Meagher County Long Range Plan

"The wise use of natural resources to serve the greatest number of people over the longest period of time while maintaining a quality environment." From Meagher County Conservation District Long Range Plan 1978

The purpose of this plan is to create a working document that describes the natural resources of Meagher County, inventories resource problems as they exist and prioritizes projects for NRCS incentive programs. The partners involved in the creation of this document are the Meagher County Conservation District, Montana Fish Wildlife and Parks, and the Meagher County Weed District.

This plan will assess priorities for conservation work in Meagher County over the next 5 to 10 years. However, the plan should be reviewed annually and adjusted as necessary based on current events and changing resource concerns.

History

Meagher County was named in honor of Irish-born Brigadier General Thomas Francis Meagher who commanded Union troops during the Civil War and afterwards served as Secretary and Acting Territorial Governor of Montana from 1865 until his mysterious drowning death in the Missouri River near Fort Benton on July 1, 1867. Originally part of Gallatin County in 1865, Meagher County was created by the Fourth Territorial Assembly and officially recognized November 16, 1867. Over the years the county has lost over half of its original size due to the creation of neighboring counties.

Prior to the arrival of European explorers and settlers, Native people of the Algonquian-speaking Piegan, Blood, and Blackfeet tribes inhabited the area in addition to a small number from the Crow Tribe. People of the flathead nation traveled through the area to hunt buffalo. There was abundant big game and fish in the area and the Smith River Canyon provided shelter from the harsh, windy winters. Natives also utilized deposits of chert in the area to make arrowheads and other tools. The hot mineral springs from which the city of White Sulphur Springs derived its name, were at this time a swamp and were used by Native Americans for bathing and healing the sick and wounded.

Following the Lewis and Clark Expedition in 1805 and 1806 the area was explored by trappers in search of furs. The discovery of gold in the Big Belt Mountains in the early 1860's resulted in a large influx of miners and the construction of Camp Baker (later moved 12 miles south and renamed Fort Logan) in 1869 for the protection of miners and settlers. By 1880 the local native people had been pushed out of the area and the gold mines in the Big Belts were nearly played out which resulted in the abandonment of Fort Logan. However, silver was soon discovered in the Castle Mountains in 1883 and by 1891 the Cumberland Mine near Castletown was the largest producer of lead and silver ore in Montana. The Panic of 1893 and the resulting plunge

in silver prices caused the abandonment of many mines. Even the construction of the Jawbone Railroad nearby (abandoned in 1899) failed to revive the mines, spelling doom for the mining towns.

The first European settlers in the Smith River Valley, James Brewer, came in search of the mineral hot springs that he had heard about from Native Americans. He built a cabin near the hot mineral springs and by 1872 had constructed several baths which he charged travelers to use. Within several years a city sprung up around the springs and in 1890 White Sulphur Springs was voted the county seat.

Ranching arrived in 1873 with the Smith Brothers who brought with them 100 head of cattle from Idaho. The Smiths later introduced sheep to the area. In 1890 Texas and Kansas cattlemen began driving cattle onto the largely open range which remained as such until the creation of the Lewis and Clark National Forest in 1897. Sheep ranching became a major agricultural activity in the county until the decline in sheep prices following the Second World War after which cattle ranching became the major driving force of the area and has been through today.

Settlers including many former miners acquired land under the provisions of the Homestead Act of 1862 and the Desert Land Act of 1877. Due to the county's large size and relative isolation, transportation of farm goods to market was difficult until 1910 when John Ringling of Ringling Brothers Circus fame constructed the White Sulphur Springs and Yellowstone Park Railway between the towns of White Sulphur Springs and Ringling (formerly Leader) and to the Milwaukee Railroad, thus connecting Meagher County with the rest of the country resulting in an increase in dry land farming. However, severe drought from 1918 to 1921 caused the abandonment of many homesteads and put the county into a long, steady economic decline until the timber industry moved in to harvest the large forest of Douglas-fir and pine in the 1950's. During the peak of logging activity in the 1960's the town of White Sulphur Springs had three lumber mills but by the early 1980's all the mills had closed and the railroad stopped using all remaining railroad lines in the county.

