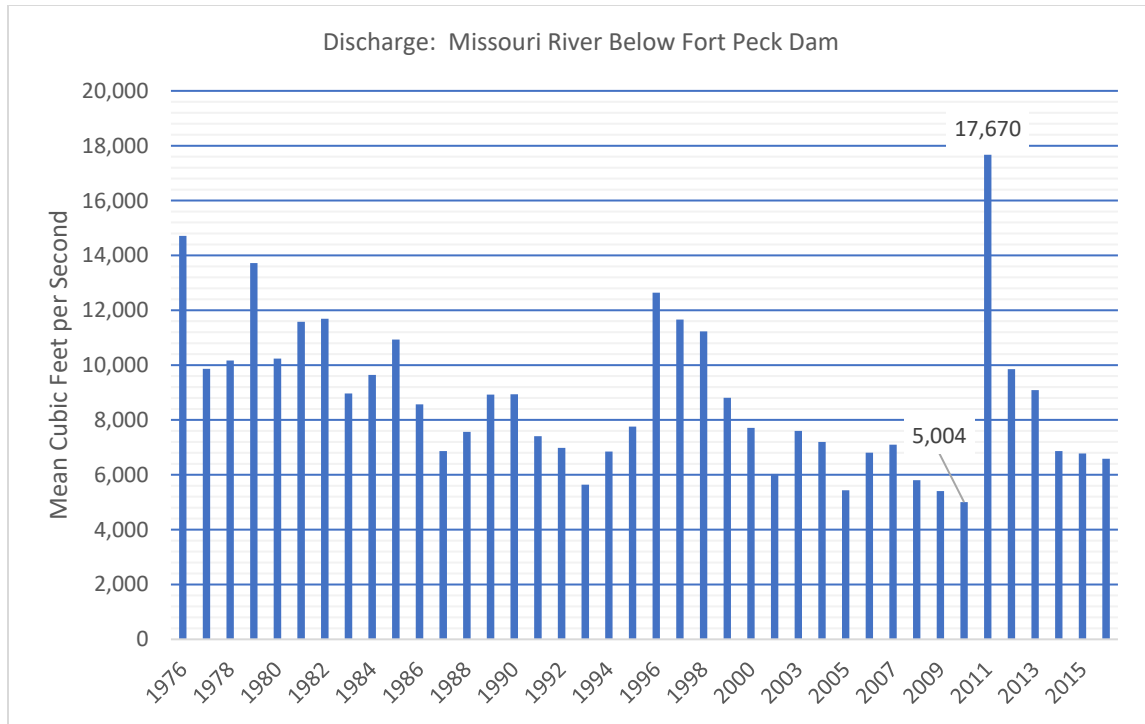


Figure 17. Mean Annual Discharge on the Missouri River.

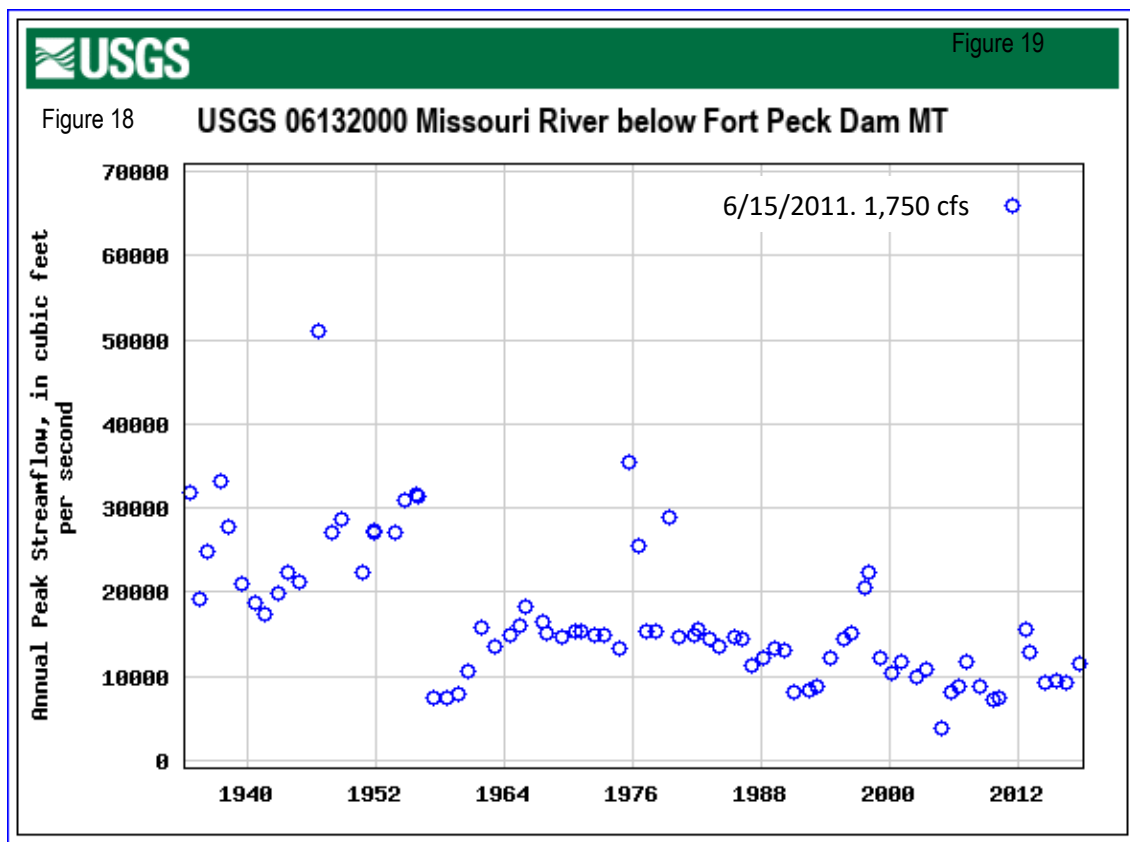


Figure 18. Annual Peak Streamflow on the Missouri River.

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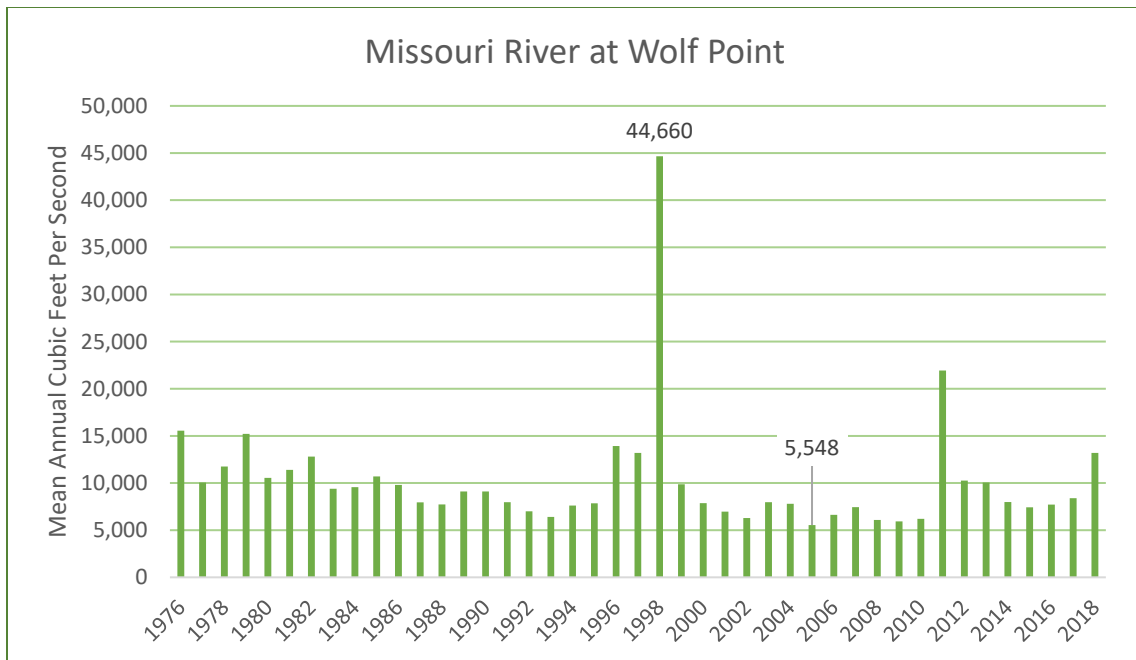


Figure 19. Mean Annual Discharge at Wolf Point.

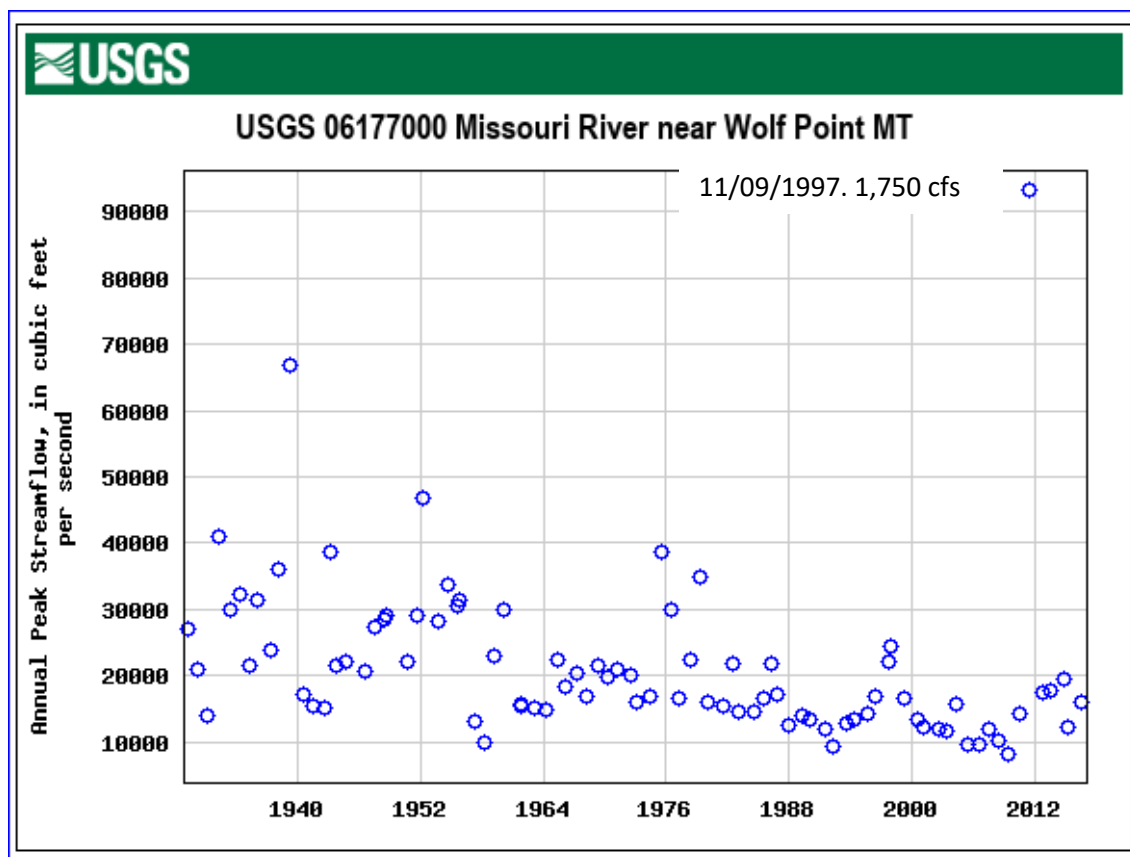


Figure 20. Peak Annual Streamflow at Wolf Point

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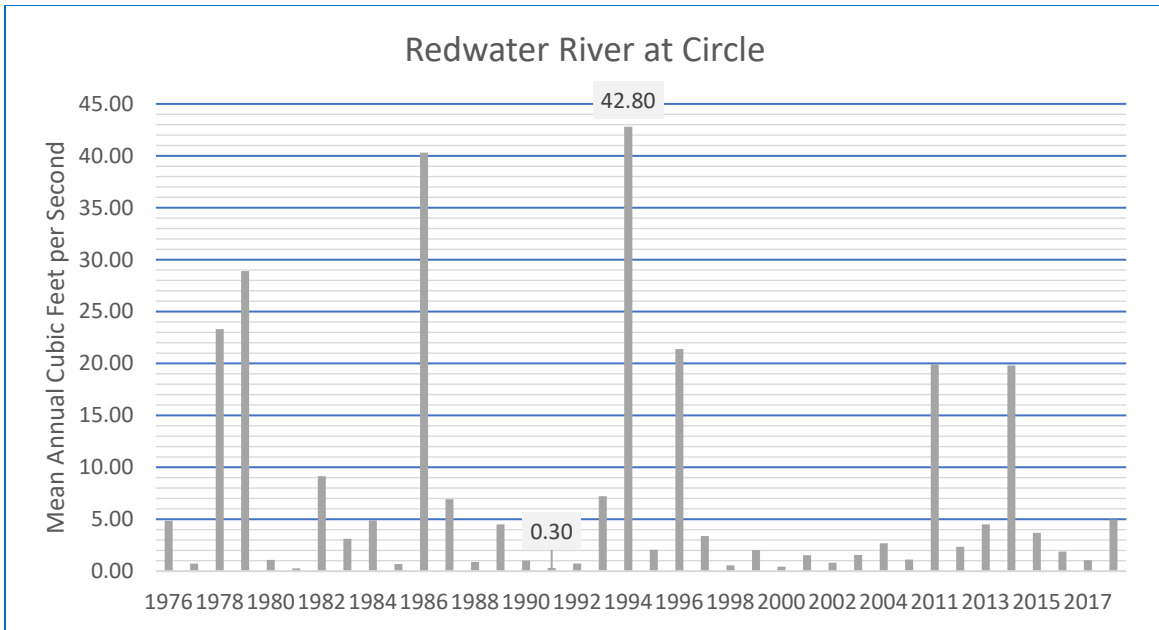


Figure 21. Mean Annual Discharge, Redwater River at Circle.

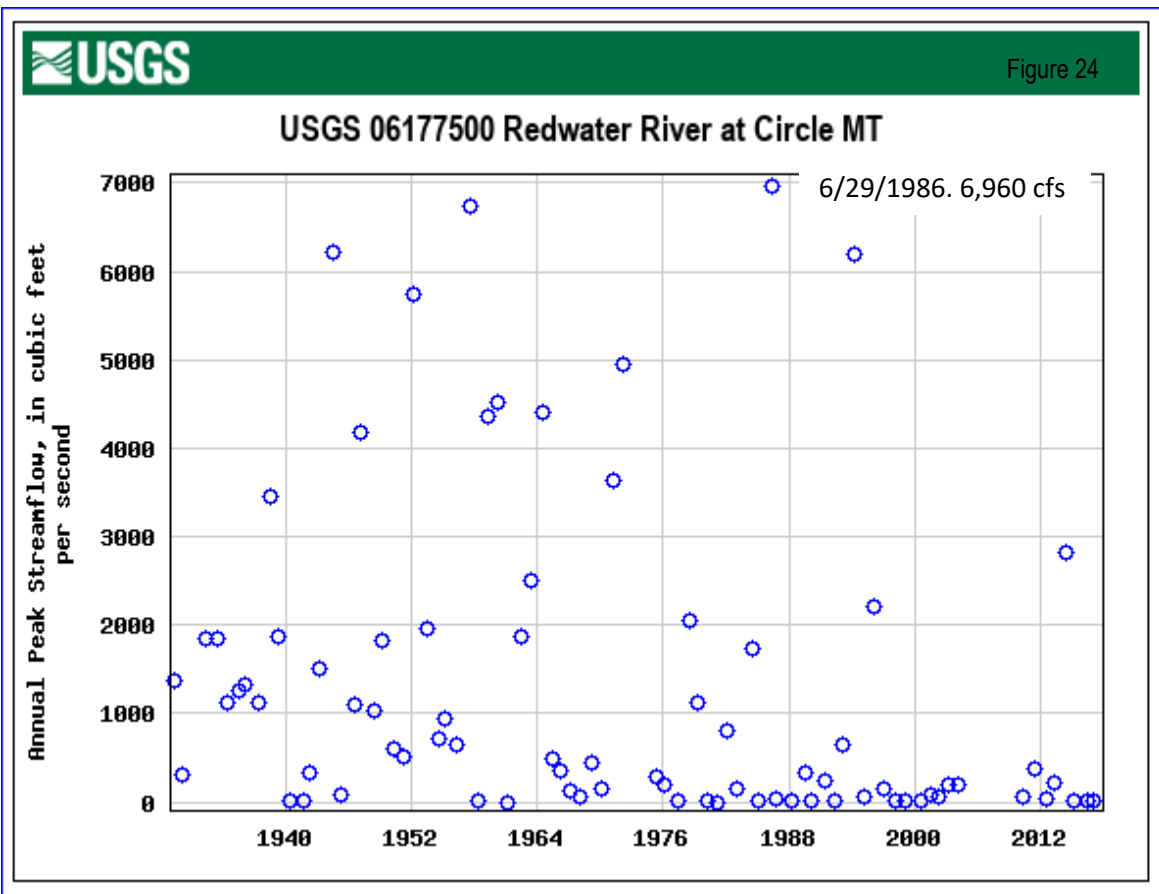


Figure 22. Annual Peak Streamflow Redwater River at Circle.



