

# MONTANA Focused Conservation

## PARK COUNTY LONG RANGE PLAN 2019

### SECTION I. INTRODUCTION

**Vision.** Shared responsibility and commitment to local action achieves effective land stewardship.

**Mission.** To build alliances and strategically invest to effectively solve natural resource problems in Park County, Montana.

**Purpose.** While the Vision and Mission may not change appreciably, the goals, objectives, strategies, and tactics will evolve as we identify new challenges, understand partnership capabilities, and re-define priorities in the county.

**Time Frame.** This plan is envisioned to be relevant for approximately 5 years with annual updates completed as pertinent information is obtained.

**Contributors.** Thanks are extended for the many parties who assisted in the creation of this document including the Park Conservation District, the Shields River Watershed Group, the Upper Yellowstone Watershed Group, the Yellowstone River Conservation Districts Council, Montana State University Extension, the Park Cooperative Weed Management Area, Montana Fish, Wildlife and Parks, Montana Rural Water Systems, US Forest Service, and the Farm Service Agency.



FIGURE 1. SAINFOIN FIELD IN THE SHIELDS VALLEY

## SECTION II. NATURAL RESOURCE INVENTORY

### A. Humans

#### 1. History

Park County totals 1,800,472 acres and ranges in elevation from a low of approximately 4195 feet where the Yellowstone River leaves the county to 12,799 feet at Granite Peak, the highest point in Montana. The county population in 2017 was estimated at 16,001. Incorporated cities include Livingston and Clyde Park with Chamber of Commerce groups located in Livingston, Gardiner, and Cooke City. After years of acrimony, Park County was officially created by the Montana Territorial Legislature on February 23, 1887 and Livingston was named the county seat. A general map of the county is shown in Figure 11 of the Appendix.

Archaeological evidence shows human habitation in Park County for at least 13,000 years. The first Europeans exploring the area were Clark and his party in 1806 on their way back to St. Louis. Many fur trappers roamed the area for the next three decades before demand waned for pelts. Jim Bridger camped with the Crow near Emigrant during the winter of 1844 to 1845. Gold was discovered in Emigrant Gulch in 1863, at Jardine in 1866, and at Cooke City in 1870. All brought varying degrees of “rushes” but none were major, lasting ventures. Dredging and cyanide stamp mills led to environmental problems that are still in evidence today.

John Bozeman was an early pioneer who developed the Bozeman Trail in 1864 to shorten the distance between Fort Laramie and the gold fields of Western Montana. His death at the hands of Blackfeet Indians near Mission Creek in 1867 led to a military installation near the mouth of the Shields River to protect settlers.

Nelson Story brought 1000 head of longhorn cattle from Texas to the Shields Valley in 1866 with the intent of supplying miners further west. Half of the cattle were lost to Native Americans but Mr. Story persevered with agricultural and business interests in the area.

In 1868 a treaty with the Crow led to an Indian Agency being established on the Crow Reservation near Mission Creek. In 1882 the Crow Reservation lands in Park County were ceded by the tribe to the United States.

In 1870 Dr. Andrew Hunter first developed the hot springs bearing his name near Springdale in 1873. It was a prominent cultural and health destination in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries but the facility (Figure 2) was destroyed by fire in 1932 and, after a brief and modest renaissance from 1948 to 1974, the site is now abandoned.



**FIGURE 2. THE DAKOTA HOTEL NEAR HUNTER'S HOT SPRINGS IN THE EARLY 20TH CENTURY.**

Yellowstone National Park (YNP) was created in 1872 but it took the Northern Pacific Railroad's expansion into Montana to lead to significant development of Park County. The railroad arrived at the site of Livingston (named for Northern Pacific Railroad Director Crawford Livingston) in 1882 with a National Park branch completed in 1883. This led to rapid growth of the county as the route from Livingston to Cinnabar and later to Gardiner was the only ready access to YNP. The population jumped from about 200 people in 1880 to 6,900 in 1890. Livingston became a railroad center for people travelling to YNP. The rail center also serviced trains before they travelled over the Bozeman Pass to the west.

Several sites in the county produced coal and coke for the smelters of the Anaconda Copper Mining Company. Remnants of the coke ovens can still be seen at Cokedale and the site of Aldridge just north of YNP. At the height of production in 1901 there were 500 men shipping out 650 train cars of coke per day from the Aldridge operation. Mismanagement led to its closure in 1910.

Agriculture and tourism/recreation are currently the leading economic drivers in Park County.

## 2. Land Cover/Land Use

The following table lists the land cover/use for the entire county (Headwaters Economics):

Land Cover/Use, 2006	Acres	Percent of Total
Forest	648,170 acres	36%
Grassland	702,184 acres	39%
Shrubland	234,061 acres	13%
Mixed Cropland	162,042 acres	9%
Urban	989 acres	0.1%
Other	12,110 acres	0.7%

This table separates the land cover/use for the farmland in the county (Headwaters Economics):

Land Use of Farms, 2012	Acres	Percent of Total
Cropland	110,059	14.2%
Woodland	110,412	14.3%
Land in Farmsteads/Buildings	15,895	2.1%
Pasture and Rangeland	537,691	69.5%

## 3. Land Ownership (Headwaters Economics, 2016)

Ownership	Acres	Percent of Total
Private Lands	803,459 acres	44.6%
Conservation Easements	83,398 acres	4.6% (part of private lands)
USFS	854,959 acres	47.5%
BLM	8,228 acres	0.5%
National Park Service	94,508 acres	5.2%
State Trust Lands	33,236 acres	1.8%
Other State Lands	6,050 acres	0.3%

More than half of the county is public land and much of that is forested. A map showing public land is shown in Figure 12 in the Appendix.

#### 4. Land Cover and Land Use Combined

Park County Population, Age, Gender, and Ethnicity Statistics (Headwaters Economics):

	2010	2017
Population	15,752	16,001
Total Female		8,007
Total Male		7,994
Median Age	44.6	46.4
Under 18	3,168 (20.1%)	3,031 (18.9%)
18-34	2,643 (16.8%)	2,813 (17.6%)
35-44	2,148 (13.6%)	1,899 (11.9%)
45-64	5,350 (34.0%)	5,028 (31.4%)
65 and over	2,443 (15.5%)	3,230 (20.2%)
Hispanic or Latino		436 (2.7%)
White alone		15,026 (93.9%)
Black alone		46 (0.3%)
American Indian alone		93 (0.6%)
Asian alone		19 (0.1%)
Native Hawaii/Pac Island		12 (0.1%)
Two or more races		369 (2.3%)

Park County's population is growing slowly overall and the average age is increasing with retiree numbers increasing substantially in recent years. Ethnic diversity is limited in the county but gender numbers are nearly the same.

#### 5. Census and Social Data

Income and Educational Comparison of Park County to Montana as a whole (Headwaters Economics 2017):

	Park County	State of Montana
Per Capita Income	\$29,181	\$28,706
Household Income	\$44,920	\$50,801
People Below Poverty	13.4%	14.4%
No High School Degree	4.3%	7.0%
High School Graduate	95.7%	93.0%
Associate's Degree	5.8%	8.8%
Bachelor's Degree	34.1%	30.7%
Graduate or Professional	11.0%	10.1%

You can see that Park County is generally well educated but the household income is not high. The poverty level is significant. There is a defined Food Desert in Park County that extends from central Livingston to the northeast, following the north side of the Yellowstone River for several miles (see Figure 13 in the Appendix).

## 6. Number, Types, and Size of Farms

Number and Size of Farms in 2007 and 2012 (Montana Agricultural Statistics, 2018):

	2007	2012
Number of Farms	535	564
Land in Farms	762,753 acres	774,057 acres
Average Size of Farms	1,426 acres	1,372 acres

Types of Farms (Headwaters Economics, 2012):

All Farms, 2012	564
Oilseed & Grain Farming	23
Vegetable and Melon Farming	8
Fruit and Nut Tree Farming	0
Greenhouse, Nursery, etc.	6
Other Crop Farming	121
Beef Cattle Ranch & Farm	178
Cattle Feedlots	1
Dairy Cattle & Milk Production	4
Hog and Pig Farming	7
Poultry & Egg Production	5
Sheep & Goat Farming	20
Animal Aquaculture & Other Animal Production	191

Park County is a popular location for apiaries in the summer. A map of apiary sites is shown in Figure 14 in the Appendix.

Farm Production in 2016 and 2017 (Montana Agricultural Statistics, 2018):

Commodity	2016	2017
Winter Wheat Harvested	3,500 acres at 47.1 bushels per acre	2,700 acres at 39.6 bushels per acre
Spring Wheat Harvested	1,800 acres at 46.7 bushels per acre	None reported
Barley Harvested	4,800 acres at 66.0 bushels per acre	4,700 acres at 61.3 bushels per acre
Alfalfa Harvested	32,000 acres at 2.65 tons per acre	37,000 acres at 2.4 tons per acre
Other Hay Harvested	7,000 acres at 1.65 tons per acre	10,000 acres at 1.95 tons per acre
Cattle and Calves	44,500 total	44,500 total
Milk Cows/Heifers that Calved	100 total	100 total
All Sheep and Lambs	2,500 total	2,500 total

Park County is limited by its short growing season and reduced growing degree days. Wheat and barley are mostly grown in the Shields Valley and it is not uncommon for harvesting to be completed in December. Many hay fields yield only one harvest per year with a second harvest influenced by increasing elk numbers. Paradise Valley is predominantly a beef cattle/hay production model with some grain grown during renovation years. There are two small dairies

in Paradise Valley. In the early 20<sup>th</sup> century many more sheep were raised (135,000 sheep and lambs were tallied in 1935).

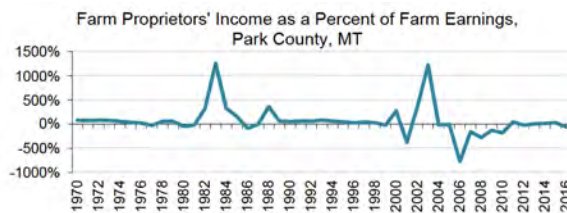
Farm Income in 2016 (Montana Agricultural Statistics, 2018):

Category	Amount in Dollars
Cash Receipts of Livestock and Products	\$22,103,000
Cash Receipts of Crops	\$13,748,000
Other Farm Income	\$9,012,000
Government Payments	\$453,000
Gross Farm Income	\$44,863,000
Production Expenses	\$50,834,000
Realized Net Farm Income	-\$5,971,000

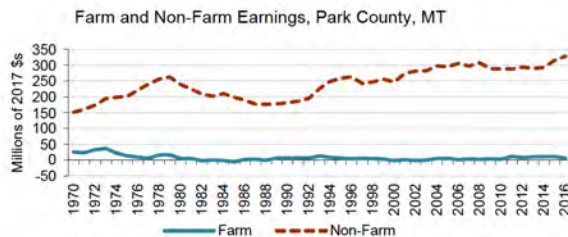
Income from farm labor has been declining as shown in the following graph (Headwaters Economics):

The following graphs (Headwaters Economics) show that agricultural income in Park County has become less sustaining with more income derived from off-farm sources. This could mean that agriculture is becoming less profitable or more wealthy landowners are in the county who earn their living in other ventures.

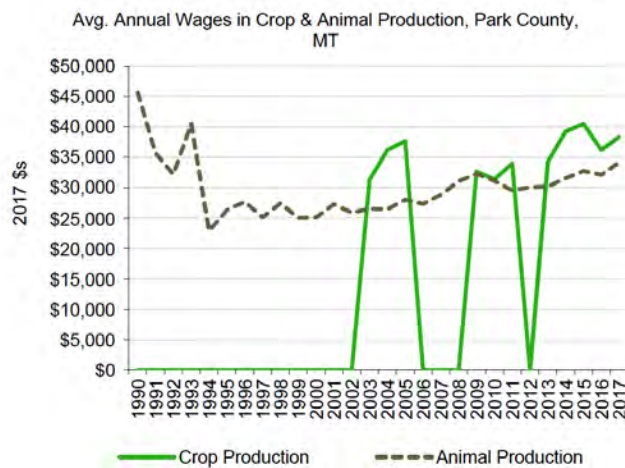
- In 1970, farm proprietors' income represented 76.4 percent of all farm earnings. By 2016, farm proprietors' income represented -61.3 percent of all farm earnings.



- From 1970 to 2016, farm earnings shrank from \$25.2 million to \$5.7 million, a 77.3 percent decrease.
- From 1970 to 2016, non-farm earnings grew from \$151.3 million to \$328.2 million, a 117 percent increase.



- From 1990 to 2017, average annual wages in animal production shrank from \$45,640 to \$34,150, a 25.2 percent decrease.



## 7. Forest/Woodland Owners

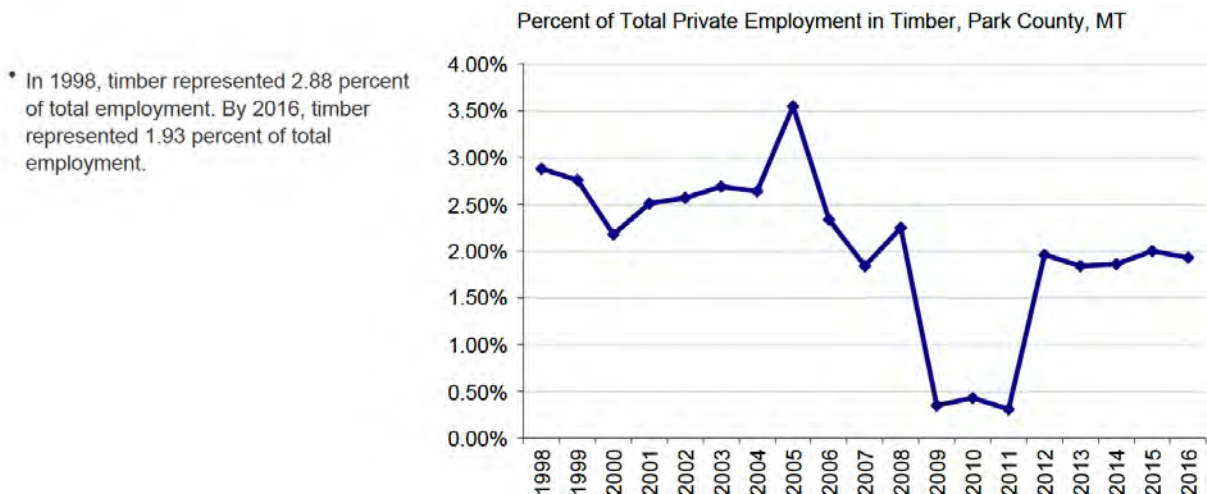
Park County has approximately 110,412 acres of private forestland, most of which is contiguous with USFS or NPS land. Fire suppression over the last 100 plus years has led to conifer encroachment in many areas and to overstocking of trees. Forest insect and disease issues have taken advantage of a lack of fire and management with western spruce budworm (*Choristoneura occidentalis*) present in many Douglas-fir (*Pseudotsuga menziesii*) stands, especially in the southern portion of the county. Mountain pine beetle (*Dendroctonus ponderosae*) infestations have slowed in recent years with improved precipitation. Trees that are properly hydrated have a better chance of resisting the beetles.

Landowner incentive to implement forest health measures is not great due to the slow lumber market and the large expense involved with forestry practices. Fear of wildfire seems to subside quickly after fires are extinguished so there are limited landowners who seek to reduce fuel loads on their properties.

Park County does have forest product businesses as follows:

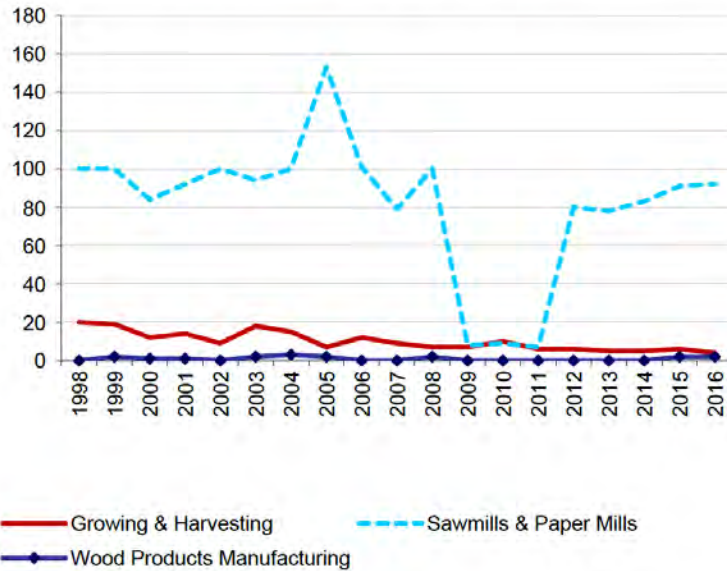
- RY Lumber has a mill in Livingston that produces studs for construction.
- Myrstol Post and Pole is located west of Clyde Park. Produces wood posts and poles for fencing.
- Numerous small firewood suppliers are in the county.

The following graphs (Headwaters Economics) represent the employment level of timber-related jobs. Except for the recession from 2009-2011, the level is typically 2-3% of the total workforce. The number of timber harvesters is in decline.



Jobs in Timber Sectors, Park County, MT

- From 1998 to 2016, Harvest shrank from 20 to 4 jobs, a 80% decrease.
- From 1998 to 2016, Mills shrank from 100 to 92 jobs, a 8% decrease.



Fire support in Park County: The Park County Fire Council’s list of resources is shown in Figure 15 in the Appendix.

The following is a list of wildland fires greater than 5000 acres in Park County in the last 20 years:

- Pine Creek Fire in 2012 burned 8,612 acres
- Wicked Creek Fire in 2007 burned 26,600 acres
- Passage Falls Fire in 2006 burned 6,620 acres
- Big Creek Fire in 2006 burned 14,000 acres
- Fridley Fire in 2001 burned 26,873 acres

Figure 3 from Headwaters Economics shows various land use planning tools that can be used to help guide communities in minimizing wildland fire risks. Park County has an extensive Wildland-Urban Interface that is growing rapidly as people wish to live next to, or within, wooded areas, some of which can be quite remote. This, along with the fire suppression factors mentioned previously, have contributed to many high-risk wildfire areas in the county.



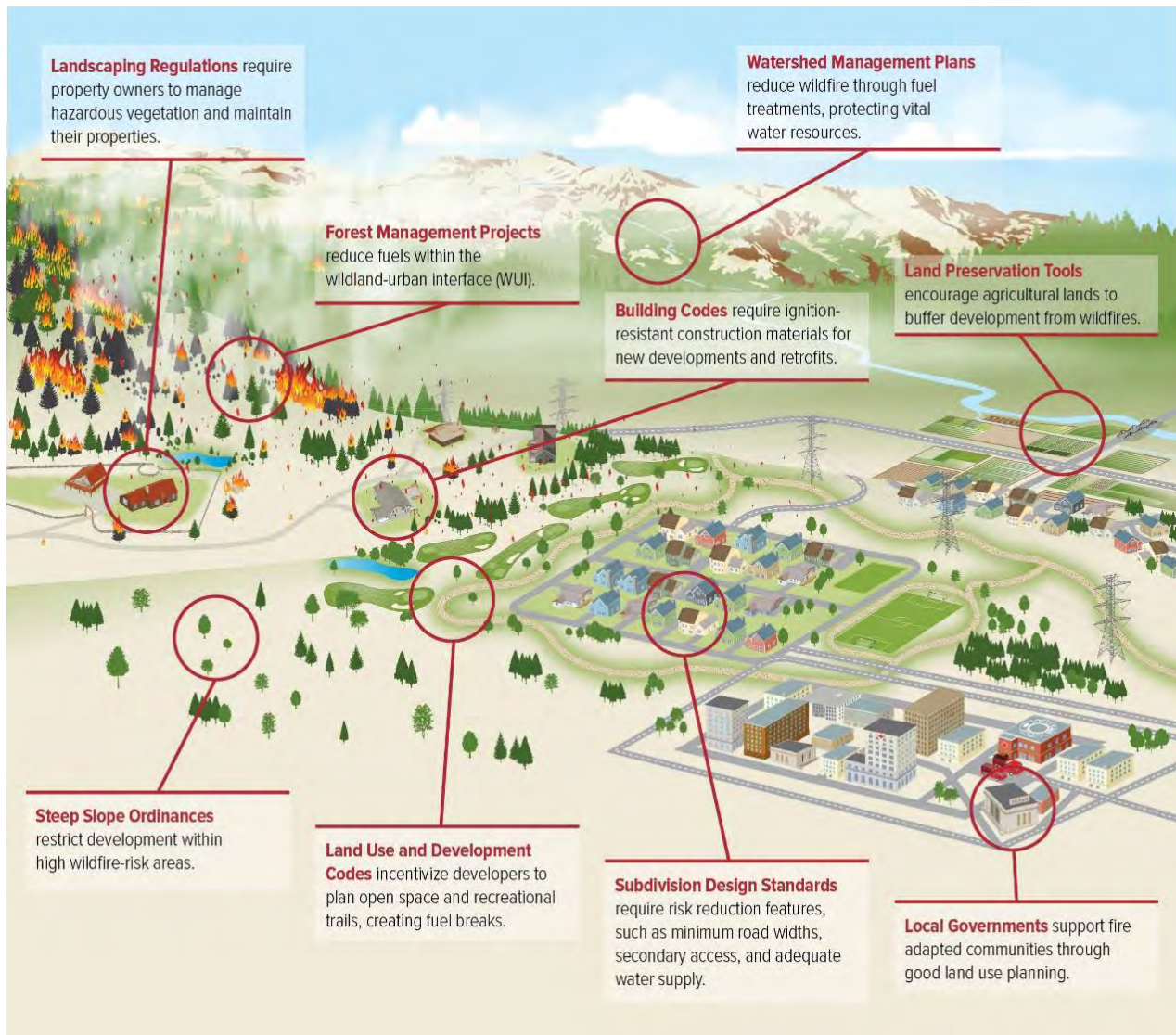


FIGURE 3. LAND USE PLANNING TOOLS TO MINIMIZE FIRE RISK (HEADWATERS ECONOMICS).