County Profile and Resource Inventory

Meagher County, in central Montana, has a total 1,506,560 acres. The county includes parts of several mountain ranges in the Rocky Mountains and valleys between the ranges. The county is bounded on the west by the divide of the Big Belt Mountains and on the north and northeast by the Little Belt Mountains. The Castle Mountains lie wholly within the county in the central portion and part of the Crazy Mountains lie in the southwest corner.

Drainage in the county is provided through four perennial streams. The Smith River and its tributaries, which flows north out of the district to the Missouri, drains the northwestern and central portions. The Shields river and its tributaries, which drains a small part of the south eastern end of the county flows to the Yellowstone River. Sixteenmile Creek drains the

southeastern portion of the county, flows to the Missouri river. The Musselshell River drains the eastern portion of the county.

The precipitation in the county varies from 10 to 50 inches annually. The frost-free period varies from 60 to 110 days. This, plus the wide variety of soil parent materials produces a multitude of soil types (from Meagher County Conservation District Long Range plan, March 1978).

The soil survey is complete for Meagher County and is available on Web Soil Survey. A hard copy of the soil survey was never completed; soil survey is only available digitally.

There were 1,851 people living in Meagher county in 2017. Meagher county residents were 96.5% white, 0.3% black or African American, 0.9% Native American, 1.7% two or more races, and 2.1% Hispanic. Median household income was $41,343 for 2013to 2017, with 16% of residents living in poverty. Meagher county is 2,391 square miles and averages 0.8 people per square mile (Headwaters Economics).

Socioeconomic Measures

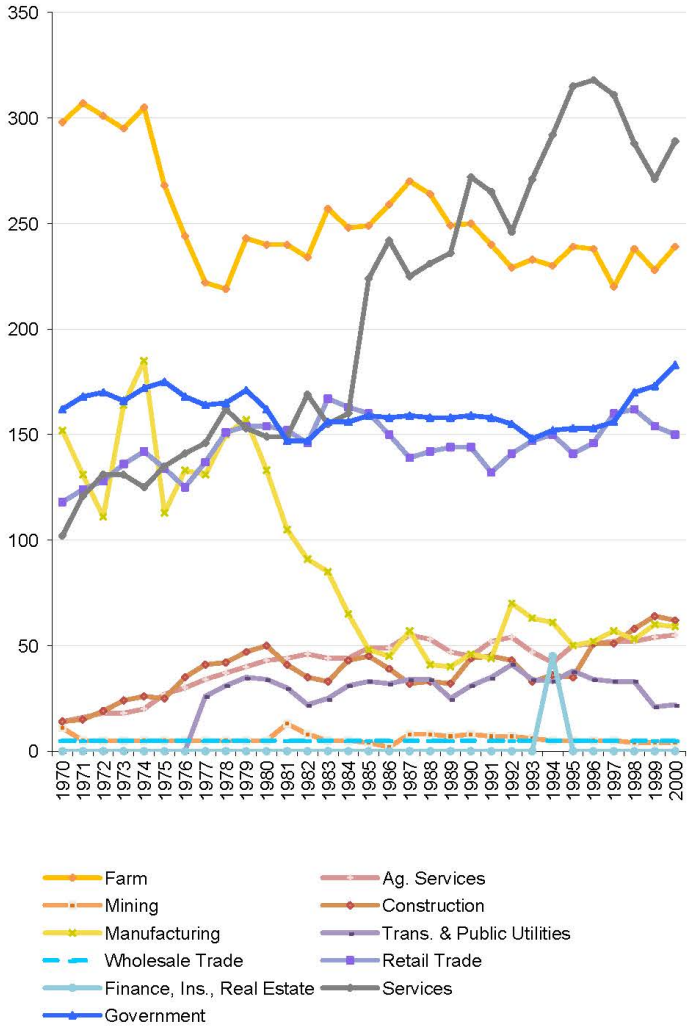
Meagher County, MT

Employment by Industry (1970-2000)

Employment by Industry, Meagher County, MT

- In 2000 the three industry sectors with the largest number of jobs were services (289 jobs), government (183 jobs), and retail trade (150 jobs).