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### Hydrography

The Hydrologic Unit Code (HUC) is a numbering system for watersheds developed by the U.S. Geological Survey (USGS) to provide a common coding system for State and Federal agencies. Each unique HUC is attached to a specific watershed, enabling different agencies to have common terms of reference and to agree on the boundaries of the watershed. The entire country has been mapped with three levels of HUCs: 8-digit HUCs for large watersheds known as sub-regions, 10-digit HUCs for watersheds, and 12-digit HUCs for smaller or sub-watersheds.

Portions of the Redwater and Fort Peck Reservoir sub-regions and the entire Prairie Elk-Wolf sub-region occur in McCone County. These are shown on the right as polygons with thick black boundaries. Within the subregions are 10-digit watersheds labeled and bordered in brown. These are divided into 12-digit sub-watersheds, shown on the map as colored polygons.



Figure 23. Hydrography of McCone County

### Hydrology

#### 303-d Listed Streams

Montana Water Quality Planning Bureau Water Quality Analysis, Reporting & Documentation System (WARD) provides reports to the EPS on water quality in all Montana water bodies. Fourteen waterbodies are listed in one of four categories of impairments in McCone County.

**Category 1:** *Waters for which all applicable beneficial uses have been assessed and all uses are determined to be fully supported.*

- Redwater River from headwaters to Hell Creek.
- Redwater River from Buffalo Springs Creek to Pasture Creek.

**Category 4A:** *All TMDLs needed to rectify all identified threats or impairments have been completed and approved.*

- Redwater River from Hell Creek to Buffalo Springs Creek.
- Timber Creek from headwaters to Fort Peck Reservoir.
- Horse Creek from headwaters to the Redwater River.
- Prairie Elk Creek, East and Middle Forks to the Missouri River.



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Category 4C: - *Identified threats or impairments result from pollution categories such as dewatering or habitat modification and, thus, a TMDL is not required.*

- Redwater River from Pasture Creek to the Missouri River. Alterations in stream-side or littoral vegetative cover and physical substrate habitat alterations caused by grazing and natural sources impair full support of aquatic life.

Category 5: *Waters where one or more applicable beneficial uses are impaired or threatened and a TMDL is required to address the factors causing the impairment or threat.*

- Big Dry Creek from Steve's Fork to Fort Peck Reservoir. Agriculture, municipal point source and discharges cause impairments to the beneficial uses for aquatic life and recreation.
- Nelson Creek, entire reach, TMDL are required for cadmium and copper from unknown sources.
- Fort Peck Reservoir does not fully support drinking water or aquatic life due to lead and mercury; TMDLs are required.
- East Redwater Creek, all reaches, does not fully support aquatic life or recreation due to nutrients, sediments and total dissolved solids probably from agriculture and unknown sources.
- Missouri River, Fort Peck Dam to Milk River and Milk River to Poplar River does not fully support aquatic life due to alteration in stream-side or littoral vegetative covers, flow modification and temperature due to hydrostructure flow regulation-modification.
- Sand Creek from the confluence of the East and West Forks to the Missouri River does not fully support aquatic life. Impairments are nutrients, sedimentation and physical substrate habitat alterations probably from agriculture and grazing (Montana DEQ, 2019).

### Air and Energy Resources

#### Air Quality

Montana Department of Environmental Quality Air Quality Bureau maintains air quality monitoring stations in Malta and Sidney, Montana. Ambient temperature, wind speed and direction and pollutants including NO, NO<sub>2</sub>, NO<sub>x</sub>, ozone and particulate matter are monitored. There are no areas of non-attainment in eastern Montana (MT DEQ CWAIC, 2019)

#### Utilities

McCone Electric is a rural electrical cooperative that serves 14,000 square miles in McCone, Garfield and Dawson Counties. Most of McCone County, including the City of Circle, is serviced by McCone Electric. Residents in other areas of the county purchase electricity and natural gas from Montana Dakota Utilities. MDU provides retail natural gas and electric services to parts of Montana, North Dakota, South Dakota and Wyoming in a service area covering more than 168 thousand square miles.

#### Petroleum Resources

McCone County ranks twenty-ninth in Montana for oil production and twenty-sixth for natural gas. In contrast, neighboring counties Richland and Dawson are first and seventh for oil production, respectively. Data provided by Montana Department of Resources & Conservation Board of Oil and Gas Conservation shows peak production for Richland County occurred in 2014 when 15.9 million barrels of oil were extracted. In the same year, McCone County produced just under fifteen thousand barrels. The chart below shows DNRC data for oil production from 1986 to 2018 (ShaleXP, 2019) Yield datapoints for the year of peak (1986) and lowest production (2018), and 2014 are labeled.

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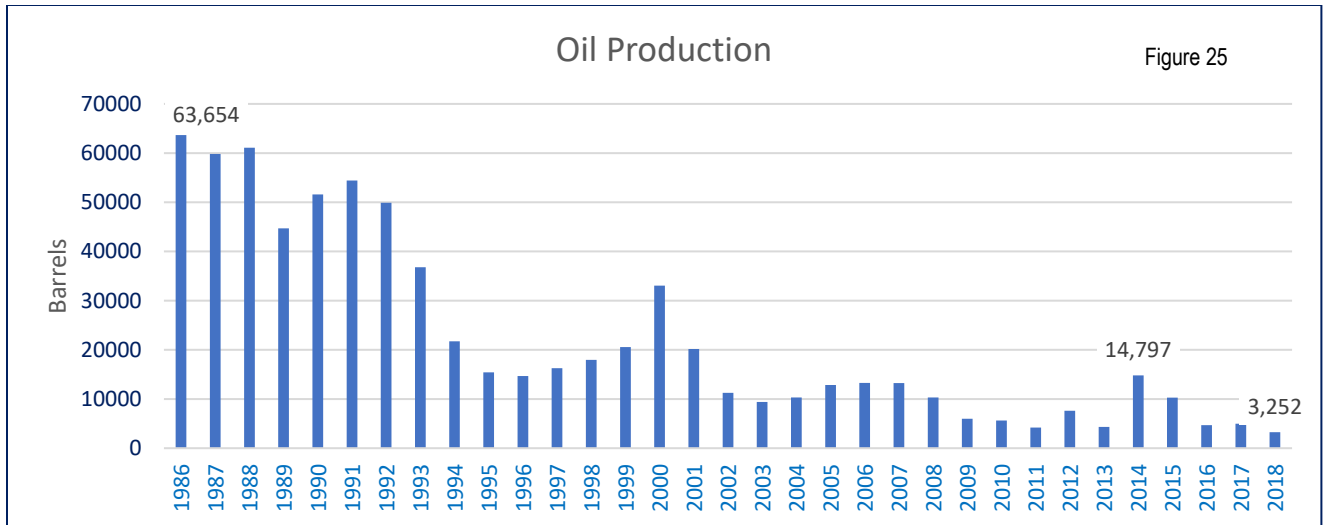


Figure 24. Oil Production in McCone County 1986 Through 2018

While the industry is active in the county, it does not play as great a role in the economy as in other areas of eastern Montana.

### Plants and Animals

#### Animal Species of Concern

The US Fish and Wildlife Service (USFWS) has determined that there are five species of native animals listed endangered or threatened under the Endangered Species Act in McCone County as of December 12, 2019. MTNHP lists 41 animal species of Concern in McCone County. The list is included in Appendix B1.

#### Pallid Sturgeon (*Scaphirhynchus albus*) - Endangered

Pallid sturgeon are bottom dwelling, slow growing fish that feed primarily on small fish and immature aquatic insects. Adults have a flattened snout, a long slender tail and are armored with lengthwise rows of bony plates instead of scales. Pallid sturgeon can grow up to six feet long and weigh up to 80 pounds. The species is adapted to living close to the bottom of large, silty rivers; their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.

The Pallid sturgeon is one of the rarest fishes in North America. It is only found in portions of the Missouri and Mississippi River basins; only about 200 adults remain in the upper Missouri River. It was federally listed as endangered in 1990 due to population decline caused by human alterations of the environment: impoundments, channelization and altered river hydrography, turbidity and temperature. The Pallid sturgeon is currently listed as "S1" in Montana due to extremely limited or rapidly declining population numbers, range or habitat, making it highly vulnerable to global extinction or extirpation in Montana (USFWS, 2019). Any NRCS undertaking that impacts the Missouri Riverbank below the ordinary high-water mark will require a consultation with the Corp of Engineers as well as a consultation with USFWS (Ellenburg, 2019).

#### Whooping Crane (*Grus americana*) – Endangered

Whooping cranes are the world's rarest crane and the tallest birds in North America. Adult height is about five feet, wingspan can be up to seven- and one-half feet. Average adult weight is about fifteen pounds. Once found throughout North America, the last wild flock of whooping cranes had been reduced to fewer

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than 20 birds by the 1940's due to habitat loss and hunting. Intensive conservation efforts and international cooperation between Canada and the United States rescued the species from extinction, but they are still extremely rare. Habitat loss remains one of the biggest threats facing wild whooping cranes. Collisions with wind turbines and power lines are an ongoing threat. Whooping crane utilize migratory habitat in eastern Montana although their main migratory corridor is found to the east in the Dakotas (Ziegler, 2020). They are not known to breed in the state (Audubon, 2019). Observations of these birds in the state have been in grain and stubble fields, wet meadows and wet prairie habitat (Ziegler, 2020).

### Piping Plover (*Charadrius melodus*)— Threatened, Designated Critical Habitat

Piping Plover populations are in decline due to habitat loss caused by alterations to river systems. These small shorebirds are distinguished by a single black band around their necks and very short yellow-to-orange bills with black tips. Piping plovers nest on shorelines and islands of alkali lakes in North Dakota and Montana and on sandbar islands and reservoir shorelines along the Missouri River. Dam construction, water diversion and water withdrawals change river flow and drastically reduce the amount of available nesting habitat. Human activity has increased predation which decreases nest success and chick survival. USFWS shows the Missouri River from River Mile 1,712 at Wolf Point to the Richland County line as designated critical habitat for piping plover (USFWS, 2019). Piping plover summer and migratory habitats are shown in Appendix B-2.

### Interior Least Tern (*Sternula antillarum*)— Endangered

Least terns are North America's smallest tern. These little shorebirds are easily recognized by their yellow bills and legs. The interior population has been listed as endangered because of loss of habitat. The interior population declined by about 88% between 1966 and 2015; interior least terns have been federally listed as endangered since 1985. "The USFWS listed the population of least tern that occurred throughout the interior of the U.S. as an endangered species" (Ziegler, 2020).

Least terns often nest in colonies; nesting sites are shallow scrapes on open ground near lake shores, on sandbars or along the riverside. Unfortunately, prime nesting habitat is often used by humans for recreation or residential development. Additionally, alterations to stream flows caused by dams, reservoirs, water diversion and other changes to river systems have eliminated most historic least tern nesting habitat. Wide channels dotted with sandbars, which are preferred by least terns, have been replaced by narrow, armor-banked rivers with highly altered flows. Fluctuating water levels from reservoir releases often destroy nesting sites (MT FWP, 2019). "Least terns nest on unvegetated or sparsely vegetated sandbars, channel bars and islands in northeastern and southeastern Montana along the Yellowstone and Missouri River systems." (Ziegler, 2020). The Montana Interior Least Tern Management Plan provides more information on the species and efforts to conserve its habitat in Montana at <https://www.usbr.gov/gp/mtao/loweryellowstone/EA/Final%20EA/Support/FWP%202006%20Montana%20Interior%20Least%20Tern%20Management%20Plan.pdf>. Maps of Interior least tern summer and migratory habitat are shown in Appendix B-3.

### Northern Long-Eared Bat (*Myotis septentrionalis*)— Threatened

In Montana this species is known to occupy specific habitat within a limited range along the Missouri and Yellowstone river drainages near the North Dakota border, as shown in Figure 25 from the MTNHP Field Guide. These small, light brown bats are most often found hibernating in abandoned mines in the river breaks in Richland and McCone Counties. In the summer they roost in riparian forested areas dominated by cottonwood trees. They emerge to feed at dusk using echolocation to hunt moths, flies, leaf hoppers and beetles.

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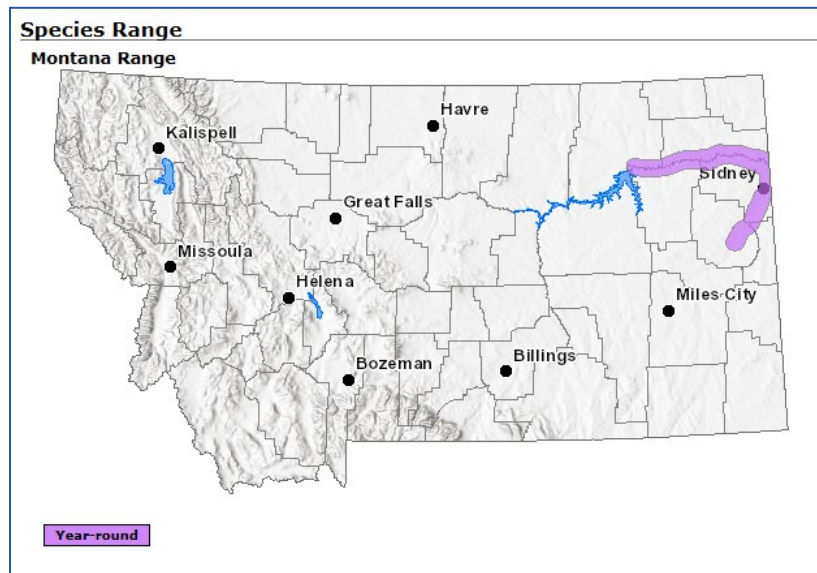


Figure 25. Northern Myotis Range in Montana (MT NHP, 2019)

Long-eared bat populations in other areas of the country have suffered tremendous losses due to white nose syndrome (WNS). Regional extinction has occurred in some locations. WNS is caused by the fungus *Pseudogymnoascus destructans*. It attacks the bare skin of bats while they're hibernating. As it grows it changes the bats' behavior, causing them to become active during hibernation, using up the stored fat that they need to survive the winter. WNS continues to spread rapidly across the United States and Canada, mostly through bat-to-bat contact. According to the White-Nose Syndrome Response Team, there were no reported occurrences of the disease in long-eared bats in Montana as of August 2019 (WNS Response Team, 2019).

### Greater Sage-grouse

Montana, along with several other western states, has been the focus of multiple petitions to list the Greater sage-grouse (*Centrocercus urophasianus*) under the federal Endangered Species Act. The primary concerns for sage-grouse are loss and fragmentation of their habitat. In Montana habitat loss due to conversion of sagebrush steppe to cropland and energy development is thought to be the biggest threats to Greater Sage-grouse.

On September 22, 2015 the USFWS determined that the greater sage-grouse did not warrant listing protections under the Endangered Species Act. It was decided that the primary threats to populations had been ameliorated by conservation efforts implemented by Federal, State, and private landowners.