## B. Cultural Resources

Park County has long been inhabited by indigenous peoples due to its abundance of natural resources including wildlife, water, fuel, and materials for tool and point manufacture. Native peoples have been documented in the county for more than 13,000 years and the Shields Valley has been coined the “Valley of the Mammoth” due to the number of remains found in the area. During the last Ice Age the Shields Valley was an open transportation corridor between two ice sheets so human and animal activity was high. The Anzick Clovis site near Wilsall was a major archaeological find that tied Native American residents of that period (about 13,000 years ago) to Central and South American groups which predated later migrations of Canadian and Arctic groups. It is the only known Clovis burial site.

Paradise Valley was a heavily-used area for quarrying and manufacture of points due to the supply of chert and the preponderance of game and living sites.

Locations with Registered Cultural Resources are routinely encountered in Park County and are typically of Native American origin but also include irrigation delivery systems, railroads, and homesteads.

## **C. Geology**

The geology of the mountains and especially the YNP region is varied and complex. The Yellowstone River corridor is mostly alluvium with some glacial till in the southern part of Paradise Valley. North of the Yellowstone River below Livingston there is the Hell Creek Formation. The Shields River is also alluvium with most of the valley north to Wilsall being the Fort Union Formation with considerable Piedmont gravels between the Shields River and the Crazy Mountains. Tertiary and Cretaceous deposits in the Shields Valley contain salts which are prone to the development of saline seep which has been noticed in the Potter Creek drainage.

## **D. Soil**

Major Land Resource Areas (MLRA) are the basic units for delineating statewide patterns of soils, climate, water resources, and land use. Elevation, topography, and rainfall have been the primary factors used to delineate these units in Montana because of their effect on potential native plant communities, land uses, and water resources. MLRA areas in Park County include 43BS (Central Rocky Mountains, South) and 44S (Central Rocky Mountain Valleys, South).

Soils of Significance – Park County only has 88.2 acres considered Prime Farmland but another 14,493.6 acres are classified as Prime if it is irrigated. There are 269.7 acres of Farmland of Local Importance and 76,060.8 acres of Farmland of Statewide Importance. A map of these soil designations within the county is shown in Figure 16 in the Appendix. Most of the soils in the Shields watershed are well drained, not hydric, and not classified as prime farmland.

Saline seeps are not common, but some can be found in the northernmost part of Park County. These seeps are commonly caused by fallow cropland conditions that allow precipitation to percolate through the soil profile and carry salts to discharge areas.

## **E. Water**

### **1. Precipitation**

Park County experiences a wide range of annual precipitation ranging from less than 10 inches in valley locations to more than 60 inches in the mountains. High-elevation mountain locations, which receive the bulk of their annual precipitation as snowfall during the winter and spring months, are important to the local surface water systems as snowmelt is the dominant driver of streamflow volumes through the spring and summer. Lower elevation agricultural areas in the county receive precipitation that ranges from 12 to 20 inches annually, with the highest precipitation totals occurring during April and May, with totals increasing again in September. A map of the precipitation zones is shown in Figure 18 in the Appendix.

### **2. Watersheds and Streams**

The primary river system in Park County is the Yellowstone River with the Shields River Watershed being the dominant drainage from the northern part of the county. There are

numerous small drainages from YNP to Springdale that contribute directly to the Yellowstone River. A map of 10-digit HUC watersheds is shown in Figure 18 in the Appendix.

Montana's State Wildlife Action Plan has identified all stream, river, floodplain, riparian, and wetland community types across the state as Community Types of Greatest Conservation Need (CTGCN). The Plan states that there is a clear obligation to use resources to implement conservation actions that provide direct benefit to these community types. Park County has numerous instances of CTGCN within its boundaries.

**Yellowstone River**. The Yellowstone River first encounters private property within Park County. In Park County, it extends from upstream river mile 564.8 at Gardiner to downstream river mile 478.8 near Springdale. A Cumulative Effects Analysis for the Yellowstone River was led by the Yellowstone River Conservation District Council and the Army Corp of Engineers with a summary of findings from Park County shown in Figure 19 in the Appendix. Although often touted as a pristine river and fishery, the Yellowstone River has been highly manipulated through the years to protect various residential, agricultural, transportation, and recreational interests. Major tributaries to the Yellowstone River include the Gardiner and Shields Rivers as well as the following creeks: Crevice, Bear, Phelps, Mol Heron, Cedar, Slip and Slide, Sphinx, Tom Miner, Rock, Donahue, Big, Dry, Six Mile, Emigrant, Eight Mile, Mill, Elbow, Strawberry, Barney, Pine, Deep, Trail, Strickland, Billman, Fleshman, Mission, Greeley and Dog. Numerous tributaries to the Yellowstone River are considered de-watered as shown in Figure 20 in the Appendix.

The river varies in classification from confined straight, confined meandering, partially confined anabranching, partially confined meandering, partially confined braided, and partially confined straight through most of its course in Park County. There is only one 5.3-mile reach from the mouth of the Shields River to below the mouth of Mission Creek where the river is considered un-confined. Part of the reason for the levels of confinement are natural where the river is contained by geologic formations but much of the constriction of the channel migration zone has anthropogenic origins. Figure 5 shows an area in Paradise Valley that demonstrates exurban development and the constriction of the riparian zone along the Yellowstone River.



**FIGURE 4. A REACH OF THE YELLOWSTONE RIVER IN PARADISE VALLEY SHOWING RESIDENTIAL DEVELOPMENT AND ARTIFICIAL CONFINEMENT OF THE RIVER.**

The Yellowstone River is a national treasure and is the longest free-flowing river in the lower 48 states. Demands from irrigation (agriculture), recreation, public water supply, industry, transportation, and other uses have resulted in a less complex and less dynamic system. In Park County it predominantly has a snowmelt-driven hydrology and is a cold water, salmonid-dominated fishery.

**Shields River.** The Shields River Watershed is in south-central Montana, just north of Livingston and 13 miles northeast of Bozeman. The watershed encompasses 855 square miles (547,048 acres) mostly within Park County but includes portions of Gallatin and Meagher counties. The major water body in the watershed is the Shields River, which flows from North to South for approximately 62 river miles to the confluence with the Yellowstone River near Livingston, Montana. Major tributaries to the Shields River include the following creeks: Smith, Porcupine, Elk, Daisy Dean, Flathead which includes Potter and Muddy, Horse, Antelope, Cottonwood, Brackett, Rock, Bangtail, Chicken, Tobin, Willow, Falls, Crazy Head, and Adair. Elevations in the watershed range from approximately 10,850 feet (3307 meters) in the Crazy Mountains to 4,386 feet (1337 meters) at the mouth of the Shields River. The entire Shields River and many of its tributaries are considered de-watered as shown in Figure 21 in the Appendix.

**Clyde Park** - Clyde Park has been recognized as having nitrate levels in the public water supply that are elevated compared to ground water from other systems in Montana. The water sources for the town supply are two wells and a series of spring collections. The water from the springs likely comes from a combination of precipitation and snowmelt runoff and irrigation water applied to fields on top of Cottonwood Bench. The aquifer for the spring source is shallow and unconfined which implies a high sensitivity to potential sources of contamination from land surfaces. The wells were completed in bedrock and designed to draw water primarily from the bedrock aquifer. However, many of the wells in the area report fractures in the bedrock material which could provide pathways for water from the alluvial deposits above to mix with the bedrock aquifer, suggesting they are connected. This also suggests a high sensitivity for potential sources of contamination from land surfaces. Nitrate levels in the spring water averages 2.235 mg/l while the well water averages 1.02 mg/l.

**West Boulder River** - The West Boulder River Watershed does include agricultural land before it leaves Park County. Land use is primarily grazing land with some hay production. The watershed contains 190 square miles within the county.

There are two organized watershed groups in the county, both of which are coordinated by Ashley Lowrey of the Park Conservation District. They are the Shields Valley and Upper Yellowstone Watershed Groups.

### **3. Irrigated Lands, Water Rights, and Irrigation Districts**

The main streams from which water is diverted for irrigation are the Yellowstone River, the Shields River, and the West Boulder River and their tributaries. Accessing irrigation water from wells is not available on a large scale. The diversions and ditches in Park County are listed below:

Hunter's Hot Springs Canal Company (Incorporated). Water is diverted from the north side of the Yellowstone River near Springdale and soon crosses into Sweet Grass County.

Livingston Ditch Water User’s Corporation (Incorporated). This canal starts on the west side of the Yellowstone River a few miles above Livingston and flows to within 1.5 miles of the Shields River. The ditch was intended to irrigate 2243 acres.

Lower Shields River Canal Company (Incorporated)

Park Branch Canal (Incorporated) starts about 3 miles south of Emigrant on the west side of the Yellowstone River and runs for approximately 20 miles to the north.

Shields Canal Company (Incorporated) includes a reservoir 3.5 miles northwest of Wilsall that was formed by Cottonwood Dam with 1379 acre-feet of water under contract to this irrigation company. It was constructed in 1953 and is owned by the Montana Department of Natural Resources and Conservation (DNRC), managed by the State Water Projects Bureau (SWPB), and operated by the Shields Canal Company. It has several deficiencies noted including a deteriorating outlet conduit, a lack of freeboard at the spillway, and a need for new drains to control seepage. These repairs/renovations are projected to cost more than \$2,500,000.

Shields River Ranch Company Ditch

Upper Cottonwood Ditch Company

Yellowstone River Ditch

Many other unincorporated ditches are found on numerous streams throughout the county.

**Stream Flow Table** – this table shows the average stream flow in cubic feet per second each month over the history of record-keeping. The Yellowstone River at Corwin Springs dates to 1889, the Yellowstone River near Livingston to 1897, and the Shields River near its mouth to 1978.

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
YR Corwin	844	832	927	1610	6350	11500	6730	3130	1920	1510	1190	959
YR Liv	1210	1210	1310	2040	7240	13300	7630	3570	2370	2010	1680	1380
Shields Mouth	101	116	185	390	884	812	286	111	116	139	132	107

#### 4. Water Quality Impairment and TMDL/303d Streams

Numerous streams in Park County have identified impairments ranging from sedimentation to dewatering to metals to thermal modifications. Maps showing de-watered streams and Total Maximum Daily Load (TMDL) classifications are shown in Figures 20 and 21 in the Appendix. The Shields River, Antelope Creek, and Potter Creek have had thorough studies done resulting in a completed sediment TMDL and a wealth of information is available on the subject, specifically in these publications:

- 1) Shields River Watershed Water Quality Planning Framework and Sediment TMDLs by the Montana Department of Water Quality.
- 2) Watershed Restoration Plan for Shields River Watershed by Confluence Consulting Group for the Shields Valley Watershed Group.

There is evidence in the Shields Valley that septic system discharge is increasing the levels of nitrates in drinking water and in the streams themselves. An approach that considers the increased number of houses and human activity on the landscape and how to mitigate it would be beneficial to the water quality in the watershed.

## 5. Groundwater

As of 9/16/2019 there are 6136 wells in Park County on record with the Montana Bureau of Mines and Geology (MBMG). Of these 68.7% are for domestic use and 7.8% are for stock water use. The average depth of wells is generally shallow with 49.5% less than 100 feet deep and 75.4% less than 200 feet deep. Most wells have good water quality, but some areas of the Paradise Valley have arsenic issues likely due to natural processes. The Fort Union Formation (15.4%) and Alluvium (11.4%) are the largest geologic sources for groundwater in Park County.

Springs are utilized extensively for stock water with most being reliable through dry years.

## F. Air and Energy

**1. Non-attainment and Maintenance Areas for Air Quality Standards.** No areas of non-attainment are recognized in Park County.

**2. Visibility Standards.** Unknown.

**3. Utility / Power Company Coverage.** Park County has service provided by Park Electric Cooperative (electric) and Northwestern Energy (electric and natural gas) with coverage maps shown in Figures 22 and 23 in the Appendix. Propane is used in much of rural Park County with several companies providing service.

**4. Wind.** The Livingston area and Paradise Valley are famous for wind, especially in the winter. A map showing Wind Power Classes for Park County is shown in Figure 24 in the Appendix. To date, there have been some minor wind turbine installations tried around Livingston but excessive wind speeds at times have precluded any large-scale developments.

## G. Plants and Animals

### 1. Riparian / Buffer Land Use

Riparian health varies widely across Park County. Riparian resistance to flood damage is usually directly correlated with the health and vigor of deep-rooted riparian vegetation. Examples of bank erosion and/or channel incision can typically be found on any given stream in the county. Persistent seasonal grazing has diminished native tree and shrub reproduction in many areas leading to mature stands of cottonwood and aspen which are becoming decadent. There is extensive exurbanization of many riparian corridors in Park County making enhancement challenging. More work needs to be done to identify specific reaches that are severely impacted.

### 2. Wildlife Conservation Opportunity Areas

The US Department of the Interior (DOI) has issued an order to improve habitat quality and western big game winter range and migration corridors for pronghorn (*Antilocapra americana*), elk (*Cervus canadensis*), and mule deer (*Odocoileus hemionus*) (Secretarial Order 3362,

2/9/2018). USDA, through the USFS and the NRCS, will collaborate with the DOI, states, and other natural resource managers across the broader landscape to plan and implement improvements to these corridors. One of the priority areas identified by FWP in Montana is Yellowstone National Park to Paradise Valley which includes the Dome Mountain Wildlife Management Area. Seasonal use of this area includes the wintering exodus of elk, mule deer, and pronghorn from Yellowstone National Park to winter range in Paradise Valley and their return in spring/summer. Providing pronghorns with fence crossings would likely be the most valuable short-term opportunity in this priority area.

Although not numerous in Park County, greater sage grouse (*Centrocercus urophasianus*) occur in the northern areas of the county with significant habitat still present (See Figure 25 in the Appendix). Greater sage grouse habitat has been reduced by agricultural conversion of rangeland (mostly in the early 20<sup>th</sup> century), residential development, conifer encroachment, and a reduction in rangeland integrity. Conservation opportunities exist such as conifer removal from rangelands, strategic fencing, and proper grazing management that could benefit greater sage grouse habitat.

### **3. Confined Animal Feeding Operations (CAFOs)**

Numerous small (<300 cattle or equivalent numbers of other species) CAFOs exist in Park County. Many are located by streams and have not been evaluated by the Montana Department of Environmental Quality (DEQ) concerning their need for regulatory compliance. Evaluation of aerial photos revealed at least 103 corral facilities in Park County that are near waterways.

### **4. Priority Species**

Park County offers some of the finest remaining populations of native Yellowstone cutthroat trout (YCT, *Oncorhynchus clarkii bouvieri*), in its former range. The Shields River watershed contains many streams that still hold pure strains of YCT in most reaches. This contrasts with streams in other locations that only harbor YCT in headwater reaches. The “Yellowstone Cutthroat Trout Conservation Strategy For The Shields River Watershed Above Chadbourne Diversion” (MT FWP, et al. 2012) states that:

*The relatively intact distribution of Yellowstone cutthroat trout in the Shields River Subbasin gives the drainage high conservation value, and no other watershed in Montana has retained this spatial extent of Yellowstone cutthroat trout occupancy. Nonetheless, the remaining Yellowstone cutthroat trout face several threats. Nonnative fishes present the biggest near-term challenge to Yellowstone cutthroat trout persistence in numerous streams. Notably, brook trout continue to invade streams in the upper watershed, resulting in rapid displacement of Yellowstone cutthroat trout in some areas. In addition, competition with, and predation by, brown trout possibly limit Yellowstone cutthroat trout abundance. Rainbow trout occur in several streams in the watershed, and present genetic threats to the pure Yellowstone cutthroat trout. Dewatering and habitat degradation limit the suitability of some streams to support Yellowstone cutthroat trout. Passage barriers in the form of road crossings or irrigation structures limit connectivity within the basin.*

Montana’s State Wildlife Action Plan, developed by MT FWP, has identified the Shields YCT as an Aquatic Regional Focal Area because of its importance to YCT, a Species of Concern and a Species of Greatest Conservation Need (SGCN). MT FWP states that this area has the best

connected YCT population in the Yellowstone River basin and is a core conservation area for YCT. Current impacts include competition with non-native species, dewatering, development, and incompatible grazing practices. Additional future threats include the potential for gas development as well as climate change impacts on temperature and precipitation timing and amount.

Grizzly bears (*Ursus arctos horribilis*) and bison (*Bos bison*) are other notable examples of SGCN in Park County. Grizzly bears inhabit the Absaroka, Beartooth, and Gallatin Mountains and bison occupy public and private lands adjacent to YNP.

## 5. Diseases in Wildlife

Park County has some notable diseases in local wildlife that have the potential to significantly impact agricultural production and other revenue bases.

Brucellosis. Although 4 species of *Brucella* can cause brucellosis, in the Greater Yellowstone Region the bacterium *Brucella abortus* is the causative agent. It's present in some elk herds in Southern Park County with a great potential for spread. The disease is readily transmitted via infected fetuses, amniotic fluid, and other birthing materials among cattle, bison, and elk and can result in devastating losses due to the abortion of fetuses. Control methods have been effective in cattle, mainly through vaccination, detection and elimination, but bison and elk serve as wildlife reservoirs in the area. Recent testing of elk north of Interstate 90 has been negative. A Disease Surveillance Area (DSA) has been established to monitor and attempt containment of the disease. The following information is taken from the Montana Department of Livestock pertaining to the DSA:

*“Brucellosis (Bangs) Vaccination:*

*All sexually intact female cattle or domestic bison 12 months of age or older in Beaverhead, Big Horn, Broadwater, Carbon, Gallatin, Jefferson, Madison, Park, Stillwater, and Sweet Grass counties must be official vaccinates.*

*Official vaccinates are calfhooed or adult vaccinates (AV). Vaccination requirements apply to resident female cattle as well as cattle seasonally grazing in these counties.*

*Note: Animals that reside in the Designated Surveillance Area (DSA) may be subject to additional regulations.*

*Brucellosis Testing (Bleeding):*

*All cattle and domestic bison must be tested for brucellosis within 30 days prior to change of ownership or movement out of the DSA.*

*Identification and Disease Traceability:*

*All sexually intact cattle and domestic bison (regardless of age) leaving the DSA must be officially identified.”*

A current map of the DSA is shown in Figure 26 in the Appendix.

Proliferative Kidney Disease (PKD) – The Yellowstone River in the Paradise Valley experienced a PKD fish kill in the summer of 2016 that was unprecedented in the literature. The causative



agent was the myxozoan parasite, *Tetracapsuloides bryosalmonae*. Clinical infections by this organism cause a massive inflammatory response that manifests as cellular proliferation in the kidneys and the spleen. Thousands of mountain whitefish died with no significant effect on other salmonids in the river. Investigations have shown the organism has been present in many river systems in Montana for decades. The factors leading to the 2016 fish kill are not apparent but stressful conditions such as low water flows and high temperatures may be contributing factors. Also, a more virulent genetic type of *T. bryosalmonae* could be present in the Yellowstone River. Much study remains to be done before meaningful conclusions can be made on the epidemiology of PKD.

Whirling Disease – The causative agent is *Myxobolus cerebralis*, a parasite of salmonids. YCT are highly susceptible to the disease and sediment loading and organic enrichment are factors that influence the abundance of *Tubifex tubifex*, the intermediate host for whirling disease.