- From 1970 to 2000, the three industry sectors that added the most new jobs were services (187 new jobs), agricultural services, forestry, fishing & other (41 new jobs), and government (21 new jobs).

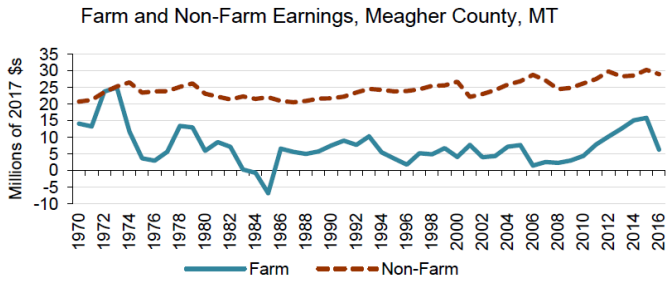


Data Sources: U.S. Department of Commerce. 2017. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C., reported by Headwaters Economics' Economic Profile System, headwaterseconomics.org/eps.

2016 Farm income for Meagher County Livestock was $26,201,000 and Crops $8,873,000.

Production expenses were $32,696,000. Realized net farm income was $4,134,000. In 2012 there were 812,325 acres in farms. The average farm size is 5,973 ac (Headwaters Economics).

- From 1970 to 2016, farm earnings shrank from $14.0 million to $6.2 million, a 55.6 percent decrease.
- From 1970 to 2016, non-farm earnings grew from $20.6 million to $28.9 million, a 40 percent increase.



Number and Size of Farms

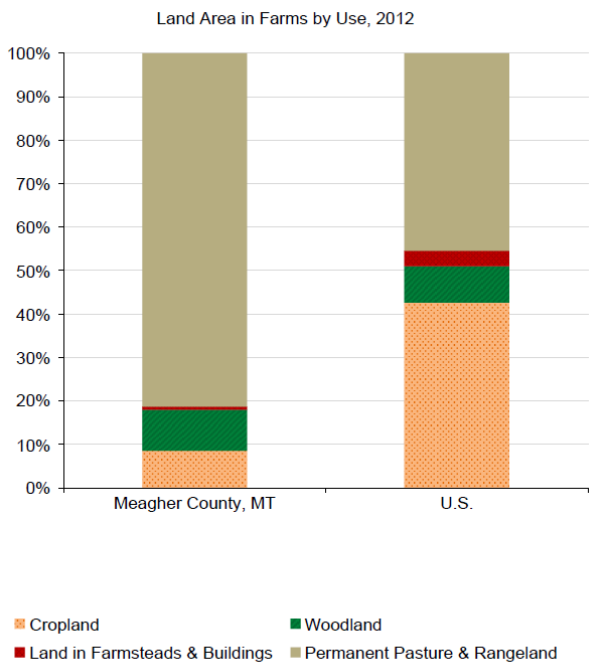
	Meagher County, MT
Number of Farms 2012	136
Land in Farms (Acres) 2012	812,325
Average Farm Size (Acres) 2012	5,973
Approximate Land Area (Acres)	1,530,819
Approximate Percent of Land Area in Farms	53.1%

In 2017 there were 4,500 ac planted to winter wheat, (average 38bu/ac), there were 1,800 ac planted to spring wheat (average 27bu/ac), 9,300ac were planted to barley (average 73bu/ac). In 2017 18,000 ac were in alfalfa (average 3.25 ton/ac) and other hay 22,800 ac (average 1.8 ton/ac). Approximately 42,000 cattle and calves were sold (Montana Agricultural Statistics 2017). Lentils, mustard, chickpeas, field peas, and canola have recently been planted as commodity crops. Hay is grown on most farms and small grains are typically used in the hay rotation. Most farms produce beef cattle.