The MTNHP Animal Species of Concern Report lists the greater sage-grouse as category S2: At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.



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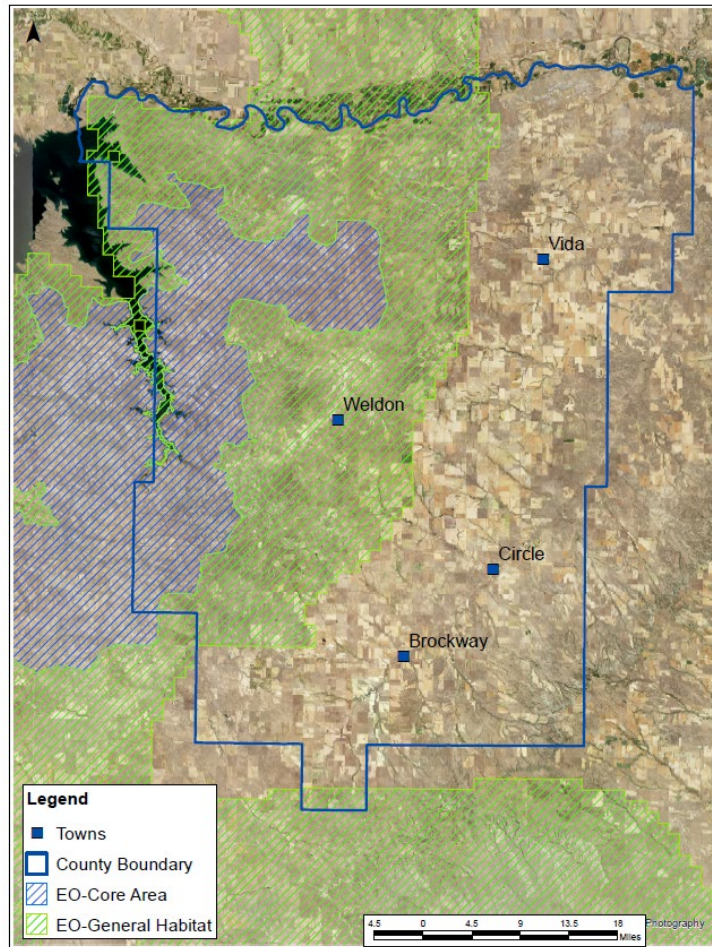


Figure 26. Sage Grouse Habitat, McCone County.

McCone County contains both general and core area greater sage-grouse habitat. Core area is defined as the area that contains the species of concern, having, exemplary natural plant and animal communities, or exceptional native diversity. Core areas delineate essential habitat that would not be able to absorb significant levels of disturbance without substantial impact to the species of concern.

Sage-grouse core areas provide habitat for 75% of all known breeding sage-grouse in Montana and represent landscapes of greatest biological importance to the long-term persistence of the species. A large territory on the west side of the county has been determined to be part of the species' core area. See Figure 26.

“General habitat areas are also important to sage-grouse and critical to the effort to maintain the abundance and distribution of sage-grouse in the state. These areas

also include leks and nesting areas, but at a lower density than core areas” (Ziegler, 2020).

In McCone County sage-grouse general habitat has been impacted by habitat fragmentation created by cultivation. Further fragmentation by cultivation poses the highest risk for sage-grouse in the county. Core habitat remains largely intact native rangeland.

### Plant Species of Concern

MTNHP describes plant Species of Concern as, “Native taxa that are at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors”. The Species of Concern Report last updated on September April 16, 2020 lists only four plant species of concern in McCone County, shown in Table 7 (MTNHP, 2019).

Table 7. Plant Species of Concern, McCone County

| Scientific Name               | Common Name                   | Habitat          |
|-------------------------------|-------------------------------|------------------|
| <i>Chenopodium subglabrum</i> | Smooth Goosefoot              | Sandy sites      |
| <i>Physaria ludoviciana</i>   | Silver Bladderpod             | Sandy sites      |
| <i>Rorippa calycina</i>       | Persistent-sepal Yellow-cress | Wetland/Riparian |
| <i>Carex gravida</i>          | Heavy Sedge                   | Wetland/Riparian |



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Four-wing saltbush (*Atriplex canescens*) is listed as a potential species of concern. Four-wing saltbush is an evergreen gray shrub from two to six feet tall with stocky, gray scurfy branches. It can grow in a wide variety of soils and is tolerant of saline-alkaline soils. This plant is rare in McCone County.

### Wetlands/ Riparian Areas

Wetlands are areas where water covers the soil or is present at or near the surface of the soil all year or for periods of time during the year, including during the growing season. The prolonged presence of water creates conditions that favor the growth of specially adapted plants and promotes the development of characteristic wetland (hydric) soils. Fort Peck Lake covers about 193.5 thousand acres in McCone county. The other wetland and riparian areas add up to a little over 29,000 acres, or slightly more than 1.7% of the county as shown in Figure 26.

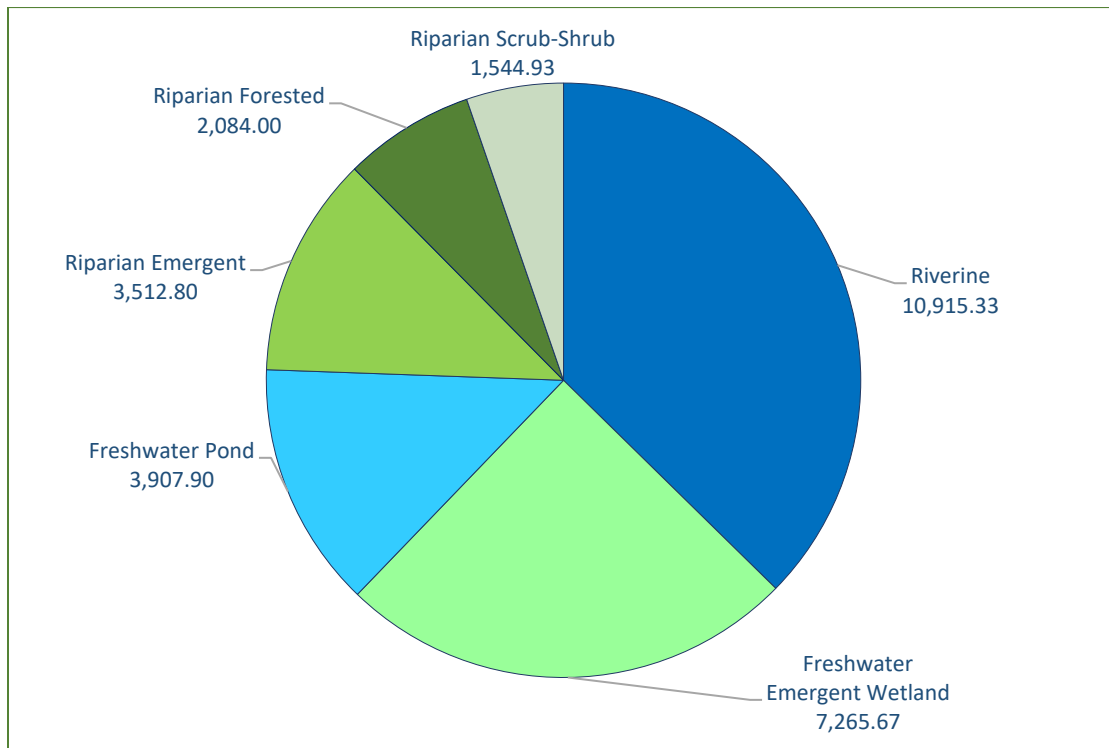


Figure 26. Wetland and Riparian Area Types, McCone County.

Riverine areas are perennial streams comprised of the deep-water habitat contained within a channel; they do not include adjacent floodplains. Logically, these are located along the south bank of the Missouri River and intermittently along either side of the Redwater River.

Freshwater and Riparian emergent wetlands are dominated by erect, rooted, water-loving plants present for at least part of the growing season. They may be persistent or ephemeral and occur mostly along major streams. Ponds are water bodies less than 20 acres in size; most of these are man-made, installed to provide water for livestock. Riparian forested systems are dominated by perennial vegetation greater than 20 feet tall. These are found mostly along the major creeks and rivers (MTNHP, 2019).

Montana's State Wildlife Action Plan (SWAP) identifies all streams, rivers, floodplains and riparian, and wetland community types across the state as "Community Types of Greatest Conservation Need". The plan defines this as meaning there is a clear obligation to use resources to implement conservation actions

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that provide direct benefit to these community types. The plan also provides lists of SOC (Species of Concern) associated with each community type (Ziegler, 2020). Figure 27 shows the SWAP Tier I Focal Areas throughout the state. The Lower Missouri Tier I Aquatic Focal Area occurs across the northern boundary of McCone County.

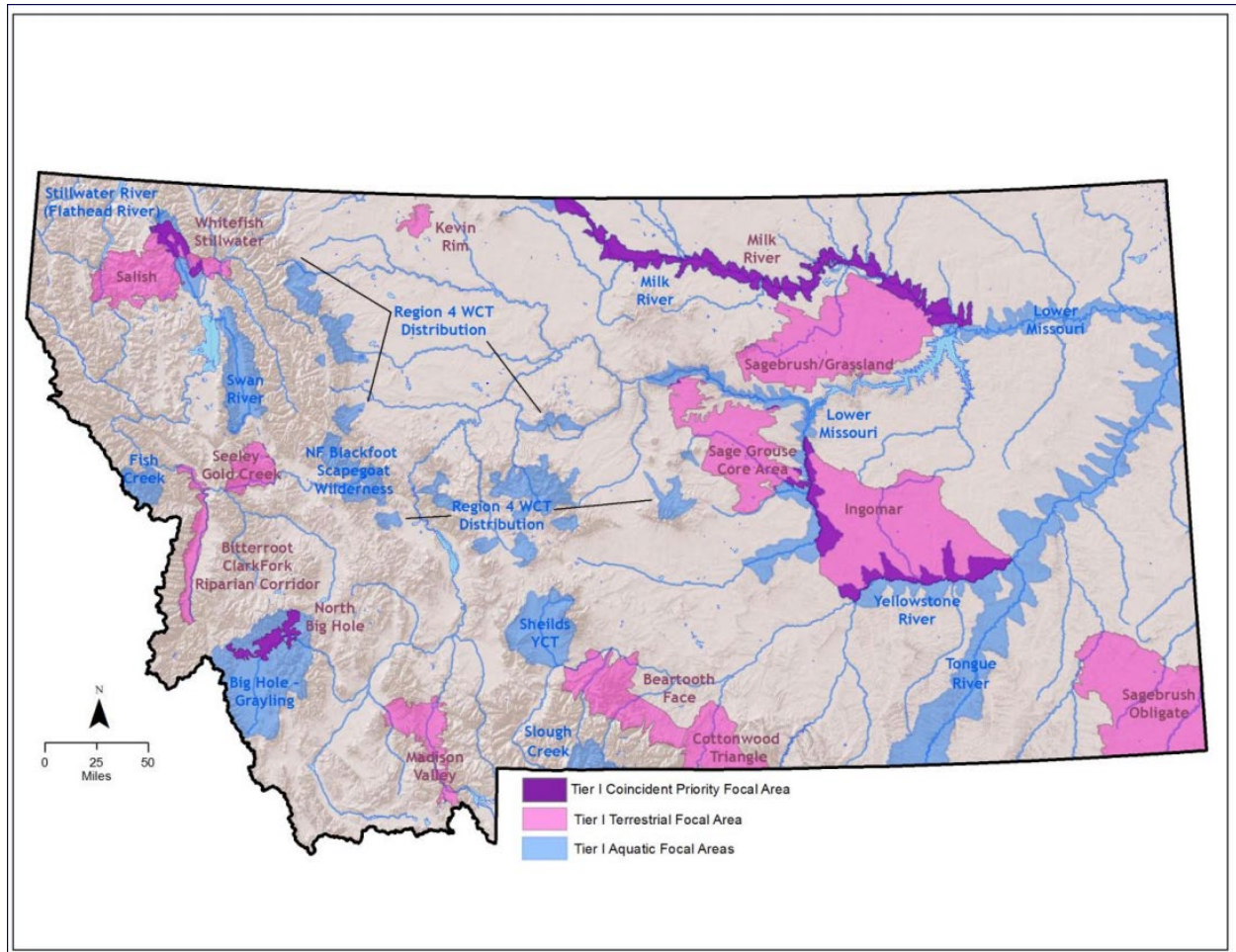


Figure 27. Tier I Focal Areas (Montana Fish, Wildlife & Parks, 2015).

Associated Community Types of Greatest Conservation Need (CTGCN) in the Lower Missouri Focal Area are Mixed Systems, Prairie River Systems and Prairie Stream Systems.

Associated Species of Greatest Conservation Need (SGCN) are:

- Blue Sucker (*Cycleptus elongatus*)
- Iowa Darter (*Etheostoma exile*)
- Northern Redbelly Dace (*Chrosomus eos*)
- Paddlefish (*Polyodon spathula*)
- Shortnose Gar (*Lepisosteus platostomus*)
- Sicklefin Chub (*Macrhybopsis meeki*)

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- Northern Redbelly x Finescale Dace (*Phoxinus eos* x *P. neogaeus*)
- Pallid Sturgeon (*Scaphirhynchus albus*)
- Pearl Dace (*Margariscus margarita*)
- Sauger (*Sander canadensis*)
- Sturgeon Chub (*Macrhybopsis gelida*) (MT FWP, 2015)

### Section III. Analysis of Existing Conservation Activity

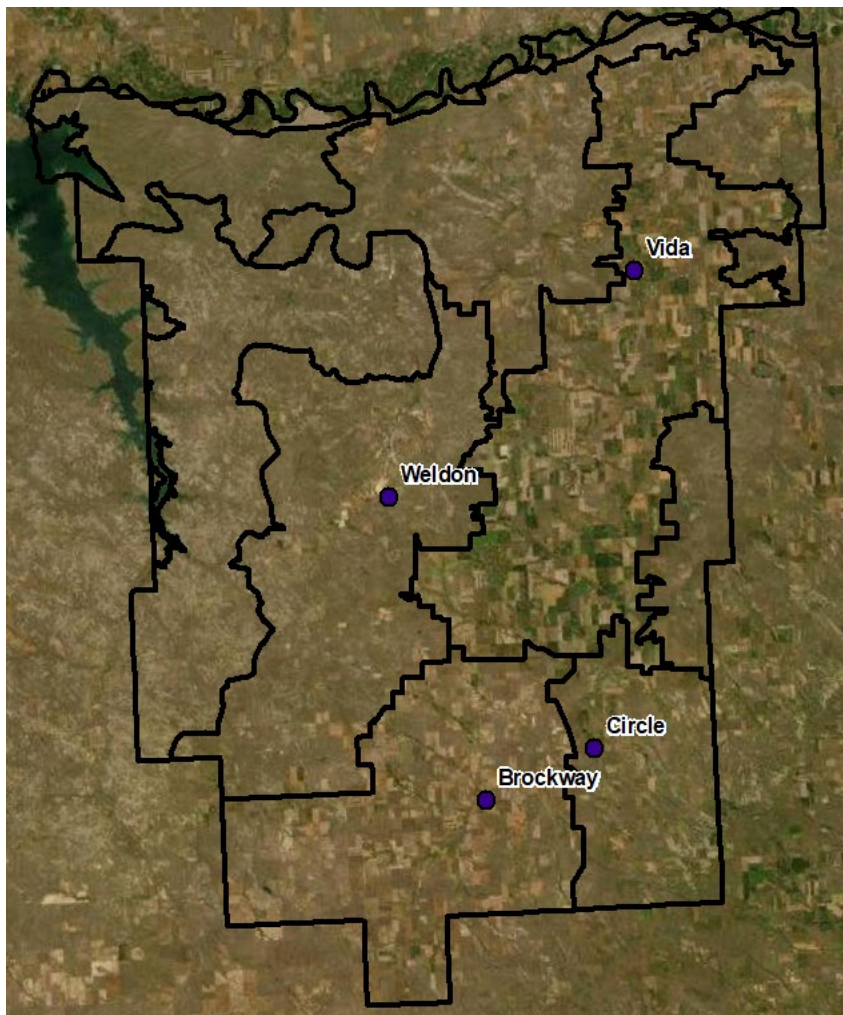


Figure 28. McCone County

The Circle NRCS Field Office has a long history of providing technical and financial assistance to agricultural producers and landowners within McCone County. The office has also supported and provided educational resources to the public, local producers, and school children.