## 6. Threatened and Endangered (T&E) and Species of Concern (SOC)

T & E species listed by the US Fish and Wildlife Service (USFWS) and State of Montana (SOC) for Park County are shown in Figures 27, 28, and 29 in the Appendix. The greater sage grouse (Figure 5) is a SOC and it maintains a scattered population in northern Park County. A map of greater sage-grouse habitat delineations in Park County is shown in Figure 25 in the Appendix. Only general greater sage grouse habitat occurs in Park County with no areas of core or connectivity habitat present. Through the years greater sage grouse have suffered habitat degradation with land conversion, conifer encroachment, invasive annual grasses, weed spread, and energy and transportation infrastructure being common issues. Disease and predator expansion have also compromised greater sage grouse populations. Maintaining healthy sagebrush-grass ecosystems and enhancing mesic areas on the landscape will benefit greater sage grouse.



FIGURE 5. GREATER SAGE GROUSE.

Canada lynx (*Lynx canadensis*) have Designated Critical Habitat in the southern portion of the county as shown in Figure 29 in the Appendix. Critical habitat for Canada lynx is montane spruce/fir forest in Western Montana.

Wolverine (*Gulo gulo luscus*) have long been present in Park County with the Crazy Mountains being a local stronghold. Wolverine habitat is high elevation alpine and boreal forests that are cold and receive enough winter precipitation to reliably maintain deep, persistent snow late into the warm season.

The Greater Yellowstone population of grizzly bears (Figure 6) was briefly de-listed but litigation contending that the Yellowstone population did not have connectivity with the Northern Rocky Mountain population to promote genetic diversity resulted in their re-listing as Threatened in October of 2018. Legislative action is being considered in Montana and Wyoming to de-list the bears. Grizzly bear populations are healthy in Park County, particularly in the Absaroka and Gallatin Mountains, and human/bear encounters occur every year. Livestock depredation from grizzly bears, especially in Tom Miner Basin, is a reality. Many livestock owners in these areas successfully utilize techniques such as using range riders to minimize these conflicts.



**FIGURE 6. SOW GRIZZLY BEAR WITH CUB.**

Whitebark pine (*Pinus albicaulis*) has decreased in Park County primarily due to the introduction of white pine blister rust (*Cronartium ribicola*) from Europe and Asia in the early 1920's. This species occurs in high-elevation, upper montane habitat near the tree line.

More plant species are being listed of late as Species of Concern by the State of Montana as their status becomes more apparent.

## 7. Sensitive or Declining Plant Communities

Northern Park County has Great Plains Mixed Grass Prairie which is important habitat for many species of wildlife and has experienced agricultural conversion in the past. More common in the county are montane grassland communities that are not significantly threatened at this time unless climate changes reduce precipitation

Montane sagebrush steppe is common from valley bottoms to montane ridges. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and Idaho fescue (*Festuca idahoensis*) dominate this community. Overgrazing can shift this community to introduced grasses which are difficult to eradicate. Controlled fire in a mosaic pattern followed by proper grazing can be beneficial to wildlife.

Alpine communities are mostly threatened by climate change that could alter precipitation and temperature regimes. These sites experience very little use by livestock.

Aspen (*Populus tremuloides*) communities are found throughout the montane and subalpine zones in the county. These ecological systems generally originate with, and are maintained by, stand-replacing disturbances such as fire, disease, or logging. Fire suppression and heavy browsing by wildlife and livestock can threaten aspen stands.

Park County has numerous additional forest communities ranging from foothill to montane to subalpine and dry to mesic. The most significant threats to these communities are fire and insects. Climate change that alters precipitation and temperature patterns could also threaten these communities.

## 8. Invasive Species Priority Areas

Common St. Johnswort (*Hypericum perforatum*) is locally extensive in the O'Rea Creek drainage. Spotted knapweed (*Centaurea stoebe*) is widespread but is more problematic in the gravelly soils of the Paradise Valley, on the slopes north of the Wineglass, and along the Interstate 90 corridor west of Livingston. Leafy spurge (*Euphorbia esula*) is more common in the Shields River Valley. Common tansy (*Tanacetum vulgare*) is found locally in the Paradise Valley, especially along streams and irrigation canals. Canada thistle (*Cirsium arvense*) is widespread in the county along waterways and in uplands. Houndstongue (*Cynoglossum officinale*) is also widespread in the county. Cheatgrass (*Bromus tectorum*) is a common invader of disturbed or barren ground throughout the county.

Invasive tree and shrub species including Russian olive (*Elaeagnus angustifolia*) and salt cedar (*Tamarix ramosissima*) are of concern in the county. The Park County Cooperative Weed Management Area (CWMA) was formed in 2008 to coordinate invasive weed management efforts including education, technical assistance, and obtain funding for targeted weed control campaigns. The CWMA has been active in scouting and treating infestations of Russian olive and salt cedar. They were very successful in treating a large infestation of Russian olive near

the mouth of Mission Creek. A map of Russian olive infestations was developed by NRCS and is shown in Figure 31 in the Appendix. Most Russian olives are found along the Yellowstone River corridor.

Ventenata (*Ventenata dubia*) is a burgeoning threat across the state that has been documented in a few areas in Park County. After discussion with the Park County CWMA it was clear that aggressive action on the part of NRCS was not warranted since other entities are engaged in its control.

Medusahead (*Taeniatherum caput-medusae*) is another annual exotic grass that is threatening the region. Like ventenata it has a high silica content which makes it unpalatable to grazing animals and it is more competitive than cheatgrass. Monitoring for its presence and maintaining healthy plant communities will be very important in limiting its success in the county.

## H. Travel and Tourism

Park County has some of the finest recreational lands in the USA. Park County has two of the five entrances to Yellowstone National Park (Gardiner and Silver Gate-Cooke City) with park visitation of late exceeding four million people annually.

The Absaroka-Beartooth Wilderness Area is a premier mountainous landscape north of Yellowstone National Park that includes 518,372 acres within Park County. Numerous trails offer access to world-class hiking, fishing, hunting, and other pursuits. The Cooke City area is a major destination for snowmobilers in the winter months.

The Crazy Mountains are equally beautiful with many hiking trails, some of which allow motorcycle and snowmobile access. The Gallatin Mountains offer more opportunities.

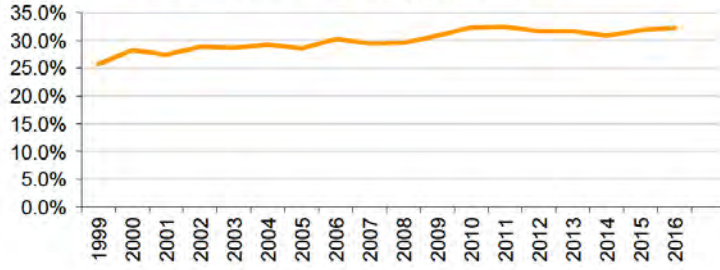
The Yellowstone River is a renowned fishing destination as it leaves YNP and passes through Paradise Valley and beyond. Cutthroat trout dominate in the upper reaches within the county but browns and rainbows increase as you move downstream. Two spring creeks (Nelson and Armstrong-DePuy) above Livingston are popular fishing destinations year-round.

Numerous fishing and hunting guides and outfitters do business in Park County, operating on public and private lands. Since they lease much of the private land in the county, most hunting opportunities are on public land or on private lands enrolled in Block Management, a program operated by MT FWP.

The following graphs (Headwaters Economics) illustrate the growth of this industry in Park County:

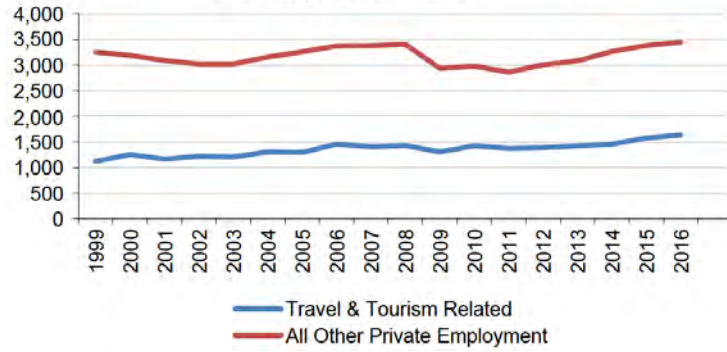
- In 1998, travel & tourism represented 29% of total employment. By 2016, travel & tourism represented 32% of total employment.

Percent of Total Private Employment in Industries that Include Travel & Tourism, Park County, MT, 1998-2016



- From 1998 to 2016, travel & tourism employment grew from 1,210 to 1,636 jobs, a 35.2% increase.
- From 1998 to 2016, non-travel & tourism employment grew from 2,955 to 3,447 jobs, a 16.6% increase.

Total Jobs in Industries that Include Travel & Tourism, Park County, MT, 1998-2016



## SECTION III. ANALYSIS OF CONSERVATION ACTIVITY

### A. Natural Resources Conservation Service (NRCS)

NRCS in Park County currently has 20 Environmental Quality Incentives Program (EQIP) contracts encompassing 26,875 acres. In 2019 there were 8 EQIP contracts obligated that included 119 contract items treating 24,420 acres. The EQIP contracts involve range, pasture, crop, forest, irrigation, AFO/CAFO, Honey Bee Pollinator Initiative (HBPI), and High Tunnels and currently are located throughout the county. There are currently 3 Conservation Stewardship Program (CSP) contracts on 2917 acres. Two of these contracts involve Forestland and one is general agricultural land.

Conservation Technical Assistance (CTA) is commonly delivered in Park County with at least 3000 acres treated annually. CTA ranges from irrigation to forestry to wildlife to rangeland. Many small property owners seek assistance in improving their land with specific goals in mind. Program participation, including the Conservation Reserve Program (CRP), is shown in Figure 32 in the Appendix.

There is currently a Supervisory District Conservationist (full time) and a Soil Conservation Technician (splits time between Park, Meagher, and Sweet Grass counties) in the Livingston Field Office.

### B. Park Conservation District (Park CD)

The Park CD has 7 Supervisors including 5 Rural and 2 Urban Supervisors, and it employs an administrator and a watershed coordinator.

The Park CD has had a 223 grant in recent years to provide funding for purchasing cover crop seed. Most participation in the grant was by producers in the Shields Valley.

They also sponsor a Youth Conservation Day each fall to provide education on numerous conservation topics to students throughout Park County.

### C. Upper Yellowstone Watershed Group & Shields Valley Watershed Group Major Projects

These watershed groups are quite active under the direction of Ashley Lowrey who took the position of Watershed Coordinator in 2017. Both groups are locally driven and have memberships that represent a wide variety of interests in the county.

Watershed Coordinator, Ashley Lowrey  
2017-2019

#### Upper Yellowstone Drought Planning

- Drought Plan Development, Management and Implementation. Developed a strategic plan for implementing the initial steps of the drought planning process in the Upper Yellowstone Watershed.
- Written action plan and two-year timeline to implement initial steps of the drought planning process. The written action plan details three phases of the planning process, including 1) a detailed outline for engaging the community, reaching out to key stakeholders, and holding outreach meetings, 2) present the framework for the data collection process, and 3) identify and plan next steps of the drought planning process.
- Engage the community in the drought planning process. Including identifying

key stakeholders that should be included in the process, reach out to stakeholders in order to gauge interest and determine familiarity and knowledge of drought. Hold public meetings and facilitate public focus group discussions to gain stakeholder input in the drought planning process. These meetings will be used to identify the framework needed for drought response and for understanding the core elements that need to be included in the drought plan. Put together Drought Focus Group to guide and provide input for the process.

- Compile and collect watershed information and drought data. Compile information on existing watershed characteristics, such as hydrology, topography, major rivers and streams, reservoirs, economics, growth, etc. Collect and compile important drought indicator data, (including but not limited to streamflow, snowpack, temperature and precipitation), as well as water supply and demand information from the watershed. This information is in the process of being collected and compiled through public meetings, outside research and consultation with outside technical experts.

#### Park Branch and Paradise Canal Irrigation Efficiency Monitoring Project

- Through the Irrigation Development Grant, Park Branch and Paradise canals in Park County, MT were able to install two water measuring systems along a stretch of their canals to measure water flow rates throughout the year and develop better water management practices and based on results. These flow meters replaced existing, obsolete flow monitors whose software is out-of-date and unusable. The measurement systems are SonTek-IQ's and are used to measure water levels and conduct internal flow calculations for both instantaneous discharge and total volume.

#### Upper Yellowstone Watershed Partnership Project

- In August of 2016, 183 miles of the Yellowstone River were closed to all water-based activities by Montana Fish, Wildlife and Parks (FWP) due to a parasite outbreak that causes Proliferative Kidney Disease (PKD) in trout. Near record low flows and warm water temperatures combined with the parasite to kill thousands of mountain whitefish. The unprecedented whitefish kill dealt a significant blow to the economic engine relying on the river. The entire community felt the impacts of this closure, both economically and ecologically. Montana Aquatic Resource Services and Trout Unlimited held the Yellowstone River Symposium last April as a forum for the community to discuss the impacts of the event. Since the Symposium, it has become clear that the conversation about how the community in the upper Yellowstone should proceed needs to continue. The Park Conservation District/Upper Yellowstone Watershed Group is now working with other regional organizations and agricultural and community members to develop a working partnership between all stakeholders. The initial goals of the partnership effort are to 1) increase awareness about the conservation impacts on the river, 2) to continue to engage the existing partnership base and add new stakeholders that rely and care about the river for recreation, business, irrigation, and ecological services, and 3) use the District Development funding to leverage and secure

more grant funds from public funding sources and private foundations.

- Developing mutually agreed upon bylaws, governance and charter for the UYWG through guidance of the Steering Committee.

### 2018 Upper Yellowstone Watershed Workshop

- Upper Yellowstone Watershed Workshop - Examining the Confluence of Past Lessons & Future Needs: September 4-7, 2018, West Creek Ranch, Emigrant, Montana
- *Workshop Concept Summary: Convene a conference on collaborative conservation, focusing on lessons learned from the Yellowstone Watershed. The goals of the conference are two-fold: 1) Focused agenda on the science of water supply and demand, impacts of climate and drought, and the practical lessons to be drawn from this science and 2) Developing a baseline of shared knowledge and information about the watershed to inform a future action plan.*
- *The Yellowstone River is one of the nation's most well-known rivers, yet little attention has been centered on its status, trends, and outstanding management needs. Outcomes from this conference will include a concise treatise on the state of the watershed and lessons for the larger region.*
- Workshop Summary: This workshop brought together an invited group of landowners, businesses, scientists, agencies, and community and land management leaders to examine what we know about the Upper Yellowstone watershed and to chart an action agenda for its future. The workshop agenda focused on water supply, water use, water quality, land use and economics, the challenges of climate and drought, and the practical lessons to be drawn from available science and practice. Participants worked to establish baseline agreement on what we do and don't know about the water budget of the watershed and begin the process of establishing an action agenda for where we go from here.

### Upper Yellowstone RiverNET

- An effort to expand the quantity, quality, and usability of water quality gages, by involving the private sector, local communities, technology companies and scientists. (For more information, see website: [www.upperyellowstone.org](http://www.upperyellowstone.org)).
- Data is regularly gathered and published online re: water quality, flows, and biodiversity (via eDNA and other methods).

### Creation of Upper Yellowstone Watershed Group webpage



## D. Yellowstone River Conservation Districts Council (YRCDC)

### **Mission Statement:**

The Council's purpose is to provide local leadership, assistance, and guidance for the wise use and conservation of the Yellowstone River's natural resources. This purpose is founded on three fundamental precepts:

- 1) The need for scientific information on which to base management decisions.
- 2) The need for broad-based local, regional, and national input.
- 3) The need for technical and financial assistance to address sustainable use issues on the Yellowstone River.

The YRCDC was formed in 1999 to address conservation issues on the entire Yellowstone River. Current projects with objectives and goals:

### **Work Group:** Irrigation Water Management

#### **Objectives:**

- (1) Information and Outreach: The Work Group will collaborate with Conservation Districts, state agencies, federal agencies, and non-profit organizations throughout the Yellowstone River Basin to identify outreach and project opportunities associated with the Council's YRRP 6.1 Irrigation Water Management Recommended Practice (March 1, 2016). A 5-year information/outreach strategy will be developed.
- (2) Montana State Water Plan: Review the Montana 2015 State Water Plan findings and key recommendations that pertain to irrigation water management and water use efficiency in the Yellowstone River Basin. The Work Group will incorporate pertinent State Water Plan recommendations into a 10-year project priority strategy for the YRCDC.
- (3) Project Identification and Prioritization: Irrigation water management projects within the Yellowstone River Basin will be identified and prioritized. These potential projects will be listed in the 10-year project priority plan.
- (4) Project Implementation: The 10-year project priority strategy will include potential project sponsors and funding sources for all actions recommended to the Council.
- (5) YRPP 6.1 Revisions: The Work Group will review and recommend revisions to the YRRP 6.1 Recommended Practice and Implementation Approach as needed.

#### **Goals:**

- 1) Five-year information and outreach strategy. This information component of this strategy will identify topics, approaches, venues, partners, and funding sources to most effectively convey the efficient application of irrigation water in the Yellowstone River Basin. The strategy will also include an outreach component that will solicit stakeholder input and vetting on irrigation system efficiency improvements and modernization.
- 2) Ten-year project prioritization plan. The project priorities will be based upon the results from the Yellowstone River Cumulative Effects Study (2016). The initial prioritization of reaches for on-farm distribution improvements have been identified in the Irrigation Water Management YRRP 6.1 (Pages 68-69). Project identification and prioritization will also incorporate the 2015

Montana State Water Plan recommendations and outreach efforts identified above. Potential sponsors and funding sources will be included in the plan.

**Work Group:** Invasive Woody Plant Control

**Objectives:**

(1) Information and Outreach: The Work Group will collaborate with Conservation Districts, state agencies, federal agencies, and non-profit organizations throughout the Yellowstone River Basin to identify outreach and project opportunities associated with the Council's YRRP 3.2 Invasive Woody Plant Control Recommended Practice (March 1, 2016). A five-year information/outreach strategy will be developed.

(2) Common Buckthorn: Develop specific educational and project approaches to address the relatively new invader, Common Buckthorn. Explore opportunities to work with the Montana Department of Agriculture with their Montana Noxious Weed Education Campaign and their Noxious Weed Trust Fund Grant Program.

(3) Russian Olive and Salt Cedar: Using the prioritization criteria outlined in the YRRP 3.2 (pages 39-40) Implementation Approach section, mainstem reaches and tributaries will be identified for focused outreach efforts and project implementation. This process will require close collaboration with county weed districts and landowners. Priority project reaches, project sponsors, and potential funding sources will be included in a ten-year project priority plan.

(4) YRPP 3.2 Revisions: The Work Group will review and recommend revisions to the YRRP 3.2 Recommended Practice and Implementation Approach as needed.

**Goals:**

1) Five-year information and outreach strategy. This information component of this strategy will identify approaches, venues, partners, and funding sources to most effectively engage stakeholders throughout the Yellowstone River Basin. The strategy will include an outreach component that will gauge landowner interest on project implementation in priority reaches identified by the Work Group.

2) Ten-year project prioritization plan. The project priorities will be based upon the results from the Yellowstone River Cumulative Effects Study (2016). The initial prioritization criteria for invasive woody plant control has been identified in the Invasive Woody Plant Control YRRP 3.2 (Page 39). Potential project sponsors and funding sources will be included in the plan.

## **E. Farm Service Agency (FSA)**

FSA currently administers 19 Conservation Reserve Program (CRP) contracts totaling 5758 acres all of which are in the Shields Valley. They have one CRP Grasslands contract on 642 acres which is also in the Shields Valley. They did two Emergency Conservation Program (ECP) projects that addressed flood damage a few years ago.

## **F. Montana Fish, Wildlife, and Parks (MT FWP)**

Montana Fish, Wildlife, and Parks faces many challenges in managing big game, especially elk, with the many different interests of landowners and recreationists in Park County. They have implemented damage hunts and shoulder seasons to try and mitigate damage to agricultural lands with varied success. FWP started the Targeted Elk Brucellosis Surveillance Project in 2011 to evaluate 1) prevalence and spatial extent of brucellosis exposure in elk populations, 2) elk spatial overlap with livestock and interchange between elk populations, 3) risk of seropositive elk shedding and potentially transmitting *Brucella abortus*, and 4) effects of

brucellosis management hazing and lethal removal on elk distributions and spatial overlap with livestock. This project is ongoing and includes several elk herds in Park County.