Table. Data from GIS layer Final Land Unit (FLU) made by the Montana Department of Revenue. (See map of data at end of document)

Land Use	Acres	Percent of County
Irrigated land; flood irrigation	25,473	1.7
Irrigated land; sprinkler irrigation	1,394	0.1
Irrigated land; pivot irrigation	17,452	1.2
All irrigated land	44,318	3
Non-irrigated hay land	10,179	0.7
Dry farmland/pasture	25,963	1.7
Forest land	608,826	40.4
Rangeland and pasture	817,274	54.2
All acres in the county	1,506,560	

- In 2012, the U.S. had the largest percent of land area in cropland (42.6%) and Meagher County, MT had the smallest (8.6%).
- In 2012, Meagher County, MT had the largest percent of land area in woodland (9.4%), and the U.S. had the smallest (8.4%).
- In 2012, the U.S. had the largest percent of land area in farmsteads and buildings (3.6%), and Meagher County, MT had the smallest (0.8%).
- In 2012, Meagher County, MT had the largest percent of land area in permanent pasture and rangeland (81.2%), and the U.S. had the smallest (45.4%).

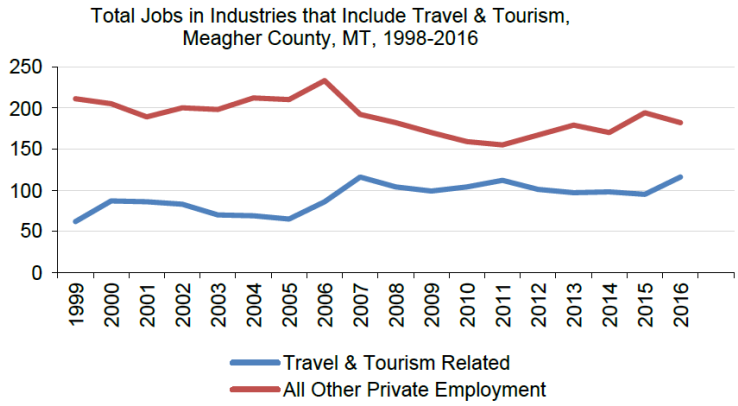


Data Sources: U.S. Department of Agriculture. 2014. National Agricultural Statistics Service, Census of Agriculture, Washington, D.C.

Meagher County is 62% private land, 5.3% of that is under conservation easements. Meagher County is 32% federal land, 31% of the county is Forest Service land and 0.5% of the county is BLM land. Six percent of Meagher county is state land (Headwaters Economics).

Agriculture has always been a critical part of Meagher Counties economy The last of the lumber mills closed in the early 80's, resulting in the loss of numerous town jobs. Recreation and tourism continue to grow in Meagher county. There are 482,000 acres of federal land offering hunting, camping, hiking, fishing, skiing, and snowmobiling. The Smith River offers a 59 mile multi-day float trips with spectacular scenery and renowned trout fishing. Float permits are offered through a lottery system. This float is through private, state and forest service land. Private land hunting is an important component of many ranch businesses.

- From 1998 to 2016, travel & tourism employment grew from 72 to 116 jobs, a 61.1% increase.
- From 1998 to 2016, non-travel & tourism employment shrank from 199 to 182 jobs, a 8.5% decrease.



Water

The private rangelands receive 10"to 18" of precipitation annually with the Fort Logan area having the lowest average annual precipitation and the higher elevation areas having the highest. Private forest land or mountain meadows receive 16"-22". Higher elevation mountainous areas receive greater than 22" precipitation but these lands are mostly National Forest Service lands.