McCone county can be broken up into a few major areas from a working lands perspective, each of which has its own set of commonly encountered resource concerns and typically applied conservation measures. These areas are roughly defined and should be refined over time if they are used to apply focused conservation. Furthermore, there may be opportunities to further focus conservation efforts in these areas as resource concerns and opportunities arise.

Between the Redwater and Prairie Elk Drainages, running through the heart of the county, is a bench of the Tongue River member of the Fort Union geologic formation. Here, the landscape is dominated by dryland annual crop fields dissected by drainages, woody/shrubby draws, and mostly non-contiguous parcels of grazing land. In the last decade, conservation efforts have been focused on agronomic practices such as nutrient management, pest management, residue management, conservation crop rotation, and cover crops to

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address resource concerns on cropland associated with soil erosion, soil quality, and potential nutrients and pesticides pollution. Conservation efforts by the agency on the grazing land within this area has been very limited.

| <b>USDA-NRCS Conservation Measures</b><br><b>Environmental Quality Incentives Program (EQIP)</b><br>McCone County, MT<br>1992-2019 |             |       |
|------------------------------------------------------------------------------------------------------------------------------------|-------------|-------|
| Practice                                                                                                                           | Applied Amt | Unit  |
| Conservation Crop Rotation                                                                                                         | 1,681.1     | acres |
| Cover Crop                                                                                                                         | 671.1       | acres |
| Critical Area Planting                                                                                                             | 102.4       | acres |
| Fence                                                                                                                              | 199,997.0   | feet  |
| Field Border                                                                                                                       | 7,784.3     | acres |
| Forage and Biomass Planting                                                                                                        | 1,505.8     | acres |
| Grassed Waterway                                                                                                                   | 0.7         | acres |
| Heavy Use Area Protection                                                                                                          | 325.5       | acres |
| Herbaceous Weed Treatment                                                                                                          | 23.6        | acres |
| Invasive Plant Species Control                                                                                                     | 59.1        | acres |
| Irrigation Water Management                                                                                                        | 34.9        | acres |
| Livestock Pipeline                                                                                                                 | 252,930.4   | feet  |
| Nutrient Management                                                                                                                | 26,756.4    | acres |
| Pest Mgt Conservation System                                                                                                       | 54.4        | acres |
| Prescribed Grazing                                                                                                                 | 61,923.5    | acres |
| Pumping Plant                                                                                                                      | 31.0        | count |
| Range Planting                                                                                                                     | 248.8       | acres |
| Residue and Tillage Mgt, No Till                                                                                                   | 14,087.9    | acres |
| Spring Development                                                                                                                 | 2.0         | count |
| Sprinkler System                                                                                                                   | 124.1       | acres |
| Structures for Wildlife (Fence Markers)*                                                                                           | 50,979.0    | acres |
| Structures for Wildlife (Escape Ramps)                                                                                             | 6.0         | count |
| Tree/Shrub Establishment                                                                                                           | 331.0       | acres |
| Water Well                                                                                                                         | 25.0        | count |
| Watering Facility                                                                                                                  | 102.0       | count |
| Well Decommissioning                                                                                                               | 14.0        | count |
| Windbreak/Shelterbelt Establishment                                                                                                | 13,617.0    | feet  |
| Windbreak/Shelterbelt Renovation                                                                                                   | 1,750.0     | feet  |
| *pasture acres in which high-risk fences were marked                                                                               |             |       |

To the west, the bench has been eroded off by geologic forces and glacier activity to expose the Hell Creek and Bearpaw Shale geologic formations. Due to the resulting rougher topography, thinner soils, and badlands, the northwest corner of the county is dominated by native rangeland with dryland crop fields occurring sporadically on historic floodplains and remnant benches where farming was practical. The amount of cropland varies throughout the area. Additionally, this area contains the state designated core



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and general habitat for sage-grouse. These habitat designations may allow for further divisions within the northwestern part of the county. Regardless, in this area conservation measures applied have been focused more on addressing grazing land resource concerns such as: native plant community composition, plant vigor/production, grazing land soil erosion, streambank erosion, and most notably, inadequate livestock water needed to facilitate proper control over livestock utilization and implement grazing rotations. In recent decades, stock water development in the form of wells and stock water pipelines, fencing, and prescribed grazing have commonly been used to address these concerns. In 2019, two operations received the county's first EQIP Sage-Grouse Initiative (SGI) funds to implement whole-ranch conservation plans to address such concerns and reduce threats to sage-grouse. To date, there continues to be strong interest in that program.

Though annual cropping agronomic practices have been applied in this area as well, in comparison to the rest of the county, there has been more interest by agriculture producers in this area to plant annual cropland to perennial forages for grazing or haying. In 2019, through the EQIP SGI - Cropland Seeding Special Initiative, 3089.4 acres were slated to be planted to diverse forage on 3 operations. Like SGI general, there is a continued strong interest this program as well.

In the areas around Brockway, Circle, and east of the bench containing the bulk of the annual cropland, a mixed array of the conservation practices mentioned above have been implemented. The Fort Union geologic formation dominates this region as well, creating a diverse mosaic of hills, breaks, benches, and drainages. The majority of conservation efforts in these areas have been applied on annual cropland, with herbaceous weed treatment, tree plantings, and shelterbelts establishment and renovations being commonly implemented on the grazing land.

Irrigated cropland can be found along the Missouri River. Conservation efforts along the Missouri River include converting flood irrigated fields to sprinkler irrigation, irrigation water management, nutrient management, pest management, and conservation crop rotation.

Since 2008, Conservation Stewardship Program (CStWP) and Conservation Security Program (CSP) have been the most utilized NRCS program in the county. Fifty-six contracts have been awarded, covering 210,620 acres. The majority of these contracts were focused on agronomy-based management practices, such as Nutrient & Pest Management, see the table below for details.

| <b>USDA-NRCS Conservation Measures</b><br><b>Conservation Stewardship Program (CStWP) and Conservation Security Program (CSP)</b><br>McCone County, MT<br>2008-2019 |                     |             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|
| <b>Practice</b>                                                                                                                                                     | <b>Applied Amt.</b> | <b>Unit</b> |
| Apply controlled release nitrogen fertilizer                                                                                                                        | 1200                | acres       |
| Apply enhanced efficiency fertilizer products                                                                                                                       | 2099                | acres       |
| Apply nutrients no more than 30 days prior to planned planting date                                                                                                 | 2984.8              | acres       |
| Conservation cover to provide cover and shelter habitat for pollinators and beneficial insects                                                                      | 5                   | acres       |



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|                                                                                                              |         |       |
|--------------------------------------------------------------------------------------------------------------|---------|-------|
| Conservation cover to provide food habitat for pollinators and beneficial insects                            | 9.3     | acres |
| Conservation cover to provide habitat continuity for pollinators and beneficial insects                      | 7.8     | acres |
| Conservation Crop Rotation                                                                                   | 25755.6 | acres |
| Continuous No Till                                                                                           | 1511.5  | acres |
| Cover Crop                                                                                                   | 38.8    | acres |
| Crop Technology Bundle #1                                                                                    | 4457.6  | acres |
| Cropland conversion to grass-based agriculture for soil organic matter improvement                           | 249     | acres |
| Enhanced field border to provide wildlife habitat continuity along the edge(s) of a field                    | 2.5     | acres |
| Enhancement - Energy Management                                                                              | 9748.8  | acres |
| Enhancement - Grazing Management                                                                             | 949.4   | acres |
| Enhancement - Habitat Management                                                                             | 1898.8  | acres |
| Enhancement - Pest Management                                                                                | 14204.8 | acres |
| Enhancement - Soil Management                                                                                | 25773.4 | acres |
| Extending existing field borders for water quality protection and wildlife habitat                           | 5.3     | acres |
| Forage and Biomass Planting                                                                                  | 334.9   | acres |
| GPS, targeted spray application (Smart Sprayer), or other chemical application electronic control technology | 1114.4  | acres |
| Grazing management to improve wildlife habitat                                                               | 735.3   | acres |
| Harvest hay in a manner that allows wildlife to flush and escape                                             | 523.6   | acres |
| Harvest of crops (hay or small grains) using measures that allow desired species to flush or escape          | 144.1   | acres |
| Herbaceous weed control (inadequate structure and comp) for desired plant communities/habitats               | 20      | acres |
| Herbaceous weed control (plant pest pressures) for desired plant communities/habitats                        | 30      | acres |
| Herbaceous Weed Treatment                                                                                    | 133     | acres |
| High level Integrated Pest Management to reduce pesticide environmental risk                                 | 2021.3  | acres |
| Improving nutrient uptake efficiency and reducing risk of nutrient losses to groundwater                     | 1711    | acres |
| Improving nutrient uptake efficiency and reducing risk of nutrient losses to surface water                   | 2240.8  | acres |
| Incorporating "wildlife friendly" fencing for connectivity of wildlife food resources                        | 11838   | acres |
| Leave standing grain crops unharvested to benefit wildlife cover and shelter                                 | 5253.9  | acres |
| Leave standing grain crops unharvested to benefit wildlife food sources                                      | 2180.6  | acres |
| Maintaining quantity and quality of forage for animal health and productivity                                | 9418.1  | acres |
| Monitor key grazing areas to improve grazing management                                                      | 9143    | acres |
| Monitoring nutritional status of livestock using the NUTBAL PRO System                                       | 5852    | acres |
| Nitrification inhibitors or urease inhibitors                                                                | 1511.5  | acres |
| Nutrient Management                                                                                          | 33424.4 | acres |
| Pest Management Conservation System                                                                          | 4221.2  | acres |
| Prairie Restoration for Grazing and Wildlife Habitat                                                         | 40      | acres |
| Precision application technology to apply nutrients                                                          | 1114.4  | acres |

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|                                                                                                      |         |       |
|------------------------------------------------------------------------------------------------------|---------|-------|
| Prescribed grazing that improves or maintains riparian and watershed function-erosion                | 3559.1  | acres |
| Prescribed Grazing                                                                                   | 5520    | acres |
| Pumping Plant                                                                                        | 4       | count |
| Reduce risk of pesticides in surface water by utilizing precision pesticide application techniques   | 6992.1  | acres |
| Reduction of attractants to human-subsidized predators in sensitive wildlife species habitat         | 1       | acres |
| Residue and Tillage Management, No Till                                                              | 24405.6 | acres |
| Resource-Conserving Crop Rotation                                                                    | 1298    | acres |
| Retrofit watering facility for wildlife escape                                                       | 6       | count |
| Retrofit watering facility for wildlife escape and enhanced access for bats and bird species         | 13      | count |
| Rotation of supplement and feeding areas                                                             | 35032.9 | acres |
| Split nitrogen applications 50% after crop/pasture emergence/green up                                | 4711.5  | acres |
| Structures for Wildlife                                                                              | 11      | count |
| Tree/Shrub Establishment                                                                             | 1       | acres |
| Tree/shrub planting for wildlife cover                                                               | 112.5   | acres |
| Use drift reducing nozzles, low pressures, lower boom height and adjuvants to reduce pesticide drift | 20995.8 | acres |
| Use of Cover Crop Mixes                                                                              | 80      | acres |
| Use of multi-species cover crops to improve soil health and increase soil organic matter             | 592.6   | acres |
| Use of non-chemical methods to kill cover crops                                                      | 80      | acres |
| Wildlife Friendly Fencing                                                                            | 3876    | feet  |
| Windbreak/Shelterbelt Establishment                                                                  | 400     | acres |

As of April 2020, 62,879 acres were actively enrolled in 325 active Conservation Reserve Program (CRP) contracts. Of those acres, 28,652 acres are set to expire in 2020, 17,591 will expire in 2021, and 13,651 acres will expire in 2022.

NRCS has provided a significant amount of technical assistance to producers in the county and aided Farm Service Agency (FSA) in funding numerous Emergency Conservation Program (ECP) projects. NRCS serviced approximately 50 ECP applications consisting of mainly livestock water developments in 2017.

| <b>USDA-NRCS Conservation Measures</b><br><b>Conservation Technical Assistance (CTA)</b><br>McCone County, MT<br>20010-2019 |                     |             |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|
| <b>Practice</b>                                                                                                             | <b>Applied Amt.</b> | <b>Unit</b> |
| Access Control                                                                                                              | 218                 | acres       |
| Apply controlled release nitrogen fertilizer                                                                                | 400                 | acres       |
| Comprehensive Nutrient Management Plan - Written                                                                            | 1                   | number      |
| Conservation Cover                                                                                                          | 873.1               | acres       |

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|                                                                                                             |         |        |
|-------------------------------------------------------------------------------------------------------------|---------|--------|
| Conservation Crop Rotation                                                                                  | 1281.5  | acres  |
| Cover Crop                                                                                                  | 6.7     | acres  |
| Crop Technology Bundle #1                                                                                   | 3.4     | acres  |
| Establish pollinator and/or beneficial insect habitat                                                       | 6.5     | acres  |
| Fence                                                                                                       | 21300   | feet   |
| Forage and Biomass Planting                                                                                 | 7967.9  | acres  |
| Forage Harvest Management                                                                                   | 1719.6  | acres  |
| GPS, targeted spray application (SmartSprayer), or other chemical application electronic control technology | 7481.8  | acres  |
| Grazing Land Mechanical Treatment                                                                           | 225.1   | acres  |
| Harvest hay in a manner that allows wildlife to flush and escape                                            | 640     | acres  |
| Heavy Use Area Protection                                                                                   | 1       | acres  |
| Herbaceous Weed Treatment                                                                                   | 1885.7  | acres  |
| Irrigation Water Conveyance, Pipeline, Rigid Gated Pipeline                                                 | 2032    | feet   |
| Livestock Pipeline                                                                                          | 41278   | feet   |
| Monitoring nutritional status of livestock using the NUTBAL PRO System                                      | 6360.5  | acres  |
| Nutrient Management                                                                                         | 23057.4 | acres  |
| Pest Management Conservation System                                                                         | 23379.5 | acres  |
| Prairie Restoration for Grazing and Wildlife Habitat                                                        | 43.2    | acres  |
| Prescribed Grazing                                                                                          | 9488.9  | acres  |
| Pumping Plant                                                                                               | 694     | number |
| Range Planting                                                                                              | 62.9    | acres  |
| Recycle 100% of farm lubricants                                                                             | 2       | acres  |
| Residue and Tillage Management, No Till                                                                     | 14720.8 | acres  |
| Residue Management, Seasonal                                                                                | 177.9   | acres  |
| Resource-Conserving Crop Rotation                                                                           | 1200    | acres  |
| Retrofit watering facility for wildlife escape                                                              | 9       | number |
| Rotation of supplement and feeding areas                                                                    | 8534.5  | acres  |
| TA Check-Out                                                                                                | 1       | number |
| TA Design                                                                                                   | 1       | number |
| Upland Wildlife Habitat Management                                                                          | 5041.8  | acres  |
| Watering Facility                                                                                           | 14      | number |
| Well Decommissioning                                                                                        | 2       | number |

### Partner Conservation Efforts

Many partner groups have an interest in wildlife conservation in McCone County. For example, the county is a focal area for the Bird Conservancy of the Rockies (BCR) whose goal is to provide education, monitoring, research, and conservation of declining grassland birds. The local BCR biologist is stationed in the Glendive Field Office (NRCS), has been actively working with the Circle Field Office to plan and implement NRCS projects and programs. Additionally, BCR has sought funding for rangeland renovations, herbaceous weed control, and Russian Olive removal projects in the county.

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The American Bird Conservancy (ABC), is represented by a biologist, stationed in the Miles City Area Office. Though McCone County is not a focus area for ABC, the group has the ability to provide education and assistance for conservation projects.