Carol Endicott, the Yellowstone Cutthroat Trout Biologist for FWP, provided information as follows:

*Montana Fish, Wildlife & Parks (FWP) has continued to collaborate on projects to benefit Yellowstone cutthroat trout in Park County. Major threats to Yellowstone cutthroat trout include nonnative species, habitat degradation, stream dewatering, passage barriers, and climate change. By addressing the suite of stressors to Yellowstone cutthroat trout, FWP and its partners are protecting and restoring Yellowstone cutthroat trout throughout Park County and increasing the Yellowstone cutthroat trout's resilience to climate change.*

*The Yellowstone cutthroat trout in the Yellowstone River spawn in tributary streams and dewatering and passage barriers have historically been the biggest concerns for this population. Continuing water leases that began in the 1990s have restored and maintained spawning runs in Paradise Valley and continued to support a robust population of Yellowstone cutthroat trout in the upper Yellowstone River. An abandoned railroad culvert had blocked Yellowstone cutthroat trout from accessing Rock Creek for a century. FWP removed the failing culvert and constructed a series of step pools with large boulders that provides Yellowstone cutthroat trout with easy access to the stream. Yellowstone cutthroat trout returned to spawn in Rock Creek the following spring, and this stream's reliable supply of cold water is further increasing fry recruitment to the Yellowstone River.*

*FWP has been protecting Yellowstone cutthroat trout from nonnative trout by installing barriers to prevent invasion of occupied habitat and mechanical and chemical removal of nonnative trout to provide secure habitat for Yellowstone cutthroat trout. In collaboration with the Lower Shields Canal Company, FWP repaired the century old and failing Chadbourne diversion and modified it to make it impassable to rainbow trout. This project protects over 250 miles of stream habitat for Yellowstone cutthroat trout in the Shields River watershed. A brook trout invasion in the upper Shields River watershed has put the resident Yellowstone cutthroat trout at severe risk of extirpation. FWP and the U.S. Forest Service collaborated on construction of a barrier to secure 25 miles of habitat for Yellowstone cutthroat trout and have been removing brook trout upstream of the barrier using electrofishing since the early 2000s. Strategic placement and removal of impassible culverts will eventually allow Yellowstone cutthroat trout to swim freely through this protected area.*

*A brook trout invasion in Soda Butte Creek near the northeast entrance to Yellowstone National Park had been the subject of long-term efforts to remove this nonnative using electrofishing; however, brook trout were able to evade capture in the stream's complex habitat. FWP and multiple agency partners captured Yellowstone cutthroat trout from Soda Butte Creek, and held them in tributaries, while they used rotenone to get rid of brook trout. After two consecutive years of rotenone treatment, brook trout have apparently been eradicated, and this high value, Yellowstone cutthroat trout stream in the headwaters of the Nation's first national park is protected for future generations.*

*FWP has teamed with the NRCS to work with private landowners on projects to improve habitat quality. Tributaries of Horse Creek in the Shields River watershed had extremely damaged habitat, and severe bank erosion was adding tons of fine sediment to streams. A combination of*

*grazing management and stream restoration has restored health to the riparian areas, and the streambeds, formerly cloaked in mud, now have clean gravel, which is among the hallmarks of a healthy trout stream.*

### **G. Montana Department of Environmental Quality (MT DEQ)**

MT DEQ has established a sediment TMDL for the Shields River and Potter Creek. They administer 319 grants which could be used for stream improvements, especially in the Shields Watershed to address sedimentation, an established TMDL. DEQ has also studied the nitrate problem in the Clyde Park and Wilsall public water supplies and have identified potential sources of nitrate contamination in these communities.

### **H. Montana State University Extension (MSU Extension)**

In August of 2018, MSU Extension was awarded a grant to be able to offer landowners reimbursement in the form of a cost share program towards wildfire risk reduction work. The funds had to be spent on non-federal land within 30 miles of Livingston, MT and south of I-90. Advertising was done through direct mailings to properties in high wildfire risk areas identified in the Community Wildfire Protection Plan (CWPP), as well as through advertisements in the local newspaper, and through contractors. To date, over 30 landowners have contacted MSU Extension to inquire about the program. Twenty landowners have progressed with requesting MSU Extension to visit and assess the wildfire risk on the property and draft a stewardship plan to address their wildfire risk through vegetation management. Four landowners have completed projects and are in the process of acquiring reimbursement. To date, \$30,000 is left available and MSU is seeking more applicants to participate in the program.

### **I. Park Cooperative Weed Management Area (CWMA)**

The Park CWMA formed in 2008 with private landowners, government agencies, commercial applicators, ranchers, a realtor, and a non-profit group represented.

In 2013 the CWMA started applying for grants on behalf of different areas of the county. Most grants were on a 50/50 cost share and the participants usually exceeded their responsibility part of the grant. The following shows the grant amounts obtained and dollars spent since 2013:

2013	\$60,000 (exceeded \$120,000)
2014	\$35,000 (exceeded \$70,000)
	\$10,979 (exceeded \$22,000)
	\$29,644 (exceeded \$59,000)
	\$1,578 (matched in-kind for a salt cedar float/eradication)
2015	\$16,600 (\$33,200)
2016	\$50,000 (\$100,000)
	\$5,000 (matched in-kind for educational presentations)
2017	\$5,000 (\$10,000)
	\$17,300
	\$5,000
	\$1,000 (the four 2017 grants were all for a 115 ac. Russian olive project)
2018	\$1,500 (matched in-kind for a salt cedar float/eradication)

The acres involved for our first grant was 80,000. The rest of the acreages varied to as small as around 5,000 acres.

The Russian olive project in 2017 has been the only project where the CWMA took the lead. The CWMA assisted the landowners in securing funding, contractors, and land restoration experts. This grant brought together 5 different funding sources, not counting the more than matching amount that the landowners contributed to this project.

The CWMA does Alliance projects where the CWMA assists homeowner associations in gaining knowledge on weeds. The CWMA also provides help to procure sources for both biological agents and biological knowledge for land owners. Hundreds of biological agent sites are spread all over Park County.

Currently, the CWMA is applying for a Noxious Weed Trust Fund grant for the Chico-Pray-Mill Creek areas.

## **J. Park County Weed District**

The Park County Weed District operates a weed control program for Park County. Their website states that:

“The Park County Weed District aims to protect our natural resources and ecosystems by preventing and suppressing the spread of noxious weeds within the county. This will be accomplished through educational outreach, progressive integrated pest management techniques and cooperative partnerships that include but are not limited to local, state, federal, private & public entities.”

## **K. United States Forest Service (USFS)**

There are two Custer-Gallatin National Forest Ranger Districts in Park County - The Yellowstone Ranger District is located in Livingston and the Gardiner Ranger District is located in Gardiner.

A fish barrier was constructed on the Upper Shields River to secure approximately 25 miles of habitat for Yellowstone Cutthroat trout.

The USFS also constructed the Porcupine Ibex Trail along the western Crazy Mountains to allow USFS access through private lands.

## **L. Park County FireSafe Coalition (PCFSC)**

PCFSC is a sub-committee of the Park County Fire Council and a member of FireSafe Montana. Their mission is to provide regional support for FireSafe Montana objectives at the local level through resources, education, and awareness of personal responsibility. FireSafe Montana’s main objective is to mobilize Montanans to make their homes, neighborhoods, and communities fire safe.

## **M. Montana Rural Water Systems**

Offers technical assistance and training to rural water system staff across Montana. They can provide assistance with planning and implementation of conservation measures to protect Clyde Park’s public water supply.

## **N. AMB West Philanthropies Conservation Fund**

Active in supporting three areas of conservation in the Paradise Valley:

- 1) The Upper Yellowstone Watershed
- 2) Wildlife
- 3) Working landowner sustainability

AMB West only contributes to organizations classified as 503(c)(3) by the IRS.

## **O. Cinnabar Foundation**

Active in donating to NGO conservation groups and land trusts in the region. In 2018 there were 82 grants awarded that totaled \$433,000.

## SECTION IV. NATURAL RESOURCE PROBLEMS AND DESIRED FUTURE OUTCOMES

### A - Fuel Reduction

Most private forest land is located along the margins of the river valleys where the land transitions into timber adjacent to USFS holdings. There are numerous subdivisions located in these areas as well as large holdings, all of which are at increased risk of fire due to increased fuel accumulation. Forests tend to be overstocked which leads to poor forest health and desiccation during periods of drought. Many homes are placed near trees for aesthetic reasons which also increases fire risk and lowers defensible space.

Excess fuels are a problem across much of the valley/forest interface across the county. Private residences would be a primary victim of large wildfires, but it would also affect agricultural operations, transportation corridors, wildlife habitat and movement, hydrologic function, invasive species spread, and stream sedimentation and temperature.

MSU Extension and the Park County FireSafe Coalition are both active in fire safety as mentioned previously.

### B - Forest Health

The lack of a natural fire cycle through fire suppression has led to overstocking of forests which weakens trees, especially during drought, and places them at risk of insect attack and disease. There have been periods of beetle damage but it has not been excessive in Park County. Of more concern is the damage being done by the Western Spruce Budworm (*Choristoneura occidentalis*). Douglas-fir is the predominant tree in Park County forests and most stands have suffered attacks by this insect.

There are many stands of lodgepole pine (*Pinus contorta*) that are overstocked in the county's forests.

Rapid winter temperature fluctuations in recent years have caused Red Belt in some areas. Desiccation causes the foliage, and sometimes the buds, to turn red-brown but trees generally recover with few major effects.

NRCS, Montana Department of Natural Resources and Conservation (DNRC), and MSU Extension could all contribute technical and financial assistance toward treating forest health concerns on private lands. Landowner interest needs to be heightened to justify the expenditure of resources to improve forest health.

### C - Conifer Encroachment

Fire suppression over the last century has allowed conifers to advance on range lands throughout the county. This has occurred at the margins of the Shields and Yellowstone River Valleys where the valley floors abut forested areas. Some of the most encroached areas include Mill Creek between its mouth and the mountains, the Hogback, and Antelope Butte. Rocky Mountain juniper (*Juniperus scopulorum*) is the most common invader but Douglas-fir (*Pseudotsuga menziesii*) and limber pine (*Pinus flexilis*) are also contributors. Conifer encroachment reduces forage production by its footprint and by consuming water in addition to

increasing fuel loads for wildfires. Wildlife dependent on sagebrush/grassland communities are also compromised.

## **D. Water Quality**

### **Rural Source Water**

Concerns with the water quality of urban source water supplies has been noted in the inventory (Section II). The public water supplies of Clyde Park and Wilsall are not above water quality thresholds for nitrate but they are elevated enough to be a concern. Nitrates in drinking water can lead to “blue baby” disease in young children. The nitrates can be reduced to nitrites which cause the disease methemoglobinemia that can have serious implications in babies. Montana DEQ has studied the water collection system of Clyde Park extensively and has identified numerous potential sources for the nitrates in the water. It appears that the spring collections have a greater risk of nitrate contamination than the well sources.

Montana Rural Water Systems has offered their assistance in any project via outreach and monitoring. MT DEQ also provides opportunities for technical and financial assistance.

### **AFO/CAFO**

Over 100 animal feeding/confinement areas exist in the county near streams. These can provide a point source for pollution of the streams and groundwater and many predispose livestock to health issues caused by the accumulation of waste within the facility. The goal should be to renovate or remove all these facilities and prevent the water quality issues they present. However, treatment of 10 percent, or 10 facilities, would be considered successful in the next 5 years. These facilities are typically classified as small (less than 300 cattle or equivalent) and estimated NRCS expenses would be \$80,000 per project so treating 10 corrals would cost \$800,000.

## **E. Riparian Health**

Riparian health is a broad issue in the county with some egregious areas locally. Typically, the issue stems from inadequate native vegetation to properly armor the banks. This erosion leads to bank failure and downcutting when the flood plain is no longer accessible. Excessive trampling and grazing by livestock, farming too close to the stream, and building sites near streams all have contributed to riparian decline. Noxious and invasive plants have also invaded riparian areas which displaces native plants and reduces plant diversity. As native vegetative diversity is reduced, riparian wildlife values are diminished. Figure 7 demonstrates a typical stream where introduced vegetation has displaced native riparian plants leading to bank failure.

Much of the Yellowstone River in Park County has been manipulated to protect highways, railroads, residential areas, and agricultural infrastructure. This has compromised the riparian areas and the floodplain with little hope of restoring these areas to a more natural system.

The Shields River, to a lesser extent, has also been contained in areas but more opportunity exists to protect or enhance riparian conditions on the mainstem river and its many tributaries. The Shields River does see damaging floods during large runoff events which could be reduced if riparian health and function were strengthened.



The Shields Valley Watershed Group, MT FWP, and MT DEQ have all been engaged in planning for stream and riparian health with Horse Creek being a focus recently.



**FIGURE 7. NON-NATIVE PLANTS WITH SHALLOW ROOT SYSTEMS CAN LEAD TO BANK FAILURE.**

## **F. Stream De-Watering**

Most of the streams in the county are driven directly by snowmelt so stream flows are high in the spring and much lower in the summer and fall. The summer and fall periods coincide with the greatest demand for irrigation so many streams are de-watered during that period. There are many sprinkler systems currently in use, but significant flood irrigation is still used that is low in efficiency. Converting more flood irrigation to sprinklers would result in reduced withdrawals from streams when they are most stressed and using Irrigation Water Management to maximize efficiency is also desired.

One concern some people have with sprinkler irrigation is that it is “too efficient” since it does not allow deep percolation which can provide late season return flows to the stream. This can occur but it is not a given in every situation. Flood irrigation also promotes surface runoff which can erode soil and carry fertilizer and pesticides back to the stream.

## **G. Drought**

This is a problem that affects the entire county periodically and could become a long-term trend if weather patterns change to a drier regime. Agriculture in any form uses water whether it is livestock, grazing lands, irrigated crops, dryland crops, forest production, or any other niche use. Climate change could shift the local weather patterns sufficiently to change the agricultural models currently in use. Producers need to be flexible and proactive in preparing for further weather changes and periods of drought. This can include grazing practices that strengthen rangeland plants so they can better withstand dry periods, practicing soil-health-building techniques to maximize the use of natural precipitation, using the highest-efficiency irrigation

techniques, thinning forests to promote healthy stands, and developing reliable stock water systems.

Wildlife would be compromised by diminished forage production and stream flow. This would negatively affect recreation on private and public lands. There would be a higher risk of intensive wildfires on the land which would further inhibit wildlife.

As mentioned in Section III, the Upper Yellowstone Watershed Group has been actively developing a drought plan. They have been engaging numerous stakeholders to identify ramifications of drought and what can be done to increase resiliency in the future.

NRCS could readily provide technical and financial assistance with practices that would lessen drought impacts on agricultural lands.

## **H. Rangeland Health**

Rangeland is a primary land use in Park County (almost 70% of agricultural land is grazing land) and its health varies widely. Since grazing land is so extensive, its health can have a huge impact on not only the grazing land itself, but also wildlife, streams, air, and communities. Humans certainly didn't invent overgrazing as it happened naturally in places prior to human influence. We do, however, have the means to properly graze and make rangelands healthy and sustainable. There is no one geographic area in Park County that is in more need of grazing improvement than another. Every acre of range could be improved in the county with better grazing practices that focus on rangeland health.

## **I. Irrigation Efficiency**

With numerous demands on surface water in the county, there is a need for irrigators to use their water wisely and efficiently. Overuse of irrigation water affects all inhabitants by reducing stream flows, dropping water tables, and stressing riparian systems and associated wildlife. Aspects of irrigation which could be improved include delivery systems that are losing water to leakage, converting from flood irrigation to sprinklers, converting from less efficient to more efficient sprinklers (including updating nozzles), and practicing irrigation water management.

The local NRCS office has aggressively marketed their services toward meeting that end and is proposing a TIP in the Shields Valley to target irrigation efficiency and to improve stream flows.

## **J. Soil Health**

The soil health message has been delivered to most producers in Park County through many means and some have adopted all of the principles in earnest while others are dabbling with soil health practices and others are not yet ready to commit. This is a topic that is vital but it will take many years for the majority of landowners to dedicate themselves to improving soil health.

Soil Health workshops, presentations, and field tours sponsored by NRCS and other entities have been presented in Park County but more work remains to be done to further education on the topic.

The Park Conservation District provided funding recently for purchasing cover crop seed for county producers. The effort was successful in demonstrating the benefits of cover crops and which species of plants could be expected to thrive under local conditions.

## L. Noxious/Invasive Plants

Many noxious weeds are present in the county including leafy spurge, spotted knapweed, Canada thistle, common tansy, field bindweed, houndstongue, hoary allysum, whitetop, yellow toadflax, oxeye daisy, common St. Johnswort, and others. Some of these are naturalized in the county so elimination is not feasible but rather containment should be undertaken. Others are relatively sparse so elimination could be feasible. The Park CWMA has been very active and successful in combating noxious weeds in the county and the Park County Weed Department is also active.

New invaders like *ventenata* have been found in small numbers in Park County. These early colonies need to be aggressively treated as soon as they are discovered. Education is key in accomplishing this goal.

## M. Wildlife Migratory Routes

A major elk (*Cervus canadensis*) migration route exists from YNP to the Paradise Valley, including the Dome Mountain Wildlife Management Area. Pronghorn (*Antilocapra americana*) also utilize the YNP / Paradise Valley corridor. These migrations are landscape-scale so many landowners would need to participate in any effective project. Wildlife-friendly fencing should be employed to aid in their natural movement. Some large landowners have already installed wildlife-friendly fencing techniques to aid in wildlife movements.

## SECTION V. PRIORITIZATION OF NATURAL RESOURCE PROBLEMS AND DESIRED OUTCOMES

Local Work Group (LWG) meetings held in February and March of 2019 identified the following Resource Concerns in Park County. All Resource Concerns were first identified and then votes were cast to determine their priority.

### All Resource Concerns Identified:

#### WATER

- Number of ponds / availability of surface water for agricultural use (perhaps storage/reduced loss of water in transport) (4)
- Habitat restoration (1)
- Drought (6)
- Increase efficiency of energy inputs / solar power and windmills (2)
- Quality / Quantity (2)
- Education (3)
- Irrigation water management (1)
- Sedimentation in the Shields River
- Shields River flood resiliency / streambank or riparian area stability (9)
- Corral relocation/renovation – water quality (1)
- Fish passage / fish screens (3)

#### PLANTS

- Russian olive/salt cedar on the Yellowstone River (5)
- Cheatgrass (7)
- Needs following wildfire (1)
- Knapweed on all acreages – small and large landowners (6)
- Hoary alyssum (1)
- Ventenata
- Grazing management – increase intensity, decrease duration
- Grazing practices to enhance production
- Improve diversity of plants beneficial for grazing (6)

#### FOREST

- Conifer encroachment / Doug fir rangeland encroachment (6)
- Forest health / Bug kill / Dying timber
- Wildfire risk reduction / fuels management (8)
- Forest mgt. on USFS – timber sales fast track
- Sagebrush control / pasture management (2)
- Bug kill tree removal or thinning

## **SOIL**

- Reduce inputs
- Improvement of cover crops
- More knowledge of soil biology (2)
- Erosion (7)
- Increase energy efficiency – reducing fuel primarily
- Livestock grazing to improve soil health (6)
- Utilizing acres / protecting soil on expiring CRP (2)
- Biologically diverse soil (overall health) (1)

## **ANIMALS - WILDLIFE**

- Deer and elk managed at carrying capacity like livestock (1)
- Wolf population managed – manage parasites in them (1)
- Pasture health – rotational grazing – improved utilization (9)
- Brucellosis in bison
- Brucellosis control and prevention (1)
- Management of YNP bison overflow to private or public land (2)
- YNP management of bison
- Range health
- Maintain habitat to support human and wildlife populations (1)

No priority locations were identified by the LWG during the sessions.

## **Top Natural Resource Concerns Identified by the LWG:**

(number of votes received in parentheses)

- (9) Shields River flood resiliency / streambank or riparian area stability in general
- (9) Pasture health / rotational grazing / improved utilization
- (8) Wildfire risk reduction / fuels management
- (7) Cheatgrass
- (7) Erosion
- (6) Drought
- (6) Knapweed on all acreages – small and large landowners
- (6) Improve diversity of plants beneficial for grazing
- (6) Conifer encroachment / Doug fir rangeland encroachment
- (6) Livestock grazing to improve soil health

## SECTION VI. TARGETED IMPLEMENTATION PLANS (TIPS) AND INVESTMENT PORTFOLIO

### A. Shields River Flow Enhancement – 2020-2022

A TIP is being developed to improve irrigation efficiency in HUCs 1007000301 and 1007000304 in the Shields Watershed to enhance stream flow during the critical summer/fall period. The Shields River itself and numerous tributaries are considered de-watered (see Figure 19) and the primary cause is irrigation demand. If irrigation efficiency is improved, more water would be left in the streams during this high-demand period. Numerous producers are currently interested in improvements to their irrigation systems in this area. A goal of 600 acre-feet of water savings from irrigation efficiency improvements is targeted through this proposal.