Rivers are driven by snow melt hydrology. The average snow water equivalent for Elk Peak, a higher elevation site in the Castle mountains, is 10" with 48" of average snow depth during the 1st half of April. The median snow water equivalent for Kings Hill a higher elevation site in the Little Belts is 12" with 43" average snow depth in the 1st half of April. The Musselshell and the Smith rivers average peak flow is in the beginning of June.

There are 44,318 acres of irrigated ground in Meagher county. Most irrigated land is adjacent to creeks and rivers, and are supplied by surface water diverted from streams, with few groundwater irrigation wells. There are four reservoirs in the county that are used for irrigation water storage.

Irrigation Infrastructure

Bair Dam

Bair Dam is located on the North Fork of the Musselshell River in Meagher County, approximately ¾ mile upstream of Checkerboard. It is owned by the Department of Natural Resources and Conservation (DNRC) and managed by the State Water Project Bureau (SWPB), and has been operated by Upper Musselshell Water Users Association (WUA) since 1940.

This project consists of the 102 foot high dam, and a concrete chute spillway, a gated, reinforced concrete outlet conduit, a 48-inch butterfly operating gate, and a 48-inch emergency slide gate with manual operators located in a gate house on the dam crest. Original

construction was completed in 1939. Normal storage at full pool is 7,300 acre-feet, and eleven water users have 21contracts. This project irrigates approximately 4,100 acres with three canals: 1) Northfork Diversion Canal (11.7 miles long), 2) Checkerboard Canal (2.9 miles long) and 3) Two Dot Canal (32.2 miles long). The dam is a "high hazard" structure which means that its failure could cause loss of life: 94 people would potentially be impacted. Checkerboard, numerous houses, roads, bridges, and utilities are located in the flood plain. The Bair Dam was rehabilitated in 2003. The dam now meets all current safety standards, with an expected design life of 50 to 75 years. A new structural concrete spillway was constructed in the same location as the old one. The steep slope above the spillway was excavated to create a gentler slope to alleviate creep and rock fall. A new concrete conduit outlet structure was installed, and an additional toe berm was constructed to buttress downstream embankment. Finally, a new control house, fence, security gates and access road were all constructed. The recent rehabilitation cost was $2,738,562 (from SWPB website).

North Fork Smith River Dam AKA Southerland Reservoir

The North Fork Smith River Dam is located on the North Fork of the Smith River in Meagher County, ten miles East of White Sulphur Springs. It is owned by DNRC & managed by SWPB and has been operated by Smith River WUA since 1936.

The project consists of an earthen embankment dam, 84 feet high, and 1,300 feet long. There is a labyrinth weir spillway with excavated rock channel, a gated, reinforced concrete outlet conduit, and a 5-x 5-foot reinforced concrete, modified horseshoe shaped conduit with manually operated 54-inch diameter emergency slide gate and 54- inch butterfly operating gate.

The original construction was completed in 1936. Normal storage is 11,500 acre-feet, covering 335 surface acres. Twenty-nine water users have 40contracts and irrigate approximately 11,000 acres with one canal (Southside Canal; 13.2 miles long). The dam is a "high hazard" structure, which means that its failure could cause loss of life. Numerous roads, bridges, and utilities are located in the flood plain. White Sulphur Springs, (pop. 1,018) would begin flooding approximately three hours after failure of the dam.

The dam was rehabilitated in 2006. The rehabilitation brought the dam into full compliance with current safety standards.

The rehabilitation included a new structural two-cycle labyrinth weir concrete spillway, raising and leveling the dam crest, and replacing the outlet works terminal structure with a new structure. Work also included enlarging the rock spillway channel and installing new drains for seepage control. The recent rehabilitation cost was $825,000 (from SWPB website)

Newlan Creek Reservoir

Dam is located on Newlan Creek, a tributary to the Smith River, approximately six miles north of White Sulphur Springs, Meagher County, Montana. The dam was engineered by the SCS and

constructed by Rehbein Construction Company, Plains, Montana. The dam was completed in 1977. The owner is Newlan Creek Water District.