Montana Fish, Wildlife & Parks (MTFWP) works to improve grasslands and wildlife habitat on private and public land through several avenues. Through the Upland Game Bird Habitat Enhancement Program they have helped fund: 1,984 acres enrolled in CRP seed cost share program, 6,335.3 acres enrolled in Open Fields program; 1,668 acres enrolled in Nesting Cover, 7 acres enrolled in Food Plots.

The McCone County Conservation District is working on various local conservation projects including addressing aquatic invasive species through a boat check station in Valley County, selling of trees, and administering a statewide soil health grant.

In 2015 and 2016, the NRCS Circle Field Office and McCone Conservation District facilitated organization of the HighPoint Co-operative Weed Management Area to assist landowners on McCune Creek and surrounding areas to combat noxious weeds. Additional grant funding was obtained from Montana Department of Agriculture.

Dry-Redwater Regional Water Authority (DRWA) works with four conservation districts, including McCone, to provide a sustainable, high quality water system for rural residents. In addition, DRWA also hosts local events, conducts environmental studies, and has plans to purchase a water treatment plant site in McCone County.

The Northern Great Plains Joint Venture has an implementation plan for bird habitat conservation in the area that provides strategic guidance for investments on private lands through various grant opportunities.

Missouri River Conservation Districts Council (MRCDC) has a salt cedar team spraying salt cedar from Fort Peck to the North Dakota Border, in partnership with Corp of Engineers & McCone County weed district.

MSU Extension provides an annual winter series, which includes a segment on noxious weeds, and McCone County Weed District provides education and support to control noxious and invasive weeds in the county.

### Existing Concerns

Agriculture producers have made impressive advancements in conserving the function and profitability of working lands in the last century. The dust bowl era and days of severe rangeland degradation are behind us. However, conservation efforts in large complex landscapes such as those in McCone County, are still evolving and much more work remains, to not only sustain the county's resources, but start to regenerate them to a more healthy and productive state.

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### Section IV. Natural Resource Problems and Desired Future Outcomes

The following existing resource concerns are those identified by the Local Working Group (LWG), NRCS personnel, agency partners, and input from the county's agriculture producers. To-date, two LWG meetings have been held with the intent of identifying natural resource and social concern in an effort to focus conservation resources in the county. Each meeting was held in Circle in 2019; around 20 people attended the each. Additional LWG meetings will be necessary to spatially refine and update the county's resource concerns. The office is continuing to survey and collection information regarding resource concerns and desired outcomes from producers within the county.

#### **Local Working Group Top Identified Concerns**

- 1) Inadequate Livestock Water
- 2) Invasive & Noxious Weeds
- 3) Next Generation of Farmers and Ranchers.
- 4) Rangeland Degradation
- 5) Declining Populations & Bigger Operations

#### Inadequate Livestock Water and Rangeland Degradation

The LWG identified "Inadequate Livestock Water Quantity, Quality, and Distribution" as the most prevalent existing resource concern in the county. This concern was highlighted because livestock water developments are needed to facilitate regenerative grazing management and properly utilize grazing land (improve ranch profitability). The lack of wells, solar pumps, livestock water pipeline systems, and the increasing number of failing or unreliable stock water pits/reservoirs are the main contributing factors to this resource concern in the county.

Without reliable livestock water distributed across a grazing unit, grazing rotations and proper control of forage utilization by grazing animals is very limited. Poor control over livestock utilization often contributes to over-grazing near reliable water sources, under-grazing away from reliable water, and long grazing periods that do not allow time for plant recovery. Repeated patch grazing without adequate plant recovery has contributed

#### **Local Working Group Identified Grazing Land Activities:**

Improving Rangeland Health  
Designing Planned Grazing Rotations  
Developing & Distributing Livestock Water  
Installing Cross-Fencing/Controls Methods  
Reducing Weed Pressure

to declines in rangeland health, plant community composition, and productivity across the county. Consequently, rangeland degradation is a tightly associated concern and was also identified as a top priority in the county by the LWG. Though rangeland degradation can encompass numerous NRCS coined resource concerns – it can be broadly categorized into: Degraded Plant Structure and Composition, Degraded Plant Productivity and Health, Soil Erosion, and Soil Organic Matter Depletion.

#### Analysis of Products and Services Needed

Conservation plans developed on grazing lands that include livestock water and prescribed grazing require thorough field inventories, analysis of existing geospatial resources, and one-on-one planning with the producer. Each conservation plan must be uniquely adapted to the grazing unit to be successful.



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The Field Office may request assistance from the Montana Bureau of Mines and Geology to determine feasibility of wells and from NRCS engineers for assistance in planning and designing livestock pipeline systems, pipeline extensions, and solar and electrical pumps.

Education events, workshops, and grazing schools may create interest and facilitate success in addressing rangeland related resource concerns. Existing EQIP applications, producer surveys, and input gathered from the LWG can be used to focus conservation efforts within the county. Additional public announcements seeking interest in the county may also be used.

### Statement of Desired Future Condition

NRCS has a long history of addressing inadequate livestock water and rangeland resource concerns in Montana. These are very common and widespread resource concerns across a water-limited rangeland-dominated state, so much so, that the agency resources are often spread thin in the attempt to address them all. Ranch resources are often also limited, resulting in conservation plans being implemented or improved upon in stages as financial resources allow and grazing management evolves.

With this in mind, to use the agency's resources the most effectively in the county – efforts need to be focused and strategic. Mapping LWG input, analyzing survey responses and existing EQIP applications, and meeting with producers have shown interest in addressing these resource concerns may provide a starting point to narrowing down priorities within the county.

Long Term Goal: McCone County producers, seeking NRCS technical or financial assistance, have livestock water, adequate in quality, quantity, and distribution to implement a grazing rotation that improves rangeland health, productivity, and resilience; ultimately making the operation more profitable and economically viable, even through droughts and natural disasters.

Outcomes may be measured through utilization mapping and the rangeland monitoring techniques best suited for each unique grazing unit. Often this may include permanent photo points, data from line-point intercept transects to document ground cover, and ground cover photos. Comparative baseline data will be collected during the inventory phase.

### Invasive and Noxious Weeds

The LWG's second-most identified resource concern within the county pertained to invasive and noxious weeds, which falls under the NRCS coined "Plant Pest Pressure" resource concern. On rangeland, in many circumstances, this resource concern may be closely associated with or a result of inadequate livestock water and degraded rangeland health. However, weeds were highlighted as an issue on all land uses within the county.

Further investigations need to occur in order refine the location, abundance, and possible causes of invasive and noxious weeds in the county. To date, we know that Canada thistle is common in drainages, disturbed sites, and cropland throughout the county. More localized areas of spotted knapweed, leafy spurge, and houndstongue have been identified by the McCone County Weed District and others. Spotted knapweed is known to grow along both sides of Highway 13 from Wheatland Road south for four or five miles. Russian knapweed occurs in the northeast corner of the county; and houndstongue and leafy spurge are invading from the east. Baby's breath infests large areas of land in the Vida area. Field bindweed is a very common cropland weed that is also found in the road ditches throughout the county. Additionally, salt cedar is common along the Missouri River and the shorelines of Fort Peck Lake. Russian

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olive is increasingly common along many intermittent and perennial drainages, such as Horse Creek and the Redwater River.

In addition to the weeds themselves, during the LWG meetings, many producers were concerned about increasing prevalence of herbicide resistance to glyphosate (e.g. Roundup).

### State Listed Noxious Weeds:

- Houndstongue (*Cynoglossum officinale*)
- Canada thistle (*Cirsium arvense*)
- Field bindweed (*Convolvulus arvensis*)
- Spotted Knapweed (*Centaurea stoebe*, *C. maculosa*)
- Russian Knapweed (*Acroptilon repens*, *Rhaponticum repens*)
- Leafy spurge (*Euphorbia esula*)
- Salt Cedar (*Tamarix* spp.)

### State Listed Regulated Plants:

- Russian Olive (*Elaeagnus angustifolia*)
- Cheatgrass (*Bromus tectorum*)

### Other Invasive, Increasing, or Introduced Species:

- Narrowleaf hawksbeard (*Crepis tectorum*)
- Field (Japanese) Brome (*Bromus arvensis*)
- Fringed sage wort (*Artemis frigida*)
- Baby's breath (*Gypsophila paniculata*)

### Analysis of Products and Services Needed

Further investigations are needed to determine where each species of weed is prevalent in the county. Weeds are generally a symptom of a larger problem. Measures should be taken to identify and resolve problems that may be contributing to the weed's abundance in the area. Conservation plans developed to address noxious and invasive weeds through chemical or biological control methods should have field confirmations and GPS location data. If the targeted species is a result of historic or current management, such as field brome or fringed sage wort on degraded rangeland, more in-depth field inventory and planning may be necessary to effectively reduce abundance of the plant long-term. In many cases, abundance of fringed sage wort is related to rangeland health and best addressed through grazing management for long term effectiveness.

The Field Office may request assistance from the McCone County Weed District and other partners to identify focus areas, conduct field inventories, and create conservation plans.

Education events may promote interest and facilitate success in controlling noxious and invasive weeds, especially where degraded rangeland, cropland, or pastureland may be a major contributing factor to the plant's abundance.

### Statement of Desired Future Condition

**Long Term Goal:** McCone County producers have the tools and knowledge required to effectively control and manage against invasive and noxious weeds. Natural areas have robust, diverse plant communities that resist weed invasion. Outcomes may be measured weed mapping and monitoring.

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### Farm Viability/Profitability: Soil Erosion, Soil Health, & Associated Resource Concerns on Annual Cropland

Nation-wide, improving soil health has become a focus of the agency due to its extreme importance in maintaining economically viable, productive, & resilient farms. It is increasingly recognized that soils contain complex networks of living organisms, that when intentionally promoted through management, can substantially improve the health and productivity of the soil. Cropland resource concerns, soil health and soil erosion, are currently to be the most treated concerns through existing conservation plans/contracts in the county.

Locally, common goals encountered when working with farmers, all of which can be associated with soil health, include:

- Increased yields and/or increased farm profitability
- Reduced weed pressure
- Reduced inputs and production costs associated with field operations, fertilizer, & chemicals
- Increased efficiency of fertilizers and chemicals
- Reduced soil erosion, notably, gully erosion within minimum till or no-till cropping systems.

Associated NRCS Resource Concerns include:

- Soil Quality: Aggregate Instability, Compaction, Organic Matter Depletion, & Soil Organism Habitat Loss or Degradation.
- Soil Erosion: Wind, Sheet & Rill Erosion, Gully Erosion.
- Degraded Plant Condition: Plant Productivity and Health
- Plant Pest Pressure
- Field Pesticide Loss & Field Nutrient Loss
- Sediment Transported to Surface Waters

Though generalizations can be made, no definite statistics exist within the county to quantify different types of farming operations. For example, the percent of operations that are no-till, minimum till, or use conventional tillage or the percent of land that is continuously cropped vs the percent within a fallow rotation is unknown.

Within recent decades, trends observed within the county indicate a move away from conventional tillage toward large minimum-till and no-till equipment. Precision agriculture technology is being adopted to

Soil is a living and life-giving natural resource.

As world population and food production demands rise, keeping our soil healthy and productive is of paramount importance. By farming using soil health principles and systems that include no-till, cover cropping and diverse rotations, more and more farmers are increasing their soil's organic matter and improving microbial activity. As a result, farmers are sequestering more carbon, increasing water infiltration, improving wildlife and pollinator habitat—all while harvesting better profits and often better yields.

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/>



#### Local Working Group

##### Identified Soil Related Concerns:

- Degraded Soil Health
- Soil Erosion
- Soil Acidity
- Poor Infiltration

## SOIL HEALTH PRINCIPLES

1. Keep the soil covered
2. Minimize soil disturbance
3. Increase crop diversity
4. Keep living roots in the soil
5. Integrate livestock

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varying degrees of specificity and application. Like the rest of the nation, with advancements in technology, agricultural operations in McCone County have, in general, become larger and more specialized.

Despite the adoption of no-till and minimum till farming, soil quality degradation, and to a lesser extent, soil erosion, remain widespread concerns on cropland within the county. This has to do, in part, with its use as only a stand-alone conservation practice instead of as part of a comprehensive management system that intentionally promotes beneficial soil microbiology and growing soil organic matter levels. A lack of crop diversity, fallow practices, limited crop rotations and, in some cases, unsuitability of cropland for farming contribute to the ongoing degradation of soil resources within the county. Depletion of soil organic matter, soil structure, and soil biology on cropland has led to reduction in water infiltration and a need for higher inputs.

Gully erosion on cropland is an increasing problem as larger machinery has become commonplace; waterways that were once farmed around are now farmed through and the tillage that temporarily disguised the erosion problem, by filling in the gullies, is no longer being used.

Additionally, recent concerns of increasing acidity in the top few inches of soil on no-till fields have also come to light. Scientists have determined the problem is rooted in years of consistently applying high rates of nitrogen fertilizer, not exclusively the no-till practice itself. For example, in order to meet high yield goals, if large amounts of ammonium-based fertilizers (e.g. urea) are applied over many years, this may lead to nutrient saturation. When these fertilizers are converted to plant available N-nitrate by soil microbes hydrogen ions ( $H^+$ ) are released, which lowers soil pH (pH is a measure of the amount of  $H^+$  ions in the soil). This is especially true if nitrate is not taken up by plant roots (Bouman et al. 1995). Nature has a mechanism to balance this - when plant roots take up nitrate, they release an  $OH^-$  ion that has a neutralizing effect on the  $H^+$  ions. However, with consistently high rates of fertilizer use the system becomes overwhelmed. Plants can only take up so much nitrogen in space and time.

According to MSU research even the *recommended* (MSU – Fertilizer Guidelines for Montana Crops) nitrogen rates in continuous wheat systems dropped pH from 7.3 to 6.3 over 14 years in the top 4 inches of soil (Jones 2019).

In addition, fallow periods offer no opportunity for plants to take up nitrogen and release neutralizing  $OH^-$  ions. Fallow does create an opportunity in a wet year for nitrate leaching, which will contribute to lowering soil pH. Also, without plant/crop diversity there is no opportunity to *not* use nitrogen fertilizer. Pulse crops, among many other benefits, offer a break from applying nitrogen. If soil acidity is not managed even pulses may no longer be an option as nitrogen fixing bacteria nodulate poorly when pH falls below 6, and will not nodulate at all when pH is in the 4 – 5 range. Education on this topic, diverse crop rotations and field specific nutrient management will be very important in overcoming/preventing this issue within the county.

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rotations and field specific nutrient management will be very important in overcoming/preventing this issue within the county.

There remains a strong need and opportunity within the county to continue to help farmers improve upon their management strategies and strive towards not only sustainable, but regenerative farming practices. Improving the county's soil health, and therefore farm productivity/profitability, may ultimately be part of the solution to the county's declining population trends, and may encourage and help local youth stay involved in agriculture. This is not to indicate that all changes will be easy, for example, adding diversity and integrating livestock into crop rotations may be met with large hurdles, (such as marketing, equipment, and infrastructure) on many operations.

### Analysis of Products and Services Needed

Though farming operations can be generalized into categories, each operation is unique. Conservation plans must be developed with this in mind to be successful. More investigations are needed to focus conservation efforts in relation to these concerns in the county. Efforts may be taken to help participants that are already implementing no-till systems to a higher level of management, ideally one that is regenerative in nature. Other efforts may promote operations that use minimum till or tillage-based operations to adopt no-till or promote continuous cropping over fallow.

Education events will be pivotal in the acceptability and long-term success of these efforts. Managing for soil health generally requires a complete paradigm shift that comes with numerous questions to be answered. The 'why' and 'how' questions need to be answered, as with any change, the devil is in the details – so those details need to be laid out. Consequently, farm demonstrations/visits and producer panels are often effective in relaying the message.

### Statement of Desired Future Condition

Long Term Goal: Regenerative farming practices are commonplace ("the norm") in the county. Farm profitability increases, farms become resilient against drought and other natural disasters, and population in the county grows. Young people see a bright future in agriculture and want to remain on the farm.