### B. Fuel Reduction Along the Absaroka and Gallatin Northern Fronts

These areas have been extensively subdivided and are experiencing conifer encroachment and forest overstocking in recent decades. A mailing to all landowners (approximately 400) in these areas was done in the summer of 2019 with minimal response. Future outreach is planned to hopefully generate enough interest to propose a TIP in these areas. The targeted outreach area is shown in Figures 8 and 9. The Billman/Trail Creek area is 18,433 acres and the Mission Creek area is 24,704 acres.

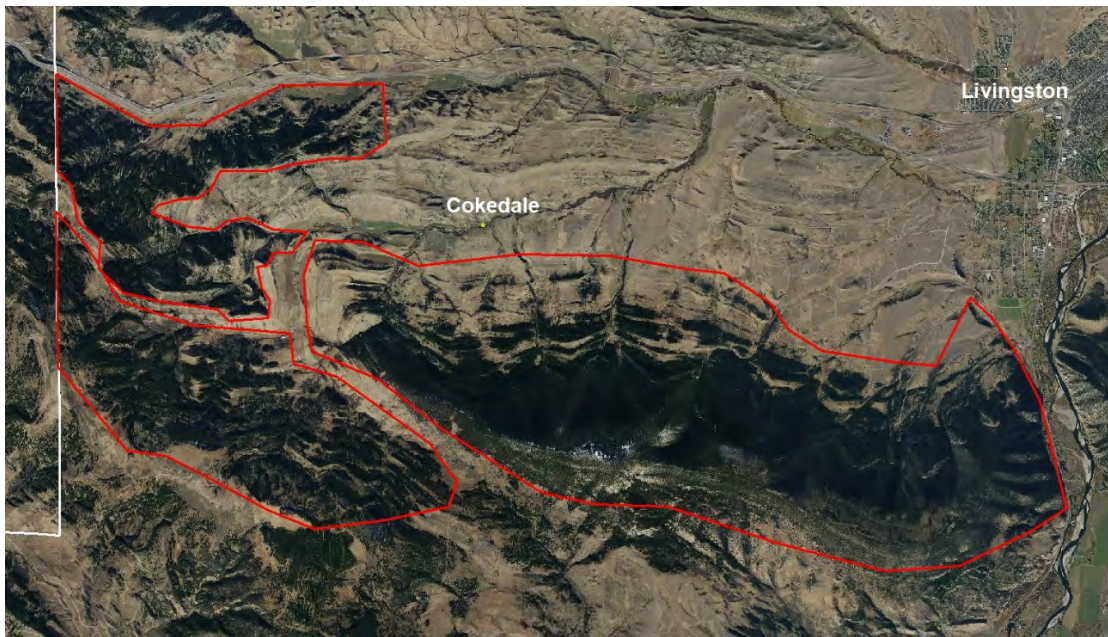


FIGURE 8. BILLMAN CREEK/TRAIL CREEK FORESTRY AREAS.

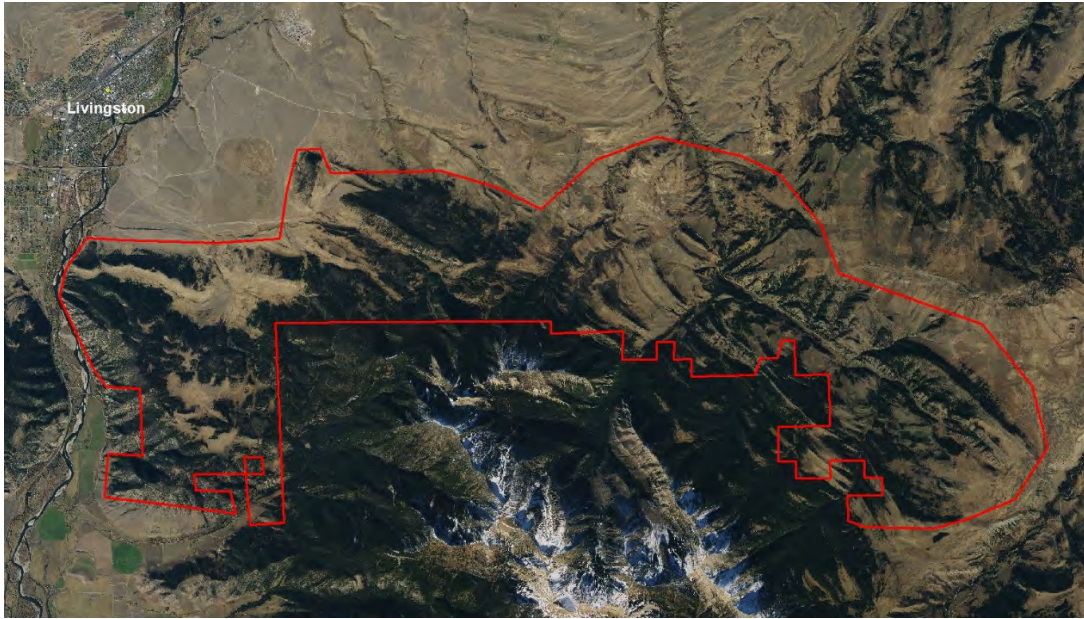


FIGURE 9. MISSION CREEK FORESTRY AREA.

### C. Fuel Reduction in the Cooke City Area

The Custer-Gallatin National Forest is proposing the Cooke City Vegetation Management Project in the wildland/urban interface around and near Cooke City and Silver Gate, Montana. This is a hazardous fuels reduction and forest resiliency project on non-wilderness land and NRCS could partner on the private lands within the project area. There are approximately 300 private landowners in the project area and residential development has been accelerating in recent years. NRCS could team with the USFS in outreach meetings in the communities. Figure 10 shows the USFS proposed project area.

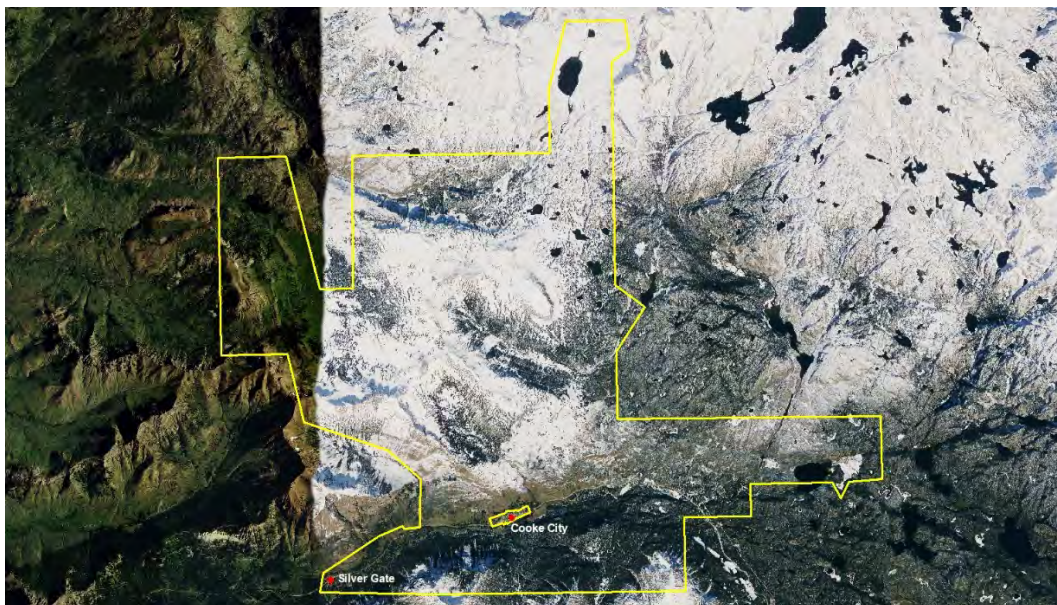


FIGURE 10. PROPOSED USFS PROJECT AREA.

## **D. AFO/CAFO Treatments in Park County**

This will be an on-going emphasis in the county since interest in treating corral/feeding areas takes time and interest is usually guarded initially. The opportunity for producers to participate needs to be available when their individual schedules allow. If stream restoration is a goal of the producers, MT FWP and the local watershed groups are willing to participate in planning and implementation of such work.

An AFO/CAFO TIP is currently being developed for the Bozeman Area and a county-level TIP may be considered in the future as well.

## **E. Conifer Encroachment**

Many landowners recognize the problems posed by conifer encroachment but the desire to act may be lacking, particularly in wetter years. Some of the most affected areas in Park County include the Wineglass, the Hogback, Antelope Butte, and the Mill Creek area. More outreach and public education are needed before a TIP can be proposed.

## **F. Clyde Park and Wilsall Source Water Quality Improvement**

These communities have been recognized as having elevated nitrate levels in the public water supply. While the nitrate levels do not exceed safety thresholds, they are still troubling to health officials. Causes of the elevated nitrate levels could include, but are not limited to, geologic connectivity between sewage facilities and water supplies, water collection deficiencies, excessive fertilizer application, livestock and wildlife contamination, land application of septic effluent, and natural sources. A map showing the recharge region for Clyde Park is shown in Figure 33 in the Appendix.

NRCS could assist with Best Management Practices on agricultural lands to reduce potential nitrate availability in the water collection zones. Montana Rural Water Systems has offered assistance with outreach and monitoring.

## **Summary**

These are initial TIP proposals (in no particular order) which are, in some cases, not completely defined or planned. They involve known resource concerns in Park County at this time whose future implementation will depend on landowner interest (through outreach and education) and partner capabilities. In time, new resource concerns will likely become known which may take priority on the ones listed.



# APPENDIX

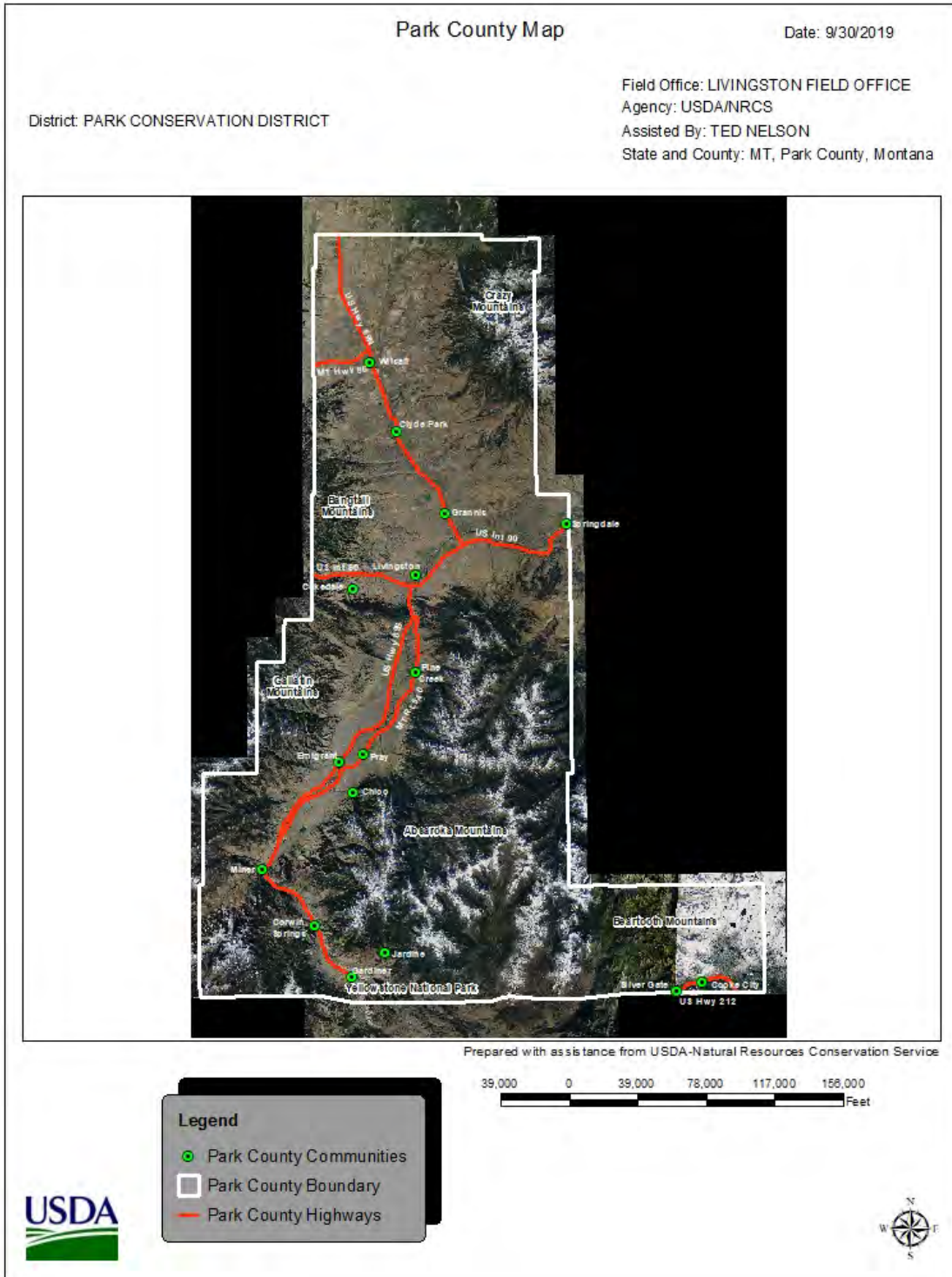


Figure 11. Map of Park County.



Food Desert Map

Date: 9/30/2019

District: PARK CONSERVATION DISTRICT

Field Office: LIVINGSTON FIELD OFFICE  
Agency: USDA/NRCS  
Assisted By: TED NELSON  
State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service



**Legend**

- food\_desert\_a\_mt
- Park County Communities



FIGURE 13. FOOD DESERT MAP FOR PARK COUNTY.

# Park County Apiaries

Date: 9/30/2019

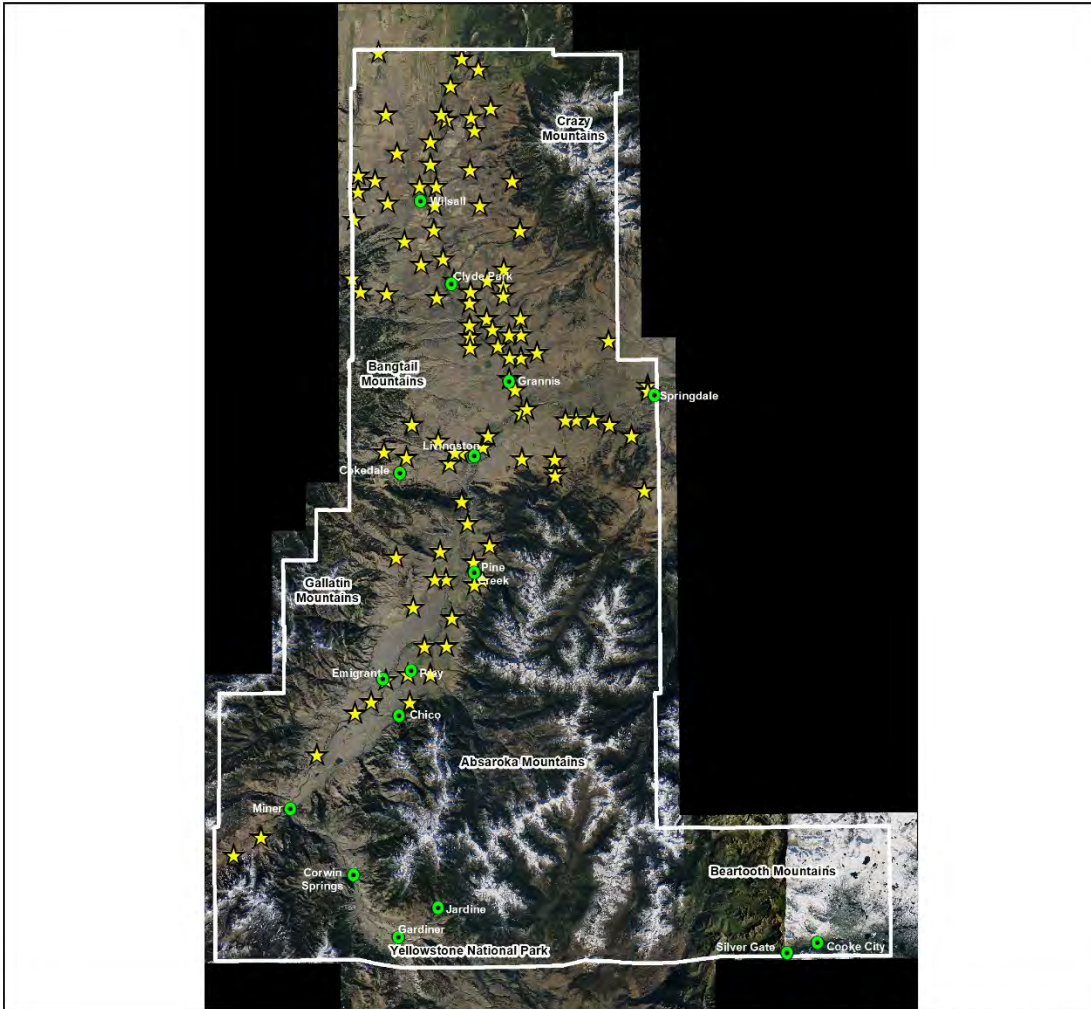
District: PARK CONSERVATION DISTRICT

Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

Assisted By: TED NELSON

State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service

**Legend**

- Park County Communities
- Park County Boundary
- ★ Apiaries\_park

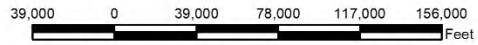


FIGURE 14. PARK COUNTY APIARIES.

# PARK COUNTY FIRE COUNCIL

Your Fire Team • Local, State and Federal Working Together

## Fire Department Contacts

Wilsall Rural Fire District #3 – Chief Gary Hoyem  
PO Box 142  
Wilsall, MT 59086  
(406) 578-2095 station

Clyde Park Rural Fire District #2 – Chief Tony Bailey  
PO Box 36  
Clyde Park, MT 59018

Clyde Park City Fire & EMS – Interim Chief Will Buniger  
PO Box 177  
Clyde Park, MT 59018  
(406) 686-4719 town hall

Park County Rural Fire District #1 – Chief Dann Babcox  
PO Box 1134  
Livingston, MT 59047  
(406) 222-0562 station

Livingston City Fire & Rescue – Chief Ken MacInnes  
414 E. Callender St.  
Livingston, MT 59047  
(406) 222-2061 station

Paradise Valley Fire & EMS – Chief Mike Story  
PO Box 1634  
Emigrant, MT 59027  
(406) 333-4357 station

Gardiner Volunteer Fire & Ambulance – Chief Bob  
Kopland  
PO Box 307  
Gardiner, MT 59030  
(406) 848-7350 station

Cooke City Fire & EMS – Chief Troy Wilson  
202 Main Street West  
Cooke City, MT 59020  
(406) 838-2185 station

## Other Fire Contacts

Park County – Fire Warden Greg Coleman  
414 E. Callender St.  
Livingston, MT 59047  
(406) 222-4188 O.  
(406) 823-0823 c.

Custer Gallatin National Forest – FMO Ashley Sites  
5242 Highway 89 South  
Livingston, MT 59047  
(406) 222-1892 station

Yellowstone National Park  
Structural Fire – Chief Britton Gray (307) 344-2190  
Wildland Fire – FMO John Cataldo (307) 344-2182  
PO Box 168  
Mammoth Hot Springs  
Yellowstone National Park, WY 82190

Montana DNRC Bozeman Unit – Craig Campbell  
2273 Boot Hill Court  
Bozeman, MT 59602  
(406) 556-4507 office

State Fire Marshal's Office – Dick Swingley  
State Fire Marshal  
DCI/DOJ  
2225 11<sup>th</sup> Avenue  
PO Box 201417  
Helena, MT 59620-1417  
Phone: (406) 444-2050  
Fax: (406) 444-2759

FIGURE 15. PARK COUNTY FIRE COUNCIL RESOURCES.