Newlan Creek Reservoir stores runoff from a drainage basin comprising an area of 43.4 square miles. The basin consists primarily of rolling prairies and the foothills of the Little Belt Mountains. In terms of land use, the drainage area above the dam is approximately 56 percent forest cover and 44 percent native range, pasture and hayland. Newlan Creek Dam was built as a multipurpose project with primary benefits associated with irrigation storage, flood control, and recreation. Normal storage is 14,030 acre-feet.

There are currently about 12 irrigators within the Newlan Creek Water Users and about 2,300 acres are irrigated. The diversion points are mostly off Newlan creek with one larger ditch that services two water users (From Otto Ohlson).

Martinsdale Reservoir

Water from Martinsdale Reservoir comes mostly from Meagher County. Some of the reservoir is in Meagher County but the dam itself, all the infrastructure, and all the places of water use are in Wheatland county.

Water Quality

The Montana Department of Environmental Quality (DEQ) lists multiple streams and rivers in Meagher County as impaired. Total maximum daily loads (TMDL) recommendations have not been completed in Meagher County. DEQ is currently working on TMDL development for Sheep Creek, a tributary to the Smith River.

Table: The Montana Department of Environmental Quality lists multiple streams and rivers in Meagher County as impaired. From Clean Water Act Information Center.

Water Body	Miles	Cause of Impairment	Source
Smith River, North and South Fork to Hounds cr	98	Escherichia coli	Agriculture
		Low Flow alterations	Irrigated Crop Production
		Phosphorus	Rangeland Grazing
North Fork Smith River, Lake Sutherlin to mouth of Smith	23	Chlorophyll-a	Source Unknown
		Escherichia coli	
		Nitrogen	
		Phosphorus	
Sheep Cr, headwaters	41	Aluminum	Natural Sources
		Escherichia coli	Grazing in Riparian zone

to mouth of Smith			
Beaver Cr, headwaters to the mouth of the Smith River	20	Alteration in stream side vegetative cover	Grazing in Riparian zone
		Nitrogen	
		Phosphorus	
		Sediment/Siltation	
Benton Gulch	13	Escherichia coli	Source Unknown
Elk Cr, headwaters to mouth of Camas Cr	10	Low flow alterations	Irrigated Crop Production
		Nitrogen	Livestock grazing or feeding
		Phosphorus	
		Sediment/ Siltation	
		Temperature, water	
Thompson Gulch	11	Alteration in stream side vegetative cover	Grazing in Riparian zone
		Nitrogen	
		Sediment/Siltation	
Newlan Cr, Newlan Reservoir to mouth of Smith	9	Alteration in stream side vegetative cover	Irrigated Crop Production
		Escherichia coli	Livestock grazing or feeding
		Low flow alterations	
		Sediment/ Siltation	
		Temperature, water	
Newlan Cr, headwaters to Reservoir	13	Alteration in stream side vegetative cover	Grazing in Riparian zone
		Cadmium	Impacts from Abandoned Mine Lands
		Nitrogen	Transfer of water from an Outside Watershed
		Phosphorus	
		Sediment/ Siltation	
		Solids	
Little Camas Cr, junction of little and		Escherichia coli	Source Unknown

big Camas cr to Smith			
Moose Cr, headwaters to mouth of Sheep Cr		Aluminum	Natural Source
N Fork Musselshell, headwaters to S fork Musselshell	38	Chlorophyll-a	Grazing in Riparian zone
			Natural Source
Trail Cr, headwaters to North Fork Musselshell	10	Chlorophyll-a	Rangeland Grazing
		Sediment/ Siltation	Silviculture
			Source Unknown
Sixteenmile Cr, Lost Cr to mouth of Missouri	50	Alteration in stream side vegetative cover	Channelization
		Nitrogen	Grazing in Riparian zone
		Phosphorus	
		Sediment/ Siltation	
Battle Cr, headwaters to mouth of Sixteenmile cr	23	Alteration in stream side vegetative cover	Grazing in Riparian zone
		Low flow alterations	Irrigated Crop Production
		Phosphorus	
		Sediment/ Siltation	

There are a small number of corrals or feedlots located on or adjacent to streams. There are no known aquatic invasive species in Meagher County.