Given the complexity of the landscape, farming operations, and these resource concerns – this may be a long transition. The office will strive to increase the adoption of the five soil health principles: 1) year-round soil armor, 2) minimal to no soil disturbance, 3) plant diversity, 4) continual live plant/root, and 5) livestock integration. In the next two decades, we would like to see a fifty percent or more of cropland in the county managed with a systems approach that is working with nature and includes three of the five soil health principles.



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## Resource Concerns on Perennial Hayland and Introduced Pasture

Across the county, many monocultures or low diversity stands of introduced grass are being used for haying and grazing. It is typical to find stands with reduced forage production, poor nutrient cycling, degraded soil health, and increasing weed pressure. Typically these strands are crested wheatgrass, smooth brome, or decadent stands of expired Conservation Reserve Program (CRP) land, but issues can also develop on hayland that is annually hayed without nutrient inputs in the form of grazing, feeding the hay on the hayland, or fertilization. Some fields of introduced grass are in the middle of or mixed with native range, or in such places that they can't be grazed during peak palatability – this limits proper use of the stand and can lead to degradation. Furthermore, many of stands that came into the drought of 2017 in poor health, have still not recovered – field brome and other invasive or undesirable species have become a problem.

### Hay and Pastureland Resource Concerns:

- Degraded Plant Production & Health
- Degraded Plant Structure & Composition
- Plant Pest Pressure
- Soil Erosion
- Soil Organic Matter Depletion
- Soil Organism Habitat Loss/ Degradation

The Circle Office has fulfilled a growing number of requests pertaining to hayland and pasture renovations – some of which pertain to re-seeding and others that may just need prescribed management. When re-seeding, producers are seeking diverse seed mixes that be can be used for multiple uses (multi-season grazing or haying as needed).

It seems apparent that this will remain a prevalent concern in the county, especially on hayland, where the nutrients are continually exported off the field. Feeding livestock on the hayland during the winter, recycles the nutrients back into the soil, but requires livestock water and sometimes, fencing.

The infrastructure (fence and livestock water) needed to manage grazing on pastureland also remains a need within the county. This is especially true for areas that contain non-contiguous grazing units. In isolated units, smaller numbers of livestock are grazed for a longer time, this requires more infrastructure to facilitate a grazing rotation.

### Analysis of Products and Services Needed

In many cases, nutrient cycling and plant composition changes are both necessary and take time. Further research/data compilation needs to be done to identify methods that successfully 1) improve nutrient cycling and 2) renovate the monoculture or replace the monoculture with a diverse plant community that fits the grazing system. Aside from conventional herbicide and/or tillage techniques, innovative ways renovating degraded stands of introduced grass are being used across the state and nation. Compiling this data into a technical reference would be a good way to give producers a list of options to consider.

Conservation plans written on perennial hayland or grazed pasture should include management that promotes the long-term health and use of the stand.

### Statement of Desired Future Condition

**Long Term Goal:** Overtime, unhealthy and unproductive stands of introduced grass in the county are renovated either through prescribed management or re-seeding and management to become productive, ecologically functioning, and profitable to the operation.

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### Wildlife Habitat

Pollinators: Pollinators are a crucial part of healthy agricultural and natural landscapes. Conservation practices that create new habitat, improve upon existing habitat, and reduce negative impacts to pollinators remain a need within the county.

Grassland birds: McCone county provides critical habitat for declining grassland birds such as the Chesnut-collared longspur, McCown's longspur, Sprague's pipit, Baird's sparrow, the Long-billed curlew, and many others. Intact native landscapes that contain a variety of herbaceous structure and plant communities is necessary to provide habitat niches for the large variety of these grassland birds. Conservation work to improve habitat quality remains a need in the county. This may include grazing management strategies that improve habitat quality and structure, reducing habitat fragmentation, reducing the spread of weeds and other invasive species, reducing the occurrence of unnatural perches and predator subsidies (e.g. abandoned buildings, abandoned fence, or other unnatural structures that create habitat for predators), and improving mesic, riparian, and wetland habitats.

Upland game birds: Turkeys, pheasants, partridge, and sage-grouse are present in the county. As previously mentioned, parts of McCone County are designated as core and general habitat for Greater Sage-grouse (*Centrocercus urophasianus*). It is vitally important for livestock producers in the west that sage-grouse populations are stable or increasing. There continues to be a strong interest in the Sage-Grouse Initiative within the county. As a result, NRCS plans to continue to work with producers to address threats and resource concerns that relate to sage-grouse.

Conservation efforts related pheasants, Hungarian partridge, and to a lesser degree sharp-tail grouse and turkeys, generally deal with improving winter cover, winter food resources, and habitat continuity/edge, as those are commonly the most limiting components on the landscape in McCone County. Maintaining healthy woody/shrubby draws and native rangeland will remain critical to improving habitat for turkeys and sharp-tail grouse.

Big Game: Mule deer, whitetail deer, antelope, and to a lesser degree, elk are present in the county. Winter cover/food, habitat continuity, riparian health, and healthy woody or shrubby draws are important, often limiting, habitat components for both deer species in the county. Native rangeland that provides quality winter forage and cover for antelope is also limiting in parts of the county, especially those dominated by cropland. Woven wire, or other wildlife unfriendly fences, hinder and limit antelope movement across the landscape.

Waterfowl: Several species of ducks and geese rely nest and raise their broods in McCone County. Habitat projects that promote nesting habitat remains a need in the county.

### Resource Concerns Pertaining to Riparian & Wetland Health

Montana's State Wildlife Action Plan identifies all stream, floodplain, riparian, and wetlands community types across the state as the "Community Types of Greatest Conservation Need". There is a clear obligation by the State Wildlife Action Plan, conservation groups, and local partners to use resources to implement conservation actions that provide direct benefit to riparian, wetland, and floodplain ecological function and health (MT FWP, 2015).

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### Resources Concerns on Irrigated Cropland

To date, very few of the producers that operate land along the Missouri River have been represented by the LWG or in producer surveys. Further efforts need to be made to include their input. Experience tells us that the resource concerns previously mentioned above on annual cropland are also present on irrigated cropland. Additionally, “Inefficient Irrigation Water Use” remains as a need to be treated.

### Human, Economic, and Social Considerations

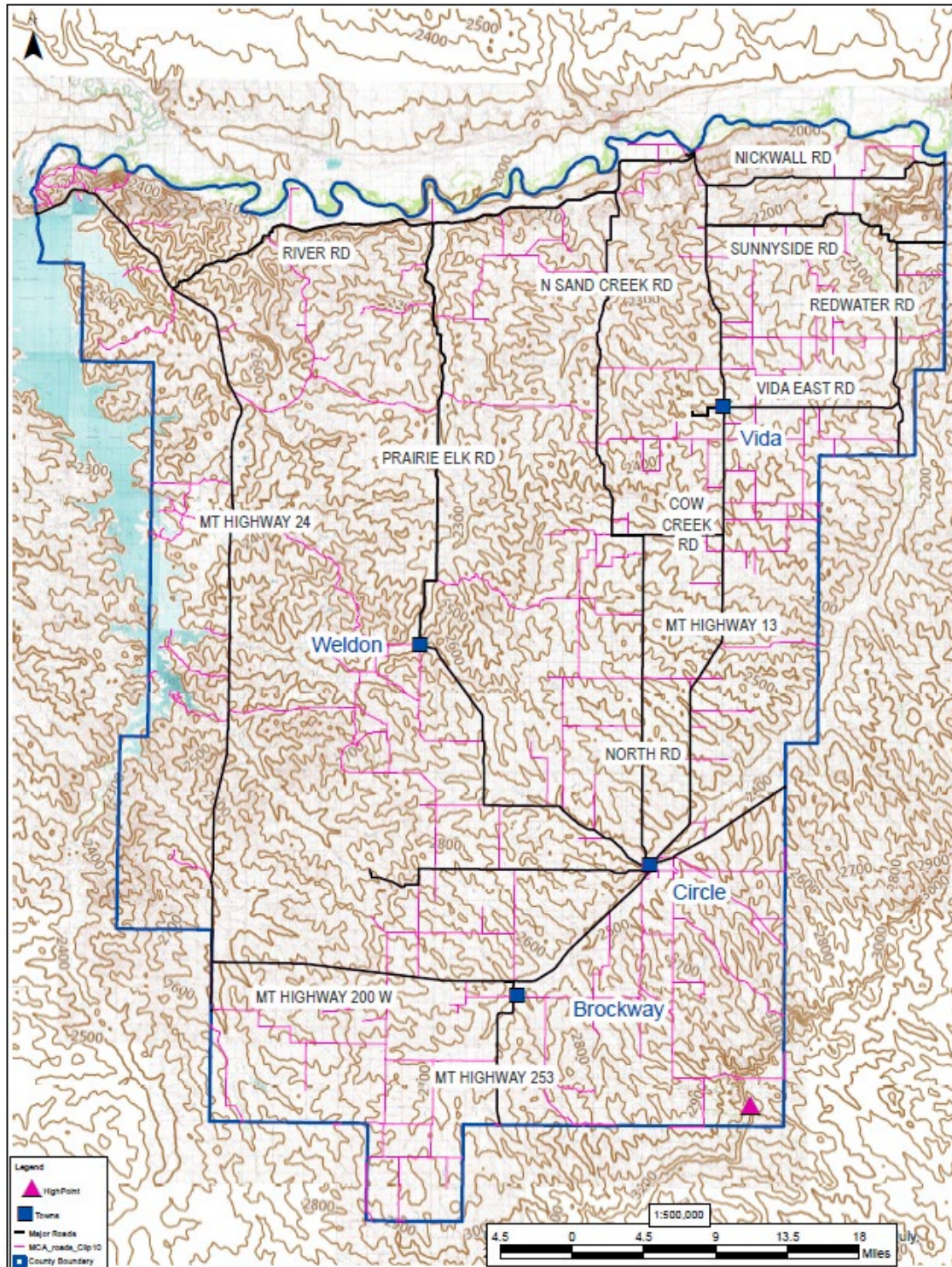
The LWG highlighted concerns about farm economics, a declining county population, and the ability for farms and ranches to be handed down to the next generation. When planning and delivering conservation programs, the agency should keep these considerations in mind at all times. Prioritization for focused efforts should reflect these concerns; for example – priority may be given to Beginning Farmer and Ranchers.



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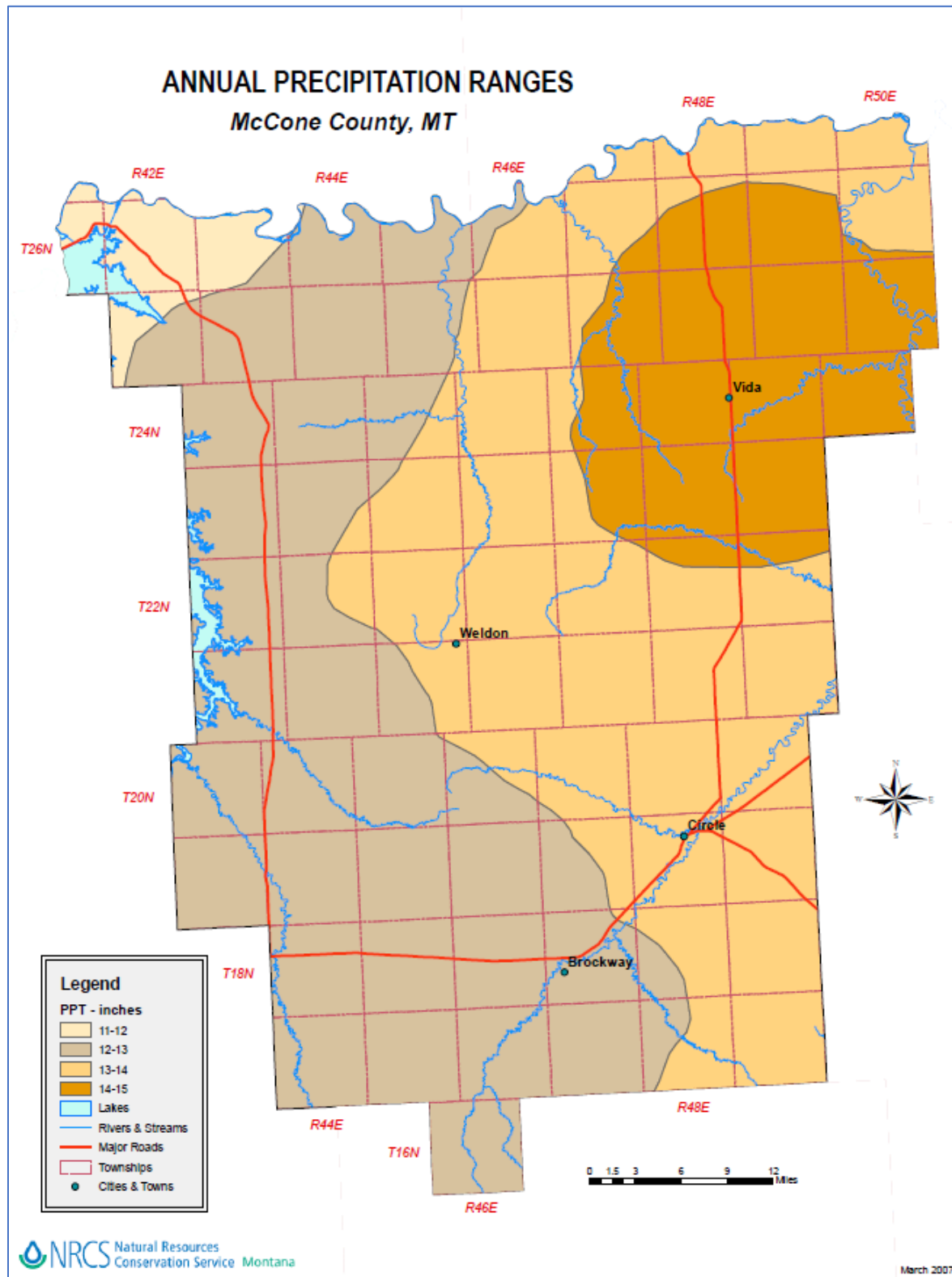
## APPENDIX A