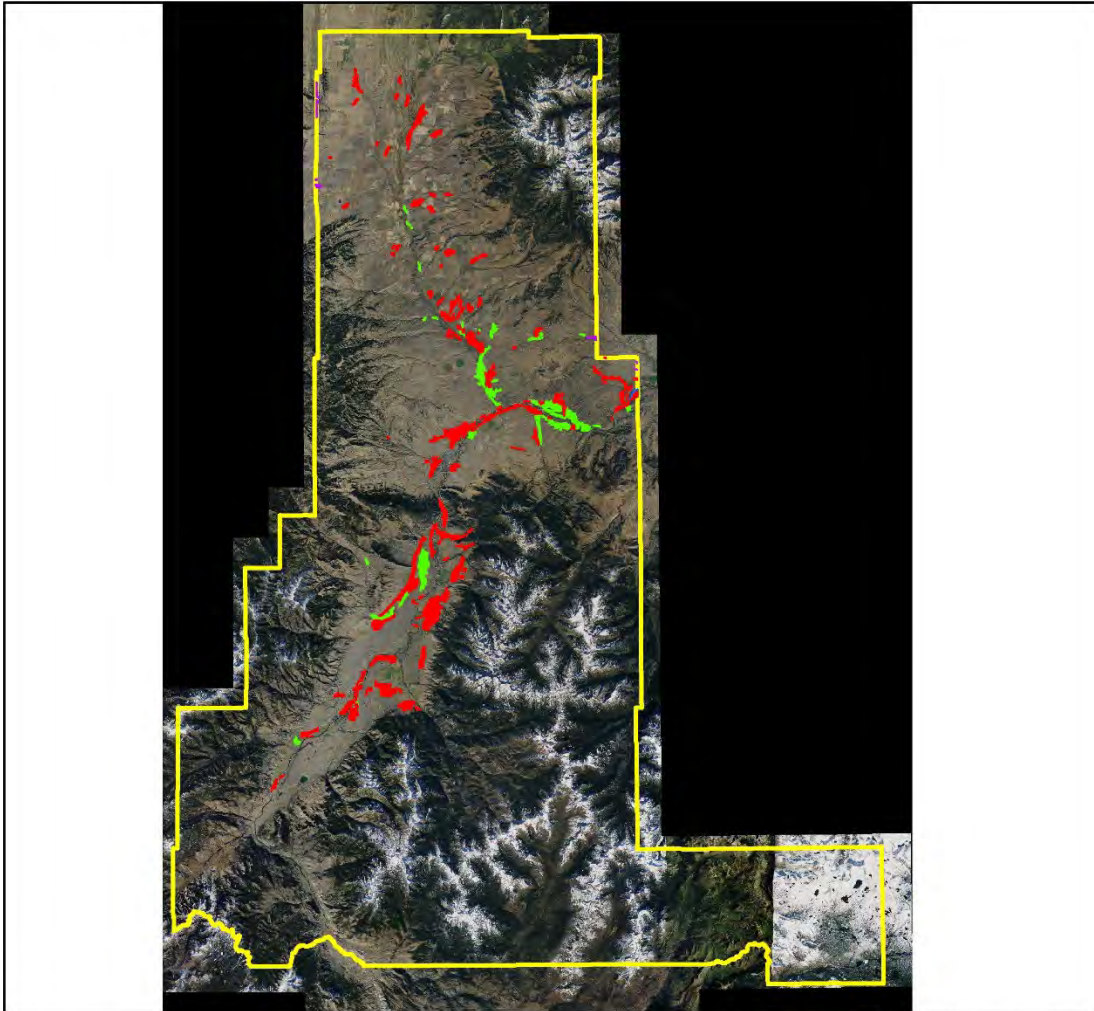
# Park County Prime and Other Important Farmlands Map

Date: 3/5/2019

Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



- Legend**
- Farmland of Statewide Importance - 76,060.8 ac.
  - Prime Farmland if Irrigated - 14,493.6 ac.
  - Farmland of Local Importance - 269.7 ac.
  - Prime Farmland - 88.2 ac
  - cnty100k\_a\_mt067

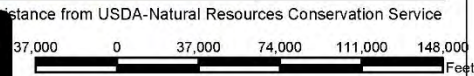


FIGURE 16. PARK COUNTY SOILS OF SIGNIFICANCE.

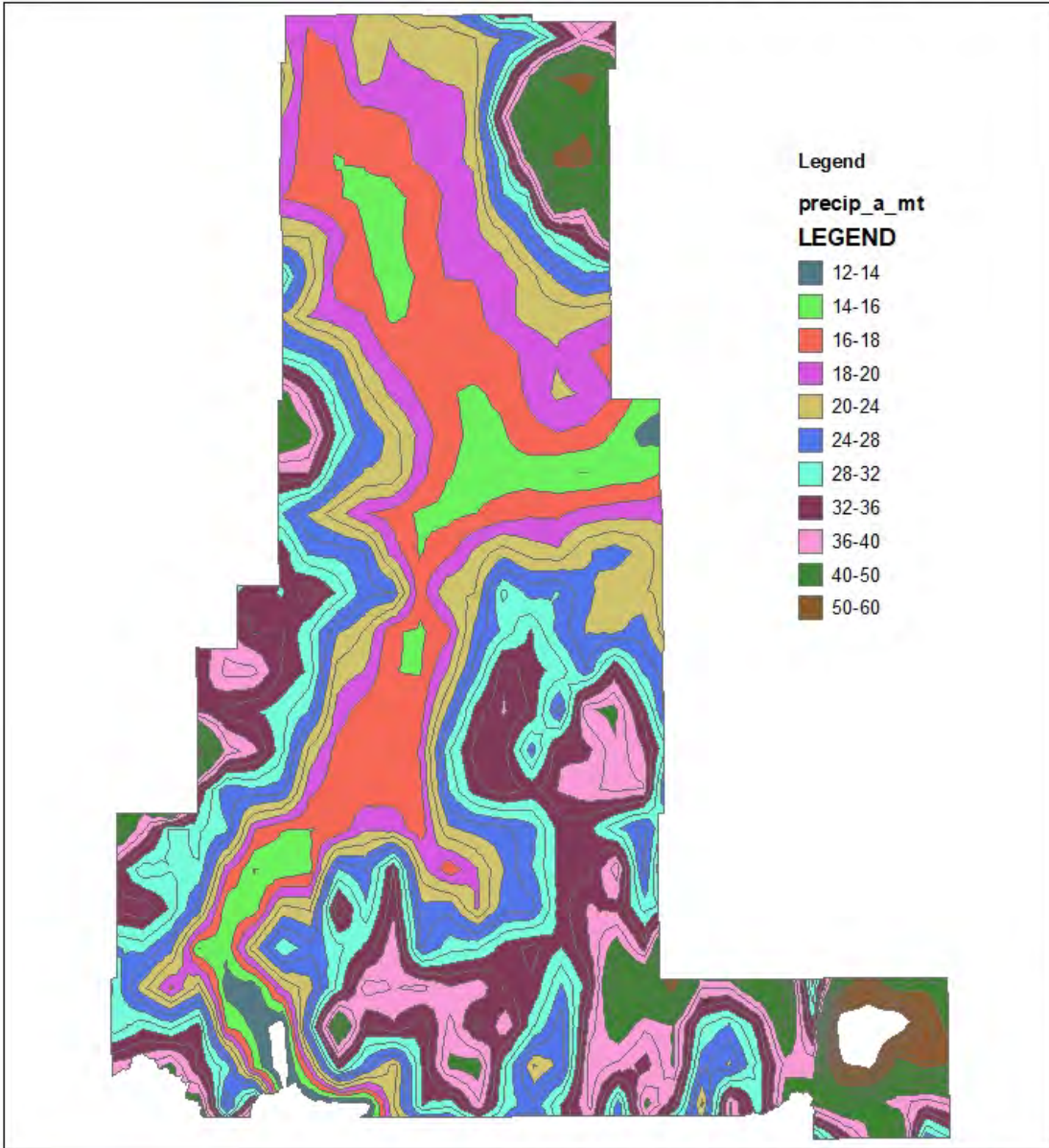
Park County Precipitation Map

Date: 2/6/2019

Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service

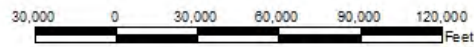


FIGURE 17. PARK COUNTY PRECIPITATION MAP.

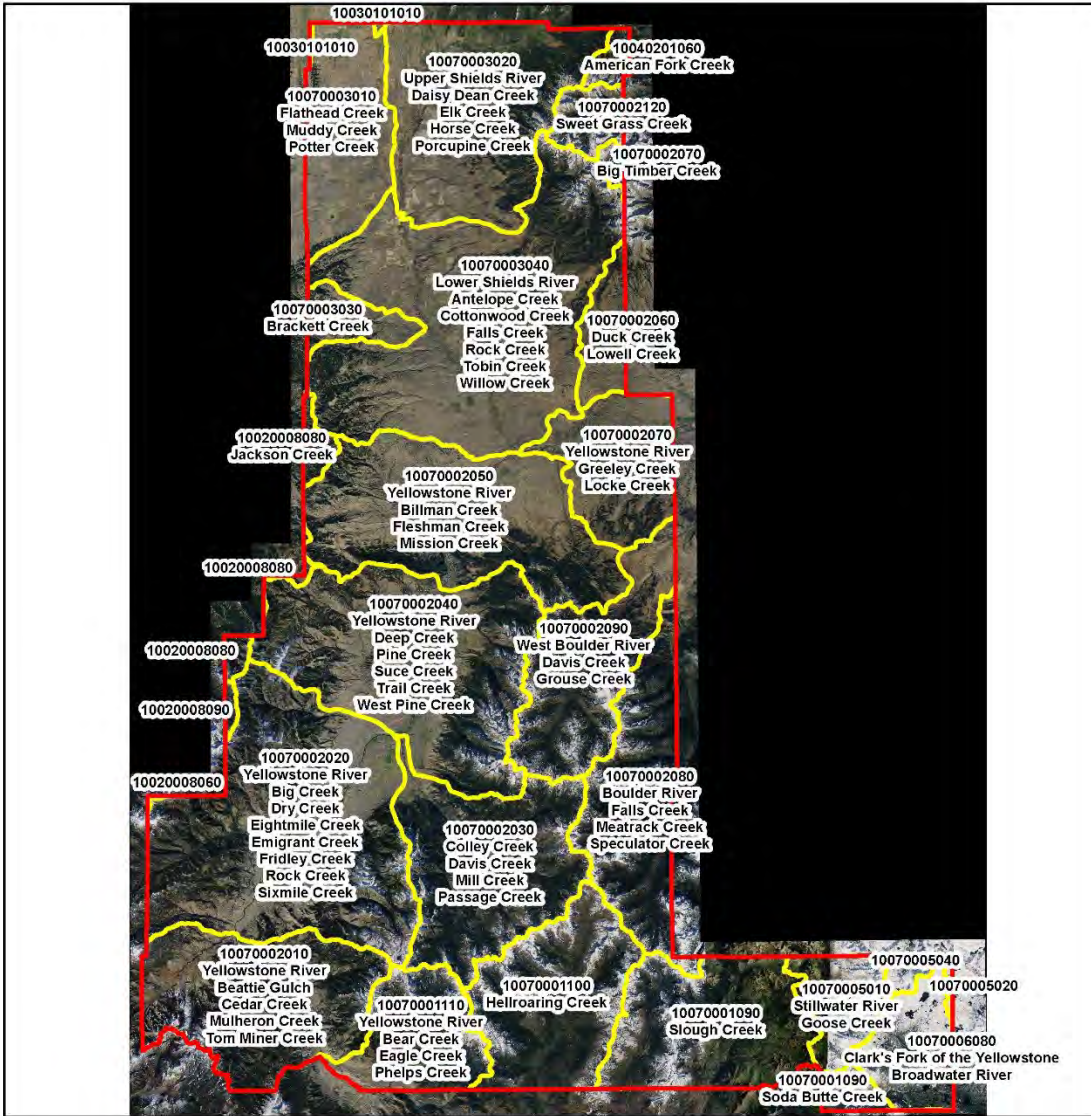
# Park County 10-Digit HUC Code Map

Date: 3/5/2019

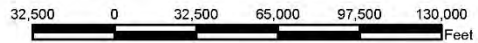
Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service



**Legend**

- cnty100k\_a\_mt067
- HUC\_10\_digit



FIGURE 18. PARK COUNTY 10-DIGIT HUC MAP.



Reach	Rock Rip-Rap Ft	Flow Deflectors Ft	CMZ Constriction Ac	Side Channel Blocked Ft	1950 Flood Ac	2011 Flood Ac	2011 Sprinkler Irr Ac	2011 Pivot Ac
PC1	0	0	0	0	42.4	0	36	0
PC2	3043	0	0	0	250.9	0	132.7	61.6
PC3	16334	294	0	0	635.1	183.7	188.1	32.3
PC4	367	434	2.7	0	62.7	8.6	84.6	96.7
PC5	4371	993	0	3503	188.3	38.7	74.2	222.4
PC6	7371	3278	24.2	0	409.1	177.9	92.5	84.5
PC7	8840	556	74.3	2950	414.7	170	50.5	16.9
PC8	7494	2757	14.5	0	1368.9	221.1	171.1	1014.3
PC9	2894	667	40.4	0	198.1	26.9	142.4	93.3
PC10	3753	1197	252.8	1454	512.4	17.1	135.9	56.1
PC11	8645	2047	154.7	1990	501	138.5	102.2	79.5
PC12	7267	4106	155.2	0	343	89.4	201.3	16.1
PC13	1240	875	19.3	0	35.9	4.2	0	0
PC14	16931	1581	268.2	5546	149.7	0.8	32.9	0
PC15	4880	613	232.1	0	13.5	0	18.1	0
PC16	6474	1703	139.8	0	662	69.8	172.9	245.7
PC17	5704	134	106	0	383.7	18.3	60.4	46.7
PC18	11486	3462	184.6	7999	1364.7	302.5	128.4	412.2
PC19	805	0	2.2	0	685.8	211.3	201.4	240.9
PC20	12763	56	66.7	0	133.5	9.2	79.1	114.9
PC21	6270	123	64.9	0	148.2	69.8	9.3	256.5
Totals	136932	24876	1802.6	23442	8503.6	1757.8	2114	3090.6

Reach	Russian Olive Ac	Ag Land Ac 1950	Ag Land Ac 2011	1950 Urban Ac	2011 Urban Ac	1950 Exurban Ac	2011 Exurban Ac	Wetland Ac
PC1	0.1	1647.8	1399.5	51.6	174.6	31.5	157.9	0
PC2	0	1158.9	1026.8	0	0	9.2	145.5	4.9
PC3	0	1158.9	1026.8	0	0	9.2	145.5	14
PC4	0	1471	1442.7	0	0	0	23.2	30.5
PC5	0.1	994.5	892.7	0	0	0	102.2	60.4
PC6	0	1278.4	770.1	0	0	4	446.2	77.2
PC7	1.5	1902	1508.7	0	0	24.9	297.7	328.5
PC8	0.7	4334.7	2838.2	0	3.5	13.6	1433	48.1
PC9	0.1	756.6	615.4	0	0	0	81.6	113.6
PC10	0.1	1329.9	1061.1	0	0	0	178.9	236.7
PC11	0.3	1057	933.5	0	0	0	2.2	158
PC12	0.2	825	749.2	0	0	0	50.8	115.8
PC13	0.2	291.6	212.4	0	0	5	82.1	12.2
PC14	4.7	811.2	444.1	277.1	328.2	37.5	266.5	93
PC15	0.7	517.5	368.5	393.6	463.3	7.7	50.7	50.5
PC16	0.8	1961.2	1530.1	7.7	69.4	1	208.4	216.5
PC17	0.3	845.9	736.1	0	0	0	39.7	86.1
PC18	16.7	3092.7	2728.1	0	0	0	155.3	579.4
PC19	0	1522.4	1450.2	0	0	0	0	51.9
PC20	0.2	2165.7	1987.4	0	0	0	0	111.1
PC21	0.2	918.3	832	0	0	12.5	21.3	89.3
Totals	26.9	30041.2	24553.6	730	1039	156.1	3888.7	2477.7

**Figure 19. Cumulative Effects Analysis of the Yellowstone River in Park County. The reaches follow the river downstream within Park County starting at Gardiner (PC1) and ending at Springdale (PC21).**

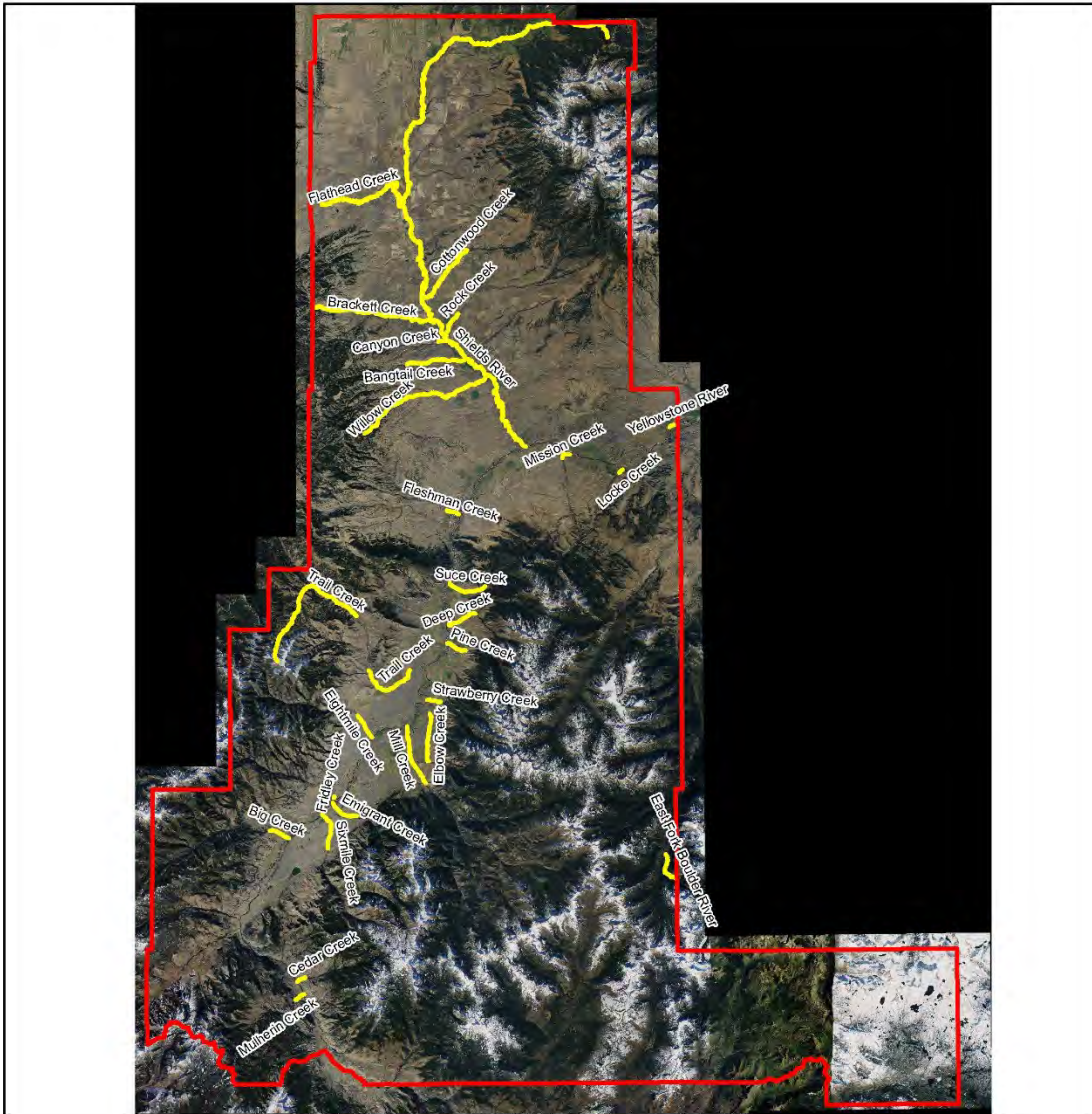
# Park County De-Watered Streams Map

Date: 3/5/2019

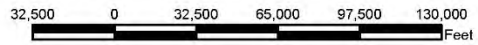
Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service



**Legend**

- cnty100k\_a\_mt067
- Park\_Dewatered\_Streams



FIGURE 20. PARK COUNTY DE-WATERED STREAMS MAP.