### A-1 McCONE COUNTY



# USDA-NRCS Circle Field Office Long-Range Plan - 2020

## A-2 PRECIPITATION

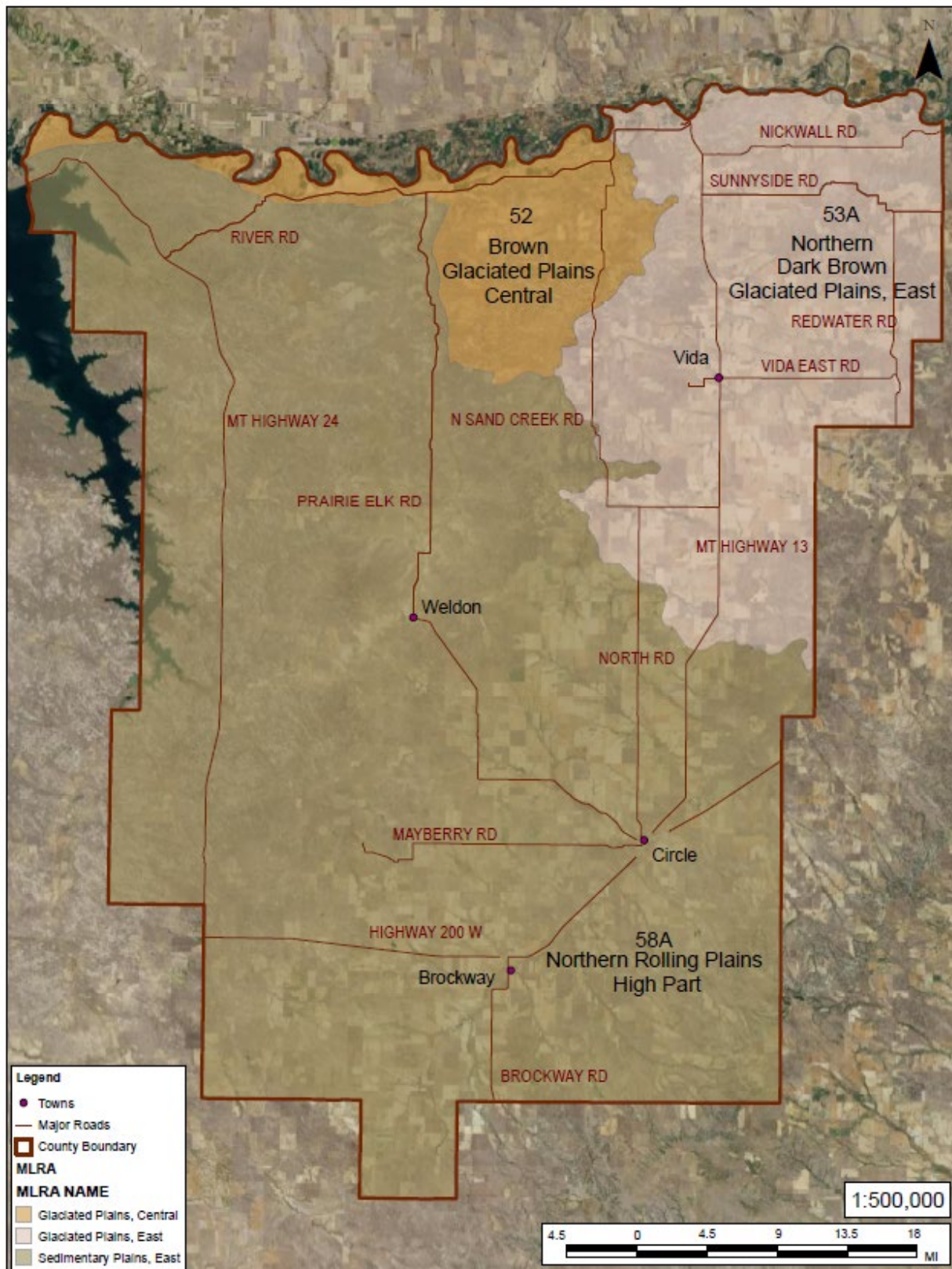






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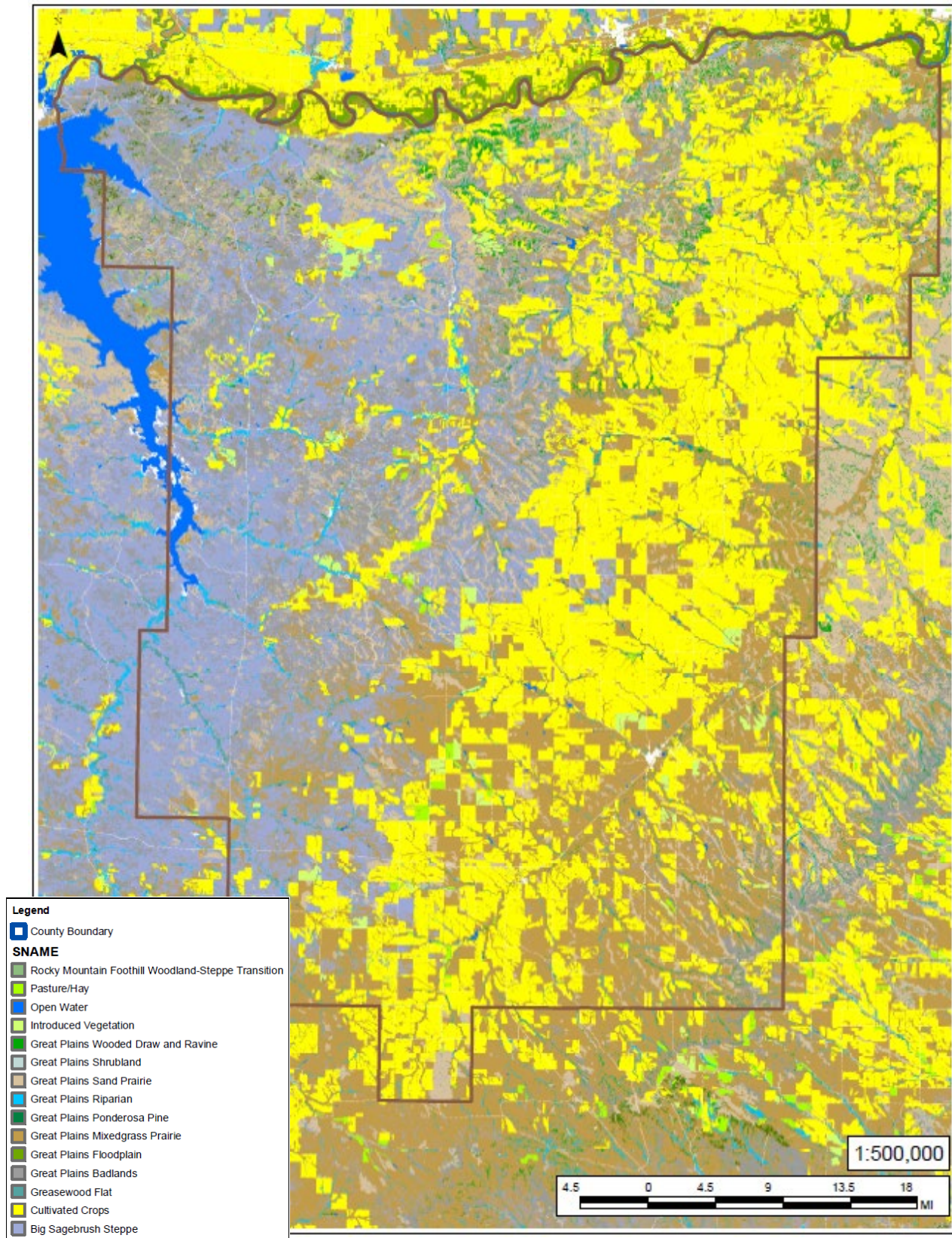
## A-4 MAJOR LAND RESOURCE AREAS





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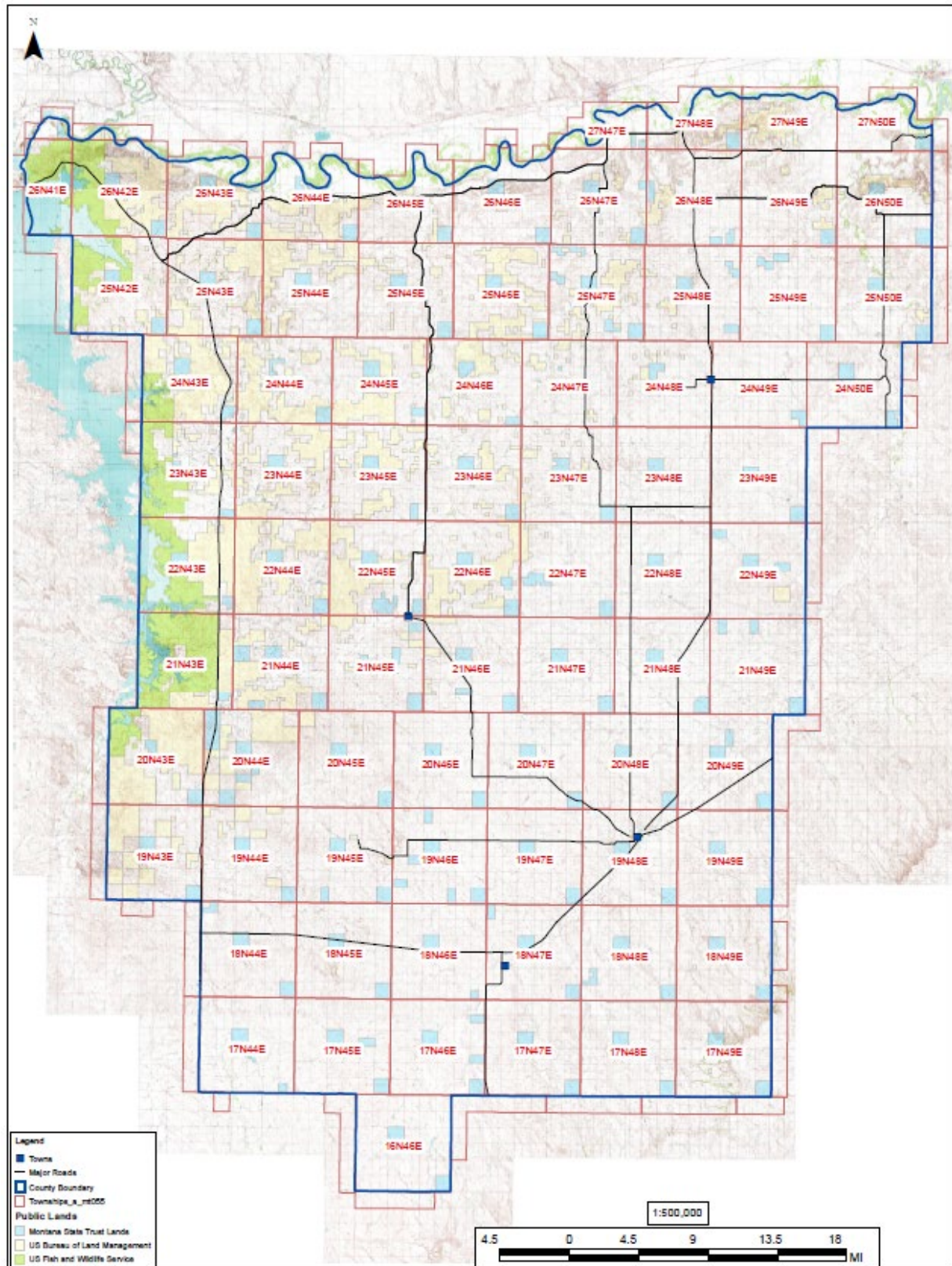
## A-5 LANDCOVER





# USDA-NRCS Circle Field Office Long-Range Plan - 2020

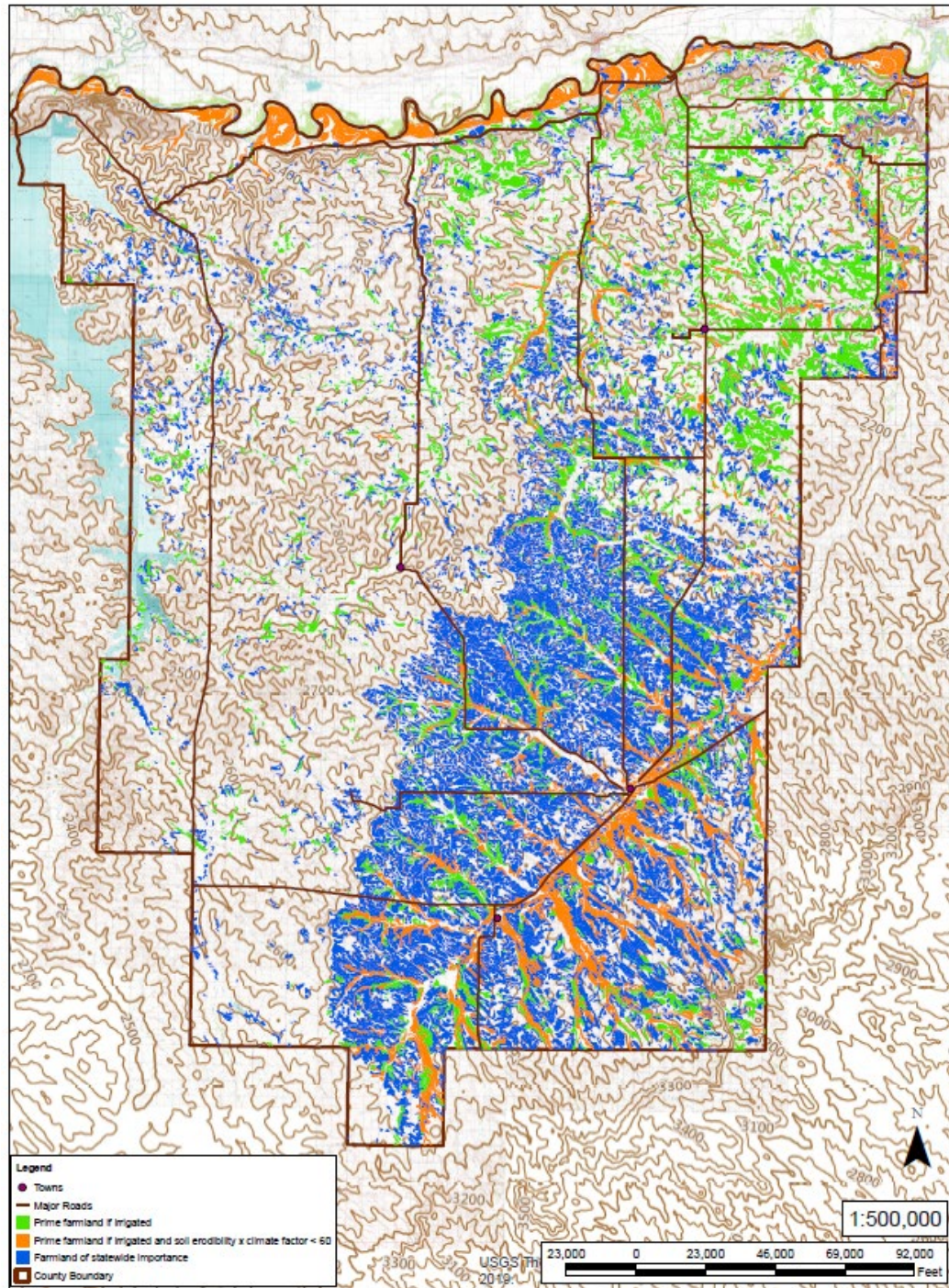
## A-6 OWNERSHIP





# USDA-NRCS Circle Field Office Long-Range Plan - 2020

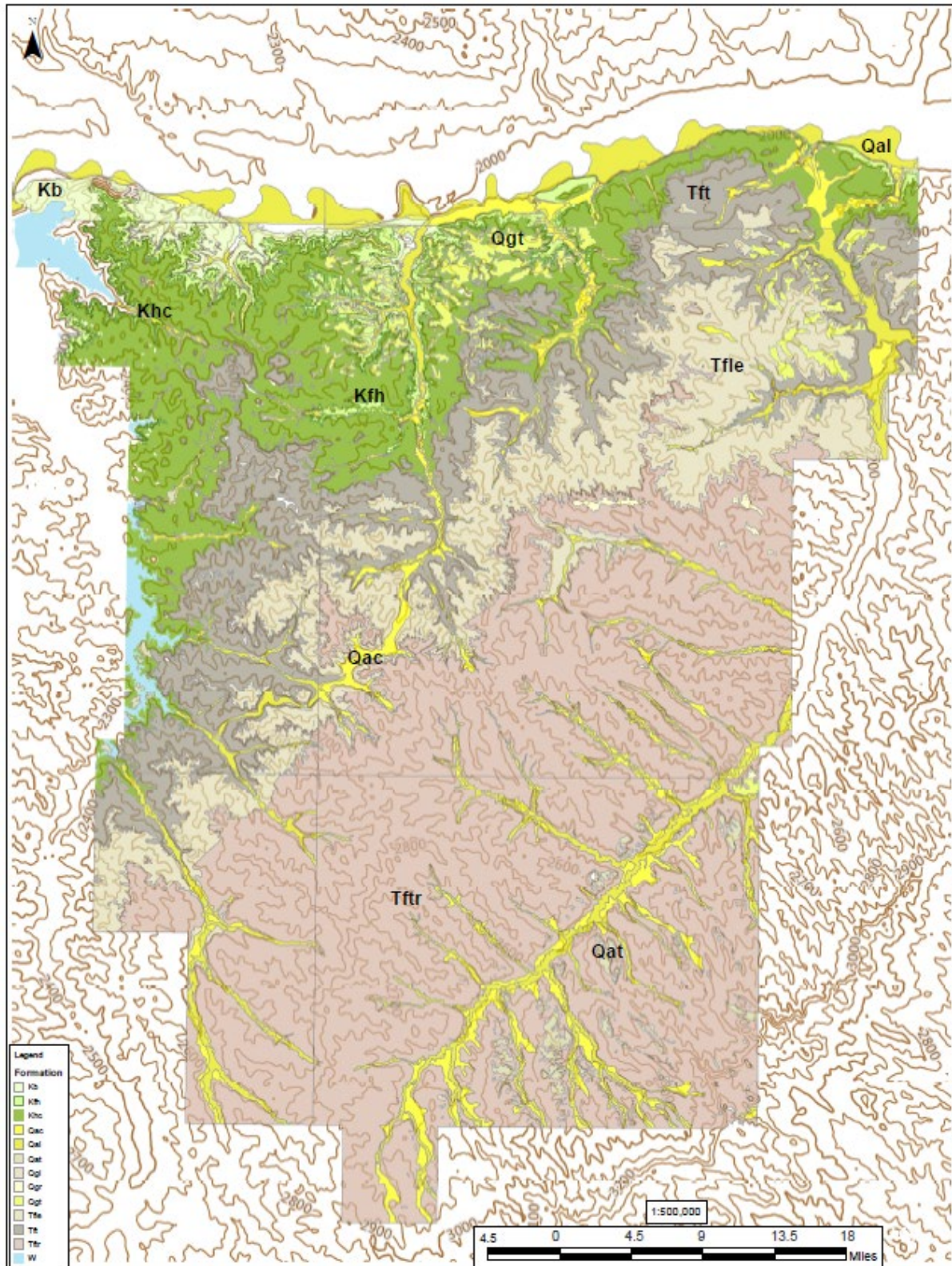
## A-7 SOILS





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## A-8 GEOLOGY



# USDA-NRCS Circle Field Office Long-Range Plan - 2020

## APPENDIX B

### B-1 ANIMAL SPECIES OF CONCERN

| Species    | Scientific Name                   | Common Name                 | Habitat                            |
|------------|-----------------------------------|-----------------------------|------------------------------------|
| Mammals    | <i>Corynorhinus townsendii</i>    | Townsend's Big-eared Bat    | Caves in forested habitats         |
|            | <i>Cynomys ludovicianus</i>       | Black-tailed Prairie Dog    | Grasslands                         |
|            | <i>Lasiurus borealis</i>          | Eastern Red Bat             | Riparian forest                    |
|            | <i>Lasiurus cinereus</i>          | Hoary Bat                   | Riparian and forest                |
|            | <i>Myotis lucifugus</i>           | Little Brown Myotis         | Generalist                         |
|            | <i>Myotis septentrionalis</i>     | Northern Myotis             | Riparian and mixed forest          |
|            | <i>Sorex merriami</i>             | Merriam's Shrew             | Sagebrush grassland                |
| Birds      | <i>Anthus spragueii</i>           | Sprague's Pipit             | Grasslands                         |
|            | <i>Aquila chrysaetos</i>          | Golden Eagle                | Grasslands                         |
|            | <i>Ardea herodias</i>             | Great Blue Heron            | Riparian forest                    |
|            | <i>Athene cunicularia</i>         | Burrowing Owl               | Grasslands                         |
|            | <i>Buteo regalis</i>              | Ferruginous Hawk            | Sagebrush grassland                |
|            | <i>Calcarius ornatus</i>          | Chestnut-collared Longspur  | Grasslands                         |
|            | <i>Catharus fuscescens</i>        | Veery                       | Riparian forest                    |
|            | <i>Centrocercus urophasianus</i>  | Greater Sage-Grouse         | Sagebrush                          |
|            | <i>Centronyx bairdii</i>          | Baird's Sparrow             | Grasslands                         |
|            | <i>Charadrius melodus</i>         | Piping Plover               | Prairie lakes and river shorelines |
|            | <i>Coccyzus erythrophthalmus</i>  | Black-billed Cuckoo         | Riparian forest                    |
|            | <i>Dolichonyx oryzivorus</i>      | Bobolink                    | Moist grasslands                   |
|            | <i>Hydroprogne caspia</i>         | Caspian Tern                | Large rivers, lakes                |
|            | <i>Lanius ludovicianus</i>        | Loggerhead Shrike           | Shrubland                          |
|            | <i>Melanerpes erythrocephalus</i> | Red-headed Woodpecker       | Riparian forest                    |
|            | <i>Numenius americanus</i>        | Long-billed Curlew          | Grasslands                         |
|            | <i>Rhynchophanes mccownii</i>     | McCown's Longspur           | Grasslands                         |
|            | <i>Spizella breweri</i>           | Brewer's Sparrow            | Sagebrush                          |
|            | <i>Sterna hirundo</i>             | Common Tern                 | Large rivers, lakes                |
|            | <i>Sternula antillarum</i>        | Least Tern                  | Large prairie rivers               |
|            | <i>Chelydra serpentina</i>        | Snapping Turtle             | Prairie rivers and streams         |
|            | <i>Heterodon nasicus</i>          | Plains Hog-nosed Snake      | Friable soils                      |
|            | <i>Phrynosoma hernandesi</i>      | Greater Short-horned Lizard | Sandy / gravelly soils             |
| Amphibians | <i>Anaxyrus cognatus</i>          | Great Plains Toad           | Wetlands, floodplain pools         |
| Fish       | <i>Chrosomus eos</i>              | Northern Redbelly Dace      | Small prairie rivers               |
|            | <i>Cycleptus elongatus</i>        | Blue Sucker                 | Large prairie rivers               |
|            | <i>Etheostoma exile</i>           | Iowa Darter                 | Small prairie rivers               |
|            | <i>Lepisosteus platostomus</i>    | Shortnose Gar               | Large prairie rivers               |
|            | <i>Macrhybopsis gelida</i>        | Sturgeon Chub               | Large prairie rivers               |
|            | <i>Macrhybopsis meeki</i>         | Sicklefin Chub              | Large prairie rivers               |
|            | <i>Margariscus nachtriebi</i>     | Northern Pearl Dace         | Small prairie streams              |
|            | <i>Polyodon spathula</i>          | Paddlefish                  | Large prairie rivers               |
|            | <i>Sander canadensis</i>          | Sauger                      | Large prairie rivers               |
|            | <i>Scaphirhynchus albus</i>       | Pallid Sturgeon             | Large prairie rivers               |



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## B-2 PIPING PLOVER SUMMER AND MIGRATORY RANGES

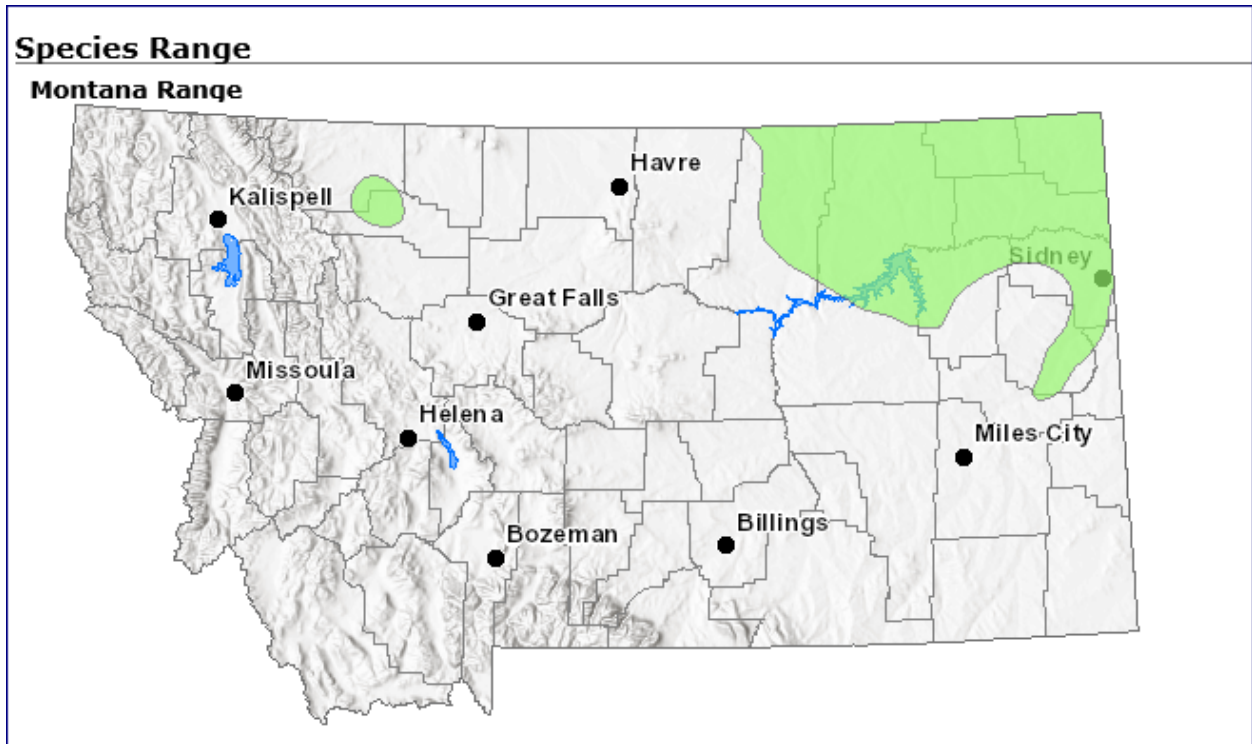


Figure 29. Piping Plover Summer Range Across Montana (MTNHP, 2020)

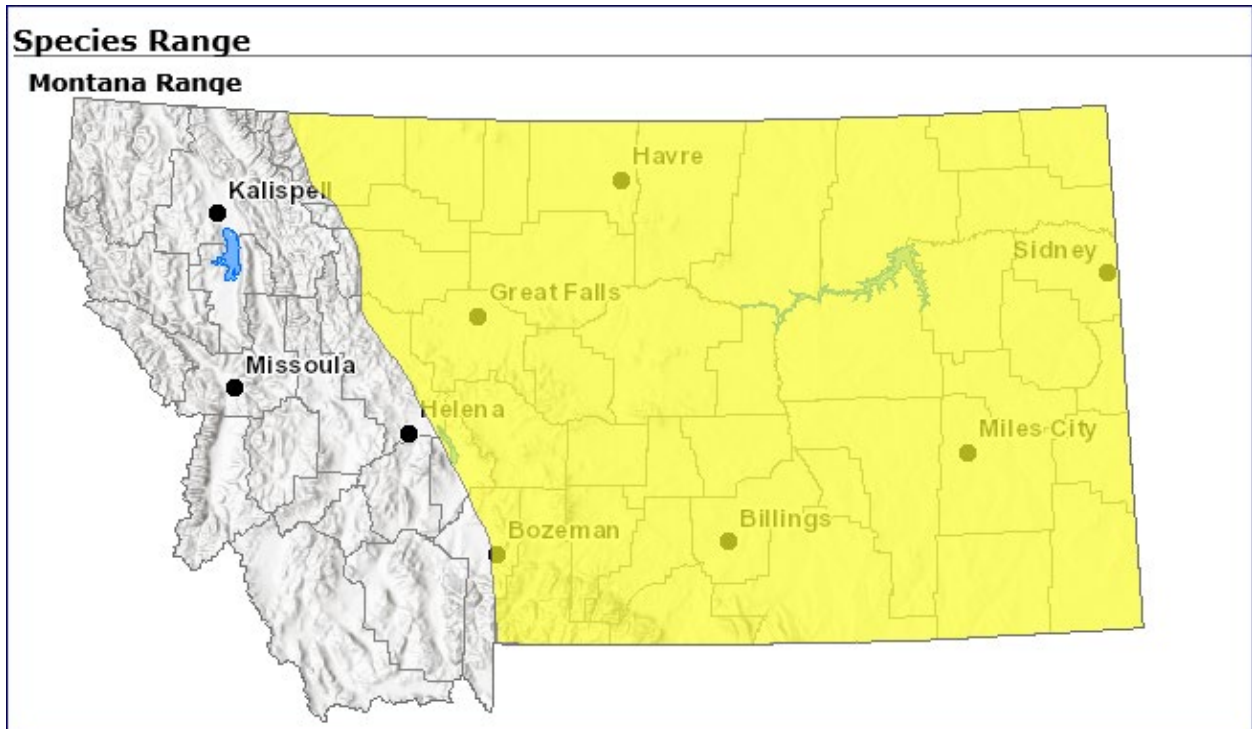


Figure 30. Piping Plover Migratory Range Through Montana (MTNHP, 2020).

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### B-3 INTERIOR LEAST TERN SUMMER AND MIGRATORY HABITAT

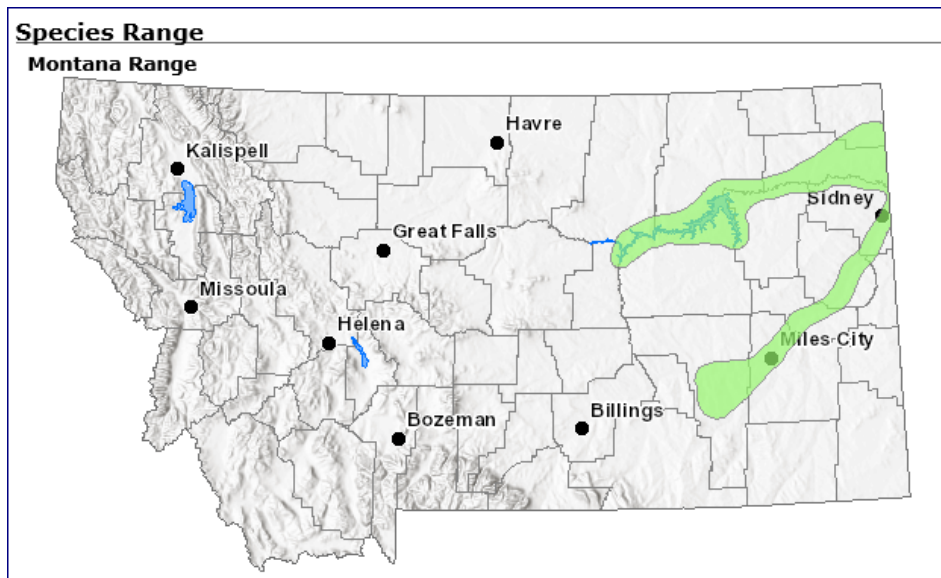


Figure 31. Interior Least Tern Summer Habitat in Montana.  
(MTNHP, 2020)

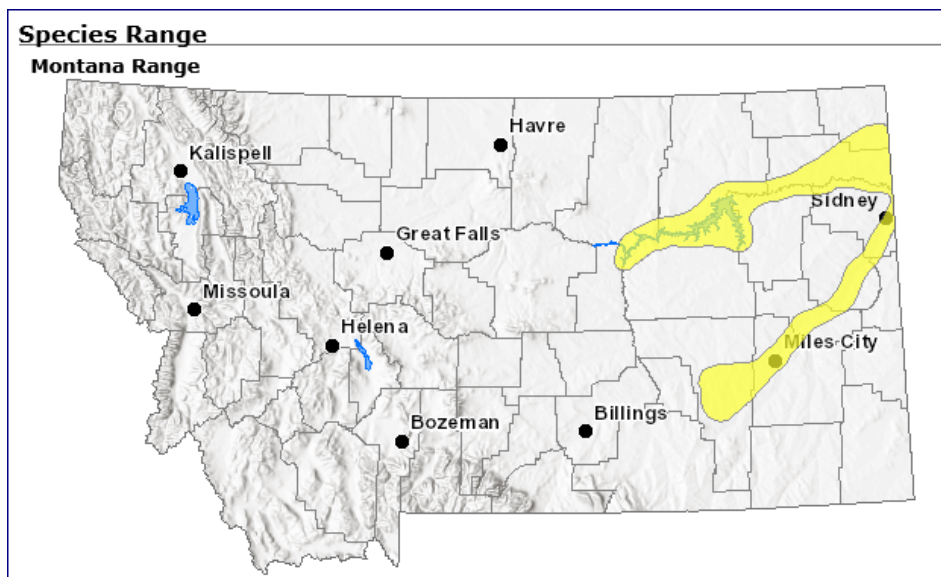


Figure 32. Interior Least Tern Migratory Habitat in Montana.  
(MTNHP, 2020)



## USDA-NRCS Circle Field Office Long-Range Plan - 2020

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