Park County TMDL Map

Date: 3/5/2019

Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana

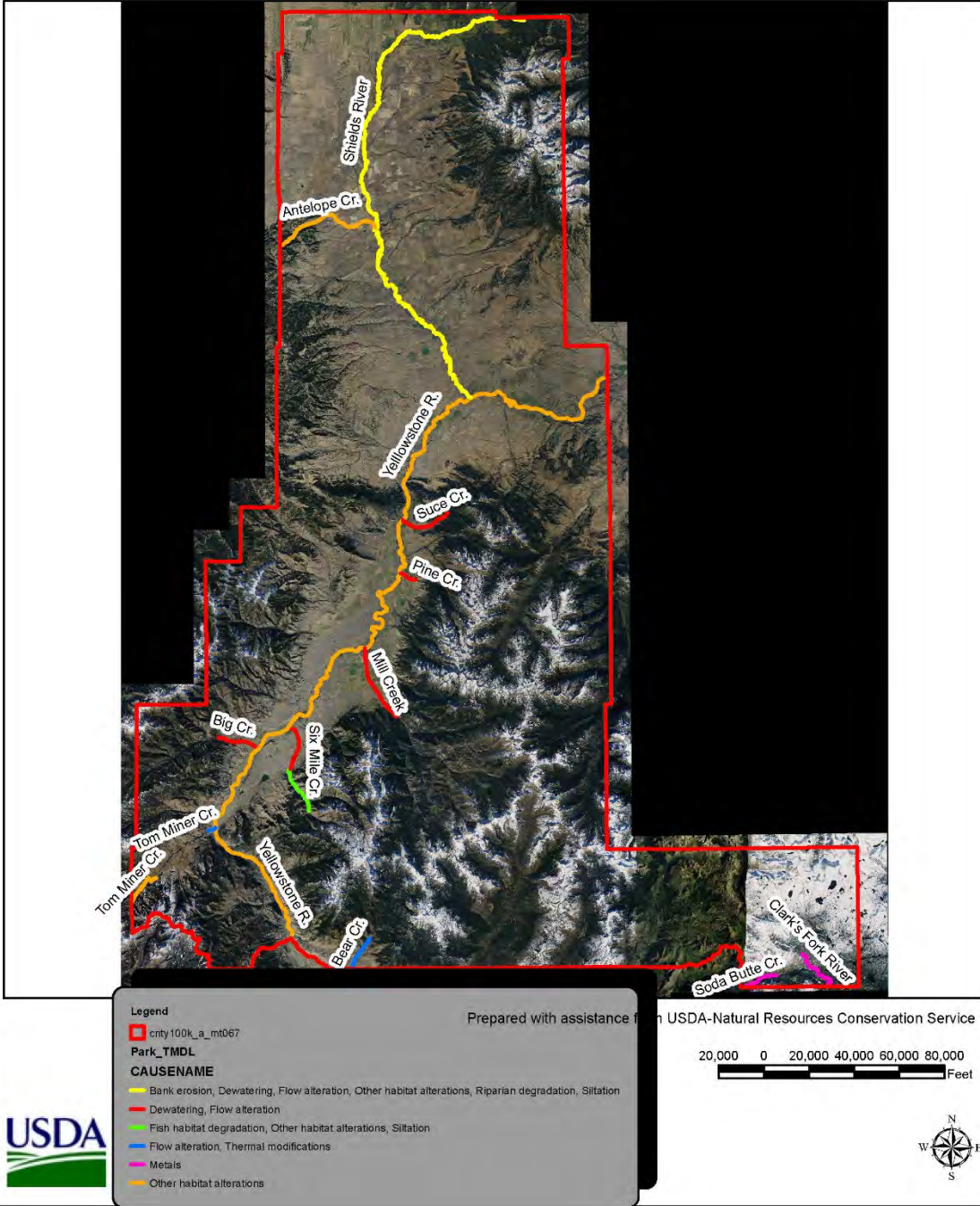
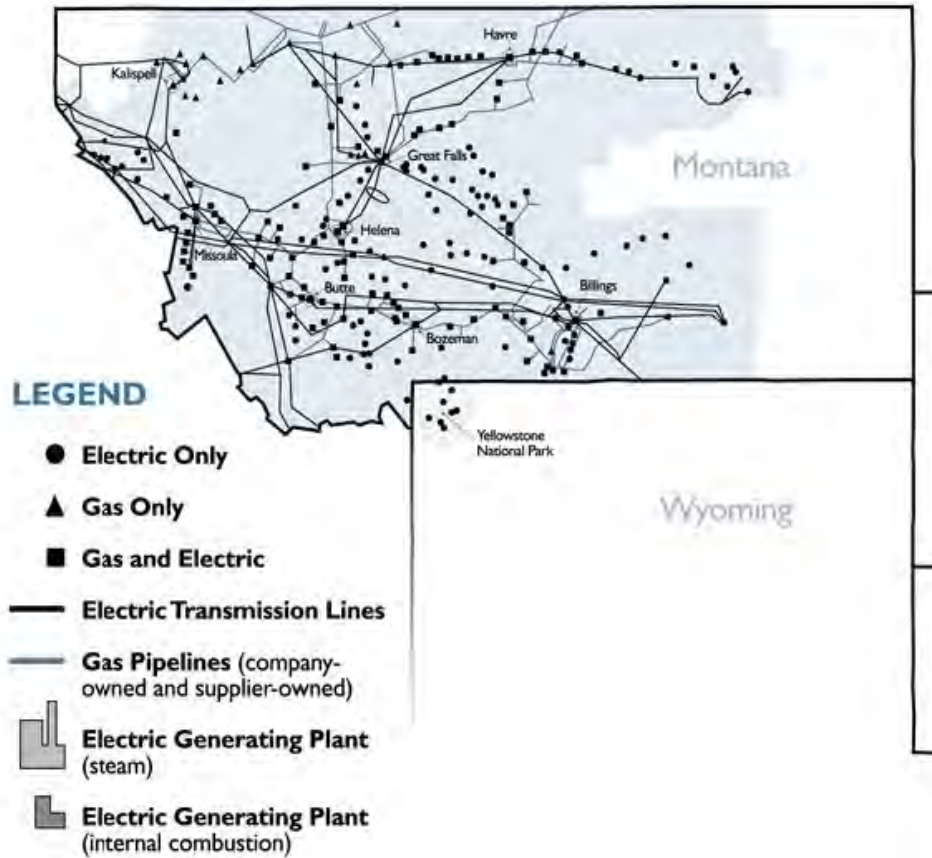


FIGURE 21. PARK COUNTY TMDL MAP.

Park Electric serves part of a 5,544 square mile area covering much of Park and Sweet Grass and portions of Gallatin and Meagher counties.



**FIGURE 22. PARK ELECTRIC COOPERATIVE SERVICE AREA.**



**FIGURE 23. NORTHWESTERN ENERGY SERVICE AREA.**

# Park County Wind Power Class Map

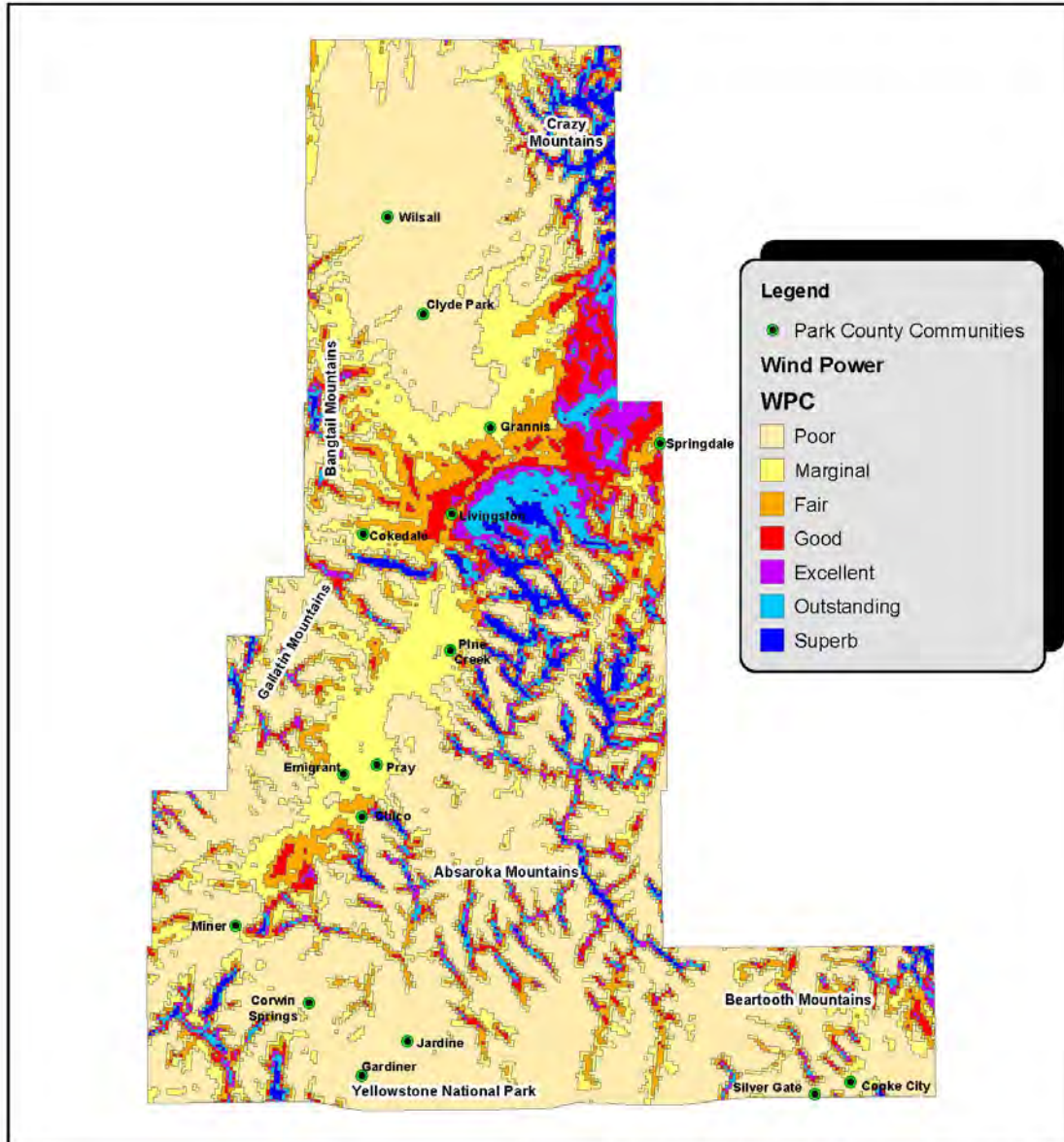
Date: 3/21/2019

District: PARK CONSERVATION DISTRICT

Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service

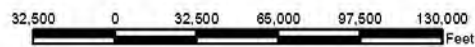


FIGURE 24. PARK COUNTY WIND POWER CLASS MAP.

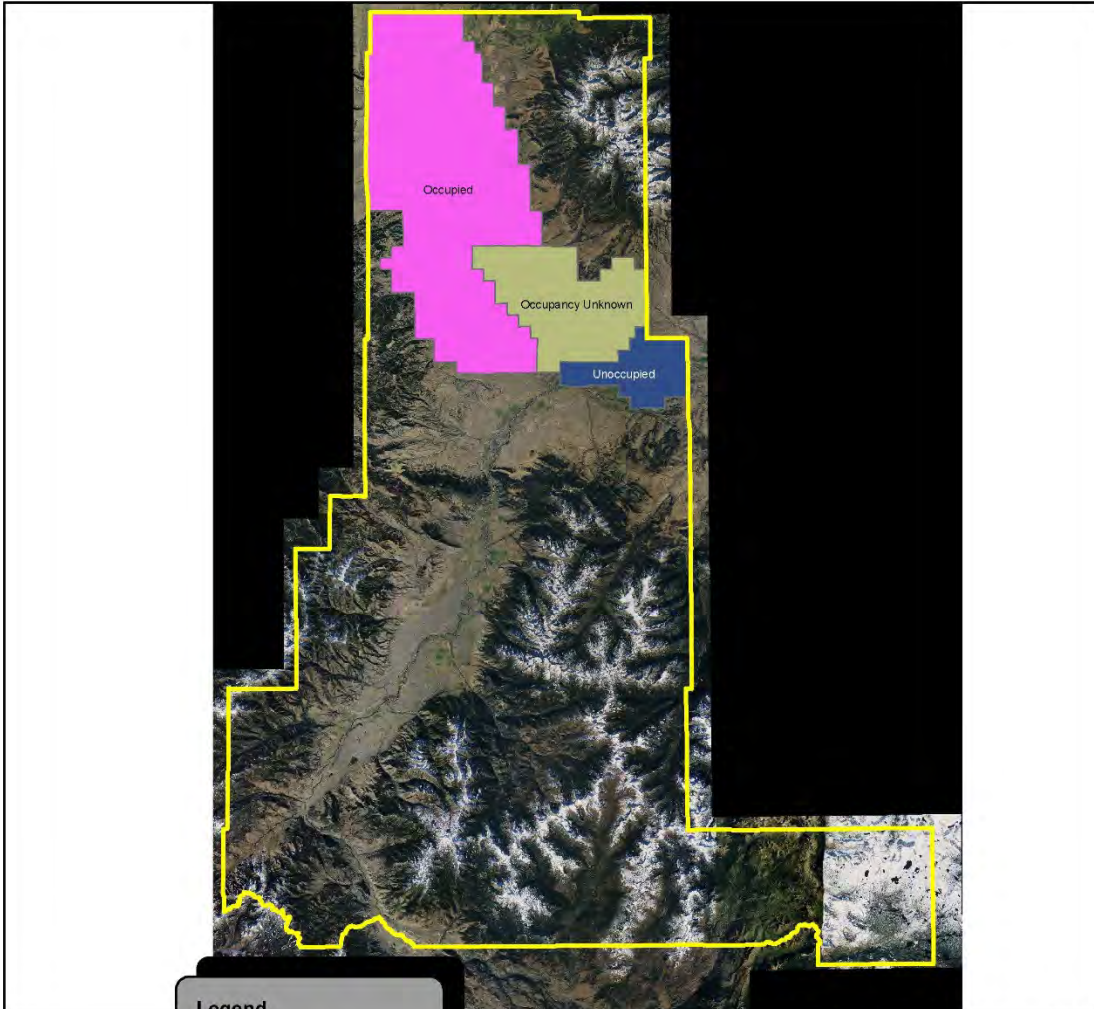
# Park County Sage Grouse Habitat Map

Date: 3/5/2019

Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



**Legend**

- cnty100k\_a\_mt067
- Sage\_Grouse\_Park
- <all other values>

**HABITAT**

- Occupancy Unknown
- Occupied
- Unoccupied

Prepared with assistance from USDA-Natural Resources Conservation Service

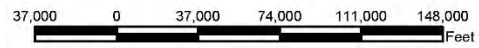


FIGURE 25. PARK COUNTY GREATER SAGE GROUSE HABITAT MAP.

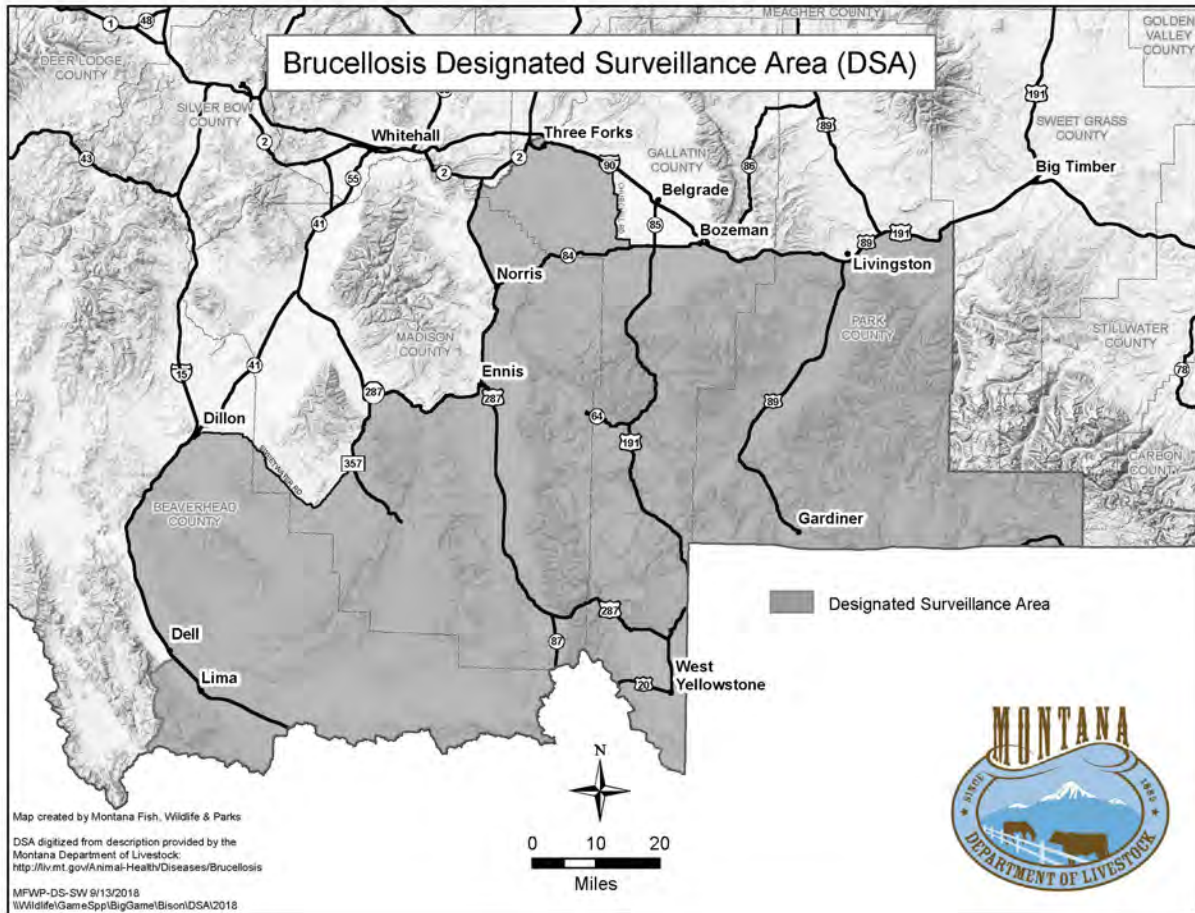


FIGURE 26. MAP OF MONTANA BRUCELLOSIS SURVEILLANCE AREA (DSA)



United States Department of the Interior  
Fish and Wildlife Service



Ecological Services  
Montana Field Office  
585 Shepard Way, Suite 1  
Helena, Montana 59601-6287  
Phone: (406) 449-5225, Fax: (406) 449-5339

**ENDANGERED, THREATENED, PROPOSED AND CANDIDATE SPECIES  
MONTANA COUNTIES\***  
**Endangered Species Act**

**October 8, 2019**

C = Candidate  
LT = Listed Threatened  
LE = Listed Endangered  
P = Proposed  
PCH = Proposed Critical Habitat  
CH = Designated Critical Habitat  
XN = Experimental non-essential population

\*Note: Generally, this list identifies the counties where one would reasonably expect the species to occur, not necessarily every county where the species is listed

County/Scientific Name	Common Name	Status
<b>PARK</b>		
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C

**Figure 27. List of USFWS Endangered, Threatened, Proposed, and Candidate species in Park County as of 10/8/2019.**



Scientific Name	Common Name	Family	Family Common Name	G Rank	S Rank	Habitat
<i>Bos bison</i>	Bison	Bovidae	Bison / Goat / Sheep	G4	S2	Grasslands
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	Vespertilionidae	Bats	G4	S3	Caves in forested habitats
<i>Gulo gulo</i>	Wolverine	Mustelidae	Weasels	G4	S3	Boreal Forest and Alpine Habitats
<i>Lasiurus borealis</i>	Eastern Red Bat	Vespertilionidae	Bats	G3G4	S3	Riparian forest
<i>Lasiurus chirensis</i>	Hoary Bat	Vespertilionidae	Bats	G3G4	S3	Riparian and forest
<i>Lynx canadensis</i>	Canada Lynx	Felidae	Cats	G5	S3	Subalpine conifer forest
<i>Myotis lucifugus</i>	Little Brown Myotis	Vespertilionidae	Bats	G3	S3	Generalist
<i>Sorex merriami</i>	Merrill's Shrew	Soricidae	Shrews	G4	S3	Sagebrush grassland
<i>Ursus arctos</i>	Grizzly Bear	Ursidae	Bears	G4	S2S3	Conifer forest
<i>Accipiter gentilis</i>	Northern Goshawk	Accipitridae	Hawks / Kites / Eagles	G5	S3	Mixed conifer forests
<i>Anthus spragueii</i>	Sprague's Pipit	Motacillidae	Pipits	G3G4	S3B	Grasslands
<i>Aquila chrysaetos</i>	Golden Eagle	Accipitridae	Hawks / Kites / Eagles	G5	S3	Grasslands
<i>Ardea herodias</i>	Great Blue Heron	Ardeidae	Bitterns / Egrets / Herons / Night-Herons	G5	S3	Riparian forest
<i>Artemisospiza nevadensis</i>	Sagebrush Sparrow	Passerellidae	New World Sparrows	G5	S3B	Sagebrush
<i>Buteo regalis</i>	Ferruginous Hawk	Accipitridae	Hawks / Kites / Eagles	G4	S3B	Sagebrush grassland
<i>Cathartes fuscescens</i>	Veery	Turdidae	Thrushes	G5	S3B	Riparian forest
<i>Centrocercus urophasianus</i>	Greater Sage-Grouse	Phasianidae	Upland Game Birds	G3G4	S2	Sagebrush
<i>Certhia americana</i>	Brown Creeper	Certhiidae	Creeper	G5	S3	Moist conifer forests
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Fringillidae	Finches	G5	S3	Conifer forest
<i>Cygnus buccinator</i>	Trumpeter Swan	Anatidae	Swans / Geese / Ducks	G4	S3	Lakes, ponds, reservoirs
<i>Dolichonyx oryzivorus</i>	Bobolink	Icteridae	Blackbirds	G5	S3B	Moist grasslands
<i>Dryocopus pileatus</i>	Pileated Woodpecker	Picidae	Woodpeckers	G5	S3	Moist conifer forests
<i>Falco peregrinus</i>	Peregrine Falcon	Falconidae	Falcons	G4	S3	Cliffs / canyons
<i>Gymnorhinus cyanocephalus</i>	Plinyon Jay	Corvidae	Jays / Crows / Magpies	G5	S3	Open conifer forest
<i>Haemorrhous cassinii</i>	Cassin's Finch	Fringillidae	Finches	G5	S3	Drier conifer forest
<i>Histrionicus histrionicus</i>	Harlequin Duck	Anatidae	Swans / Geese / Ducks	G4	S2B	Mountain streams
<i>Icterus naevius</i>	Varied Thrush	Turdidae	Thrushes	G5	S3B	Moist conifer forests
<i>Leucosticte atrata</i>	Black Rosy-Finch	Fringillidae	Finches	G4	S2	Alpine
<i>Nucifraga columbiana</i>	Clark's Nutcracker	Corvidae	Jays / Crows / Magpies	G5	S3	Conifer forest
<i>Numenius americanus</i>	Long-billed Curlew	Scolopacidae	Sandpipers	G5	S3B	Grasslands
<i>Oreoscoptes montanus</i>	Sage Thrasher	Mimidae	Thrashers / Mockingbirds / Catbirds	G4	S3B	Sagebrush
<i>Pipilo chlorurus</i>	Green-tailed Towhee	Passerellidae	New World Sparrows	G5	S3B	Shrub woodland
<i>Spizella breweri</i>	Brewer's Sparrow	Passerellidae	New World Sparrows	G5	S3B	Sagebrush
<i>Strix nebulosa</i>	Great Gray Owl	Strigidae	Owls	G5	S3	Conifer forest near open meadows
<i>Troglodytes pacificus</i>	Pacific Wren	Troglodytidae	Wrens	G5	S3	Moist conifer forests
<i>Anaxyrus boreas</i>	Western Toad	Bufoidea	True Toads	G4	S2	Wetlands, floodplain pools
<i>Oncorhynchus clarkii bouvieri</i>	Yellowstone Cutthroat Trout	Salmonidae	Trout	G4T4	S2	Mountain streams, rivers, lakes
<i>Oncorhynchus clarkii lewisi</i>	Westslope Cutthroat Trout	Salmonidae	Trout	G4T4	S2	Mountain streams, rivers, lakes
<i>Rhyacophila alexanderi</i>	Alexander's Rhyacophilan	Rhyacophiliidae	Primitive Caddisflies	G2	S2	Mountain / alpine streams
<i>Isocappia integra</i>	Alberta Snowfly	Capniidae	Small Winter Stoneflies	G4	S2	Mountain Streams to Rivers
<i>Discus shimkeli</i>	Striate Disc	Discidae	Discs	G5	S1	Aspen, mesic/moist conifer woodlands
<i>Oreohelex stيفosa berryi</i>	Berry's Mountainsnail	Oreohelecidae	Mountain Snails	G5T2	S1S2	Limestone talus

Figure 28. List of Animal Species of Concern for Park County as of 2/6/2019.



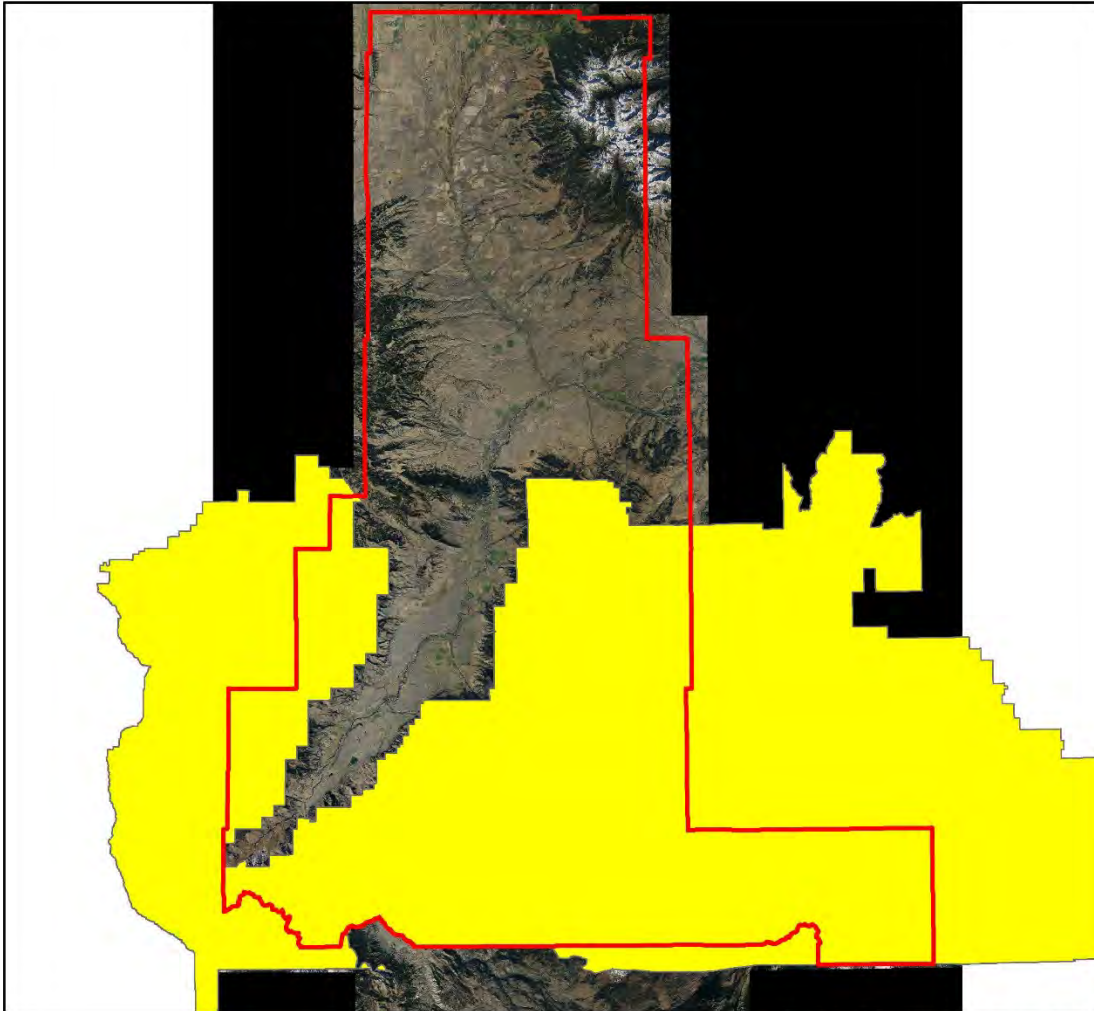
Park County Canada Lynx  
Designated Critical Habitat Map

Date: 3/5/2019

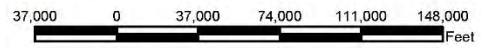
Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service



**Legend**

- cnty100k\_a\_mt067
- lynxch\_final\_mt



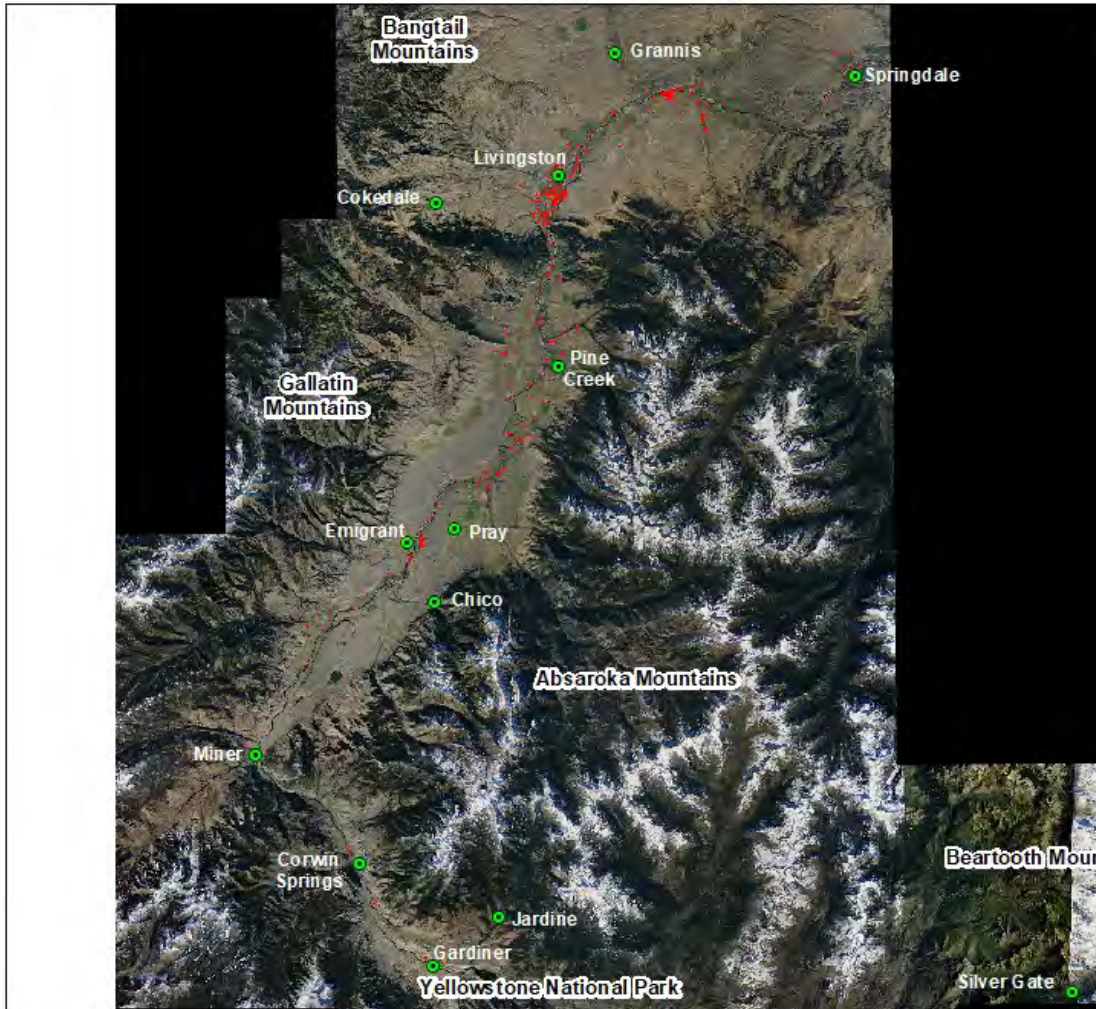
FIGURE 30. PARK COUNTY CANADA LYNX DESIGNATED CRITICAL HABITAT MAP.

Park County  
Russian Olive Map

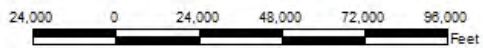
Date: 9/30/2019

District: PARK CONSERVATION DISTRICT

Field Office: LIVINGSTON FIELD OFFICE  
Agency: USDA/NRCS  
Assisted By: TED NELSON  
State and County: MT, Park County, Montana



Prepared with assistance from USDA-Natural Resources Conservation Service



**Legend**

- Park County Communities
- Russian Olive



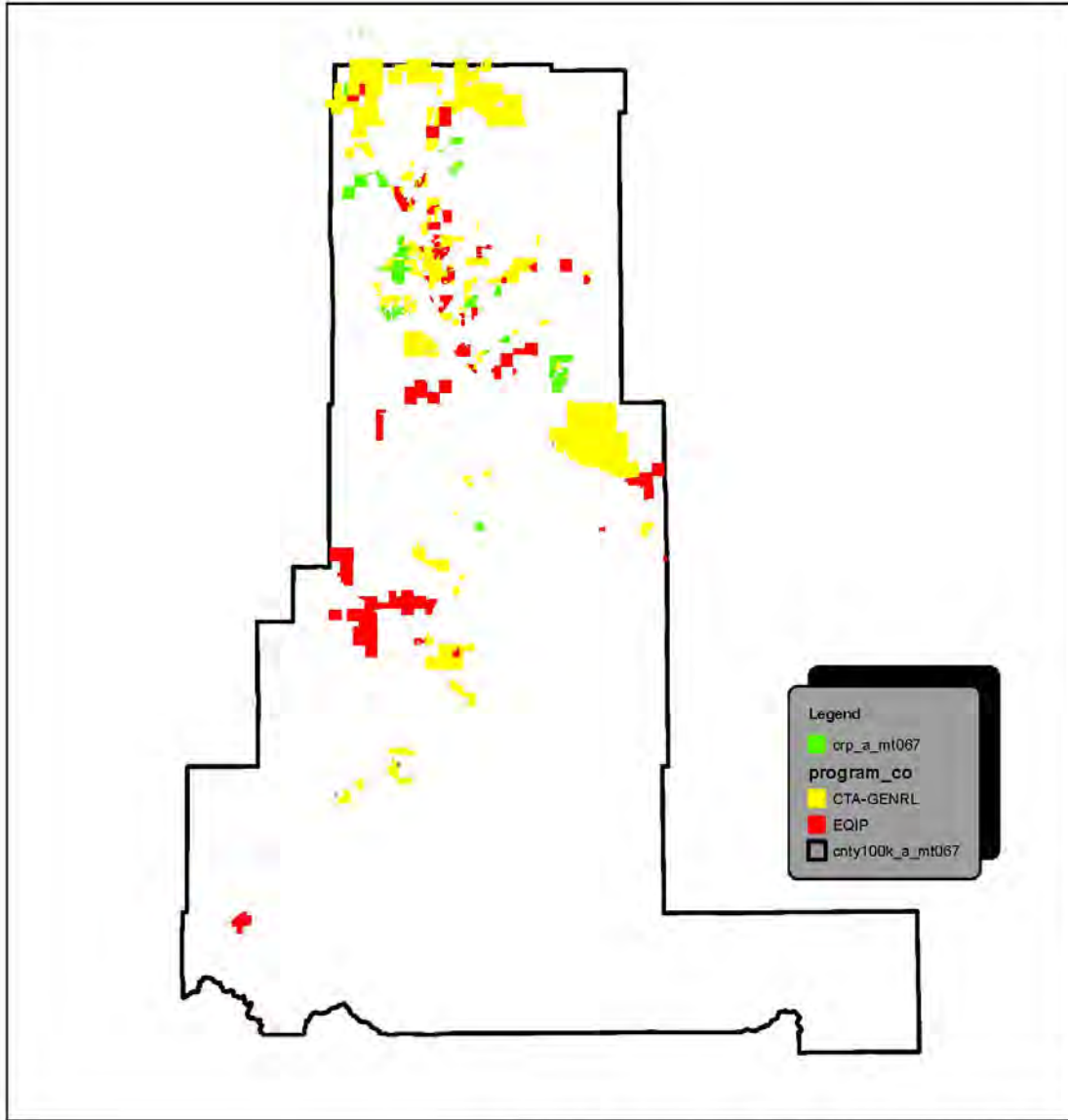
FIGURE 31. PARK COUNTY RUSSIAN OLIVE MAP.

Park County NRCS Program Participation 2008-18 Map Date: 2/19/2019

Field Office: LIVINGSTON FIELD OFFICE

Agency: USDA/NRCS

State and County: MT, Park County, Montana



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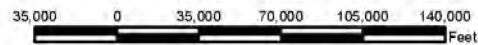
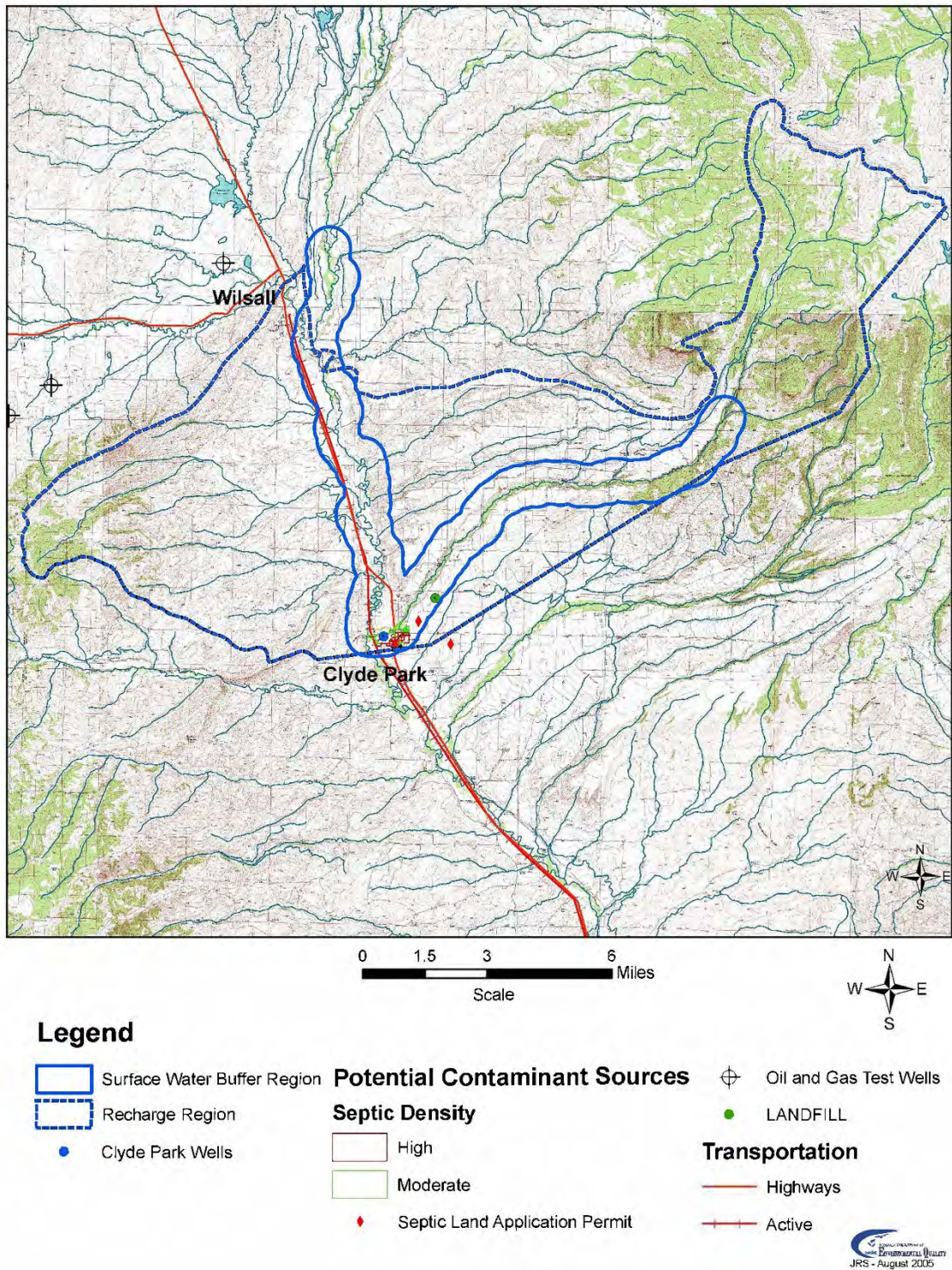


FIGURE 32. MAP OF CONSERVATION DELIVERY IN PARK COUNTY FROM 2008-2018.



**FIGURE 33. MAP OF THE RECHARGE REGION FOR THE CLYDE PARK PUBLIC WATER SUPPLY (MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY).**