Plants

The county is 54% rangeland and pasture. Plant communities vary widely as precipitation and soils vary widely. Bluebunch wheatgrass, needle grasses, Idaho fescue, rough fescue, and Wyoming and mountain big sagebrush are common rangeland plants throughout the county. At higher elevation the rangelands have a high percentage of forbs. , shallow, very shallow, Loamy, limy, droughty and limy droughty are the most common ecological sites. Meagher County

valleys are Major Land Resource Area (MLRA) 44B Central Rocky Mountain Valley and the mountains and foothills fall within 43B Central Rocky Mountains.

The majority of the forested areas are Douglas fir with ponderosa pine on south facing slopes. Lodgepole pine is common at higher elevations. Limber pine, Engelmann spruce, aspen, and subalpine fir occur in specific ecoregions throughout the county.

Flood Irrigated or wet meadow pastures are dominated by Garrison creeping foxtail, timothy, and native wet meadow grasses such as Kentucky bluegrass, tufted hairgrass, sedges and rushes.

Irrigated fields are typically managed in an alfalfa hay rotation, with alfalfa or alfalfa with a small amount of grass for 3-15 years and a small grain planted in order to renovate the stand. Orchardgrass and meadow brome are commonly chosen for irrigated grass or alfalfa grass seedings.

Dryland pastures are mostly crested wheatgrass and Russian wildrye. Pubescent wheatgrass and intermediate wheatgrass do well where the precipitation is more then 14 inches annually.

Knapweed (spotted, diffuse, and Russian) and Leafy spurge are the most controlled noxious weeds in Meagher County. Excellent effort in the county to fight these weeds has kept their populations small. Musk thistle, Canada thistle, and houndstongue are common but not always controlled. Cheatgrass is becoming more of a problem in Meagher County, and recently there has been more interest in controlling cheat grass with herbicides. See State and Meagher Co weed list in Appendix.

There is considerable potential for fires in Meagher county due to a buildup of fuels on forested land. Meagher county has had few wildfires in the past several years with our largest recent fire of 7,091 acres burned in 2017.

Total Homes and Wildlife-Urban Interface Homes, 2010

	Meagher County, MT	West
Total Number of Homes	1,432	27,766,144
WUI Homes	104	1,947,927
Second Homes in WUI	84	293,196

Fish and Wildlife

According to Montana Fish Wildlife and Parks fisheries biologist Jason Mullen, dewatering, high summer water temperatures, and sediment are his biggest concerns in the Smith River watershed. Fish populations, predominantly rainbow trout, brown trout, and mountain whitefish are stable. Their 2018 sampling found 641 trout per mile greater than 8 inches. This is just below the long-term median of 689 trout per mile greater than 8”. There are concerns that the increase in algae (*Cladophora glomerata)* will change the insect populations which could impact fish, although current sampling indicates a healthy fish population The Department of Environmental Quality (DEQ) has been doing research on algae in the Smith River and believes

it has been increasing because the outside minimum temperature has increased 3 degrees in the past 20 years.

According to Montana Fish Wildlife and Parks fisheries biologist Clint Smith, dewatering, alteration of riparian vegetation and sediment are the biggest resource concerns for fish habitat in the upper Musselshell river. Fish passage is also limited on tributaries to the Musselshell due to irrigation dams. Brook trout, rainbow trout, brown trout, mountain whitefish, and sculpin are the fish species present. There are no long term sampling sites.

Ron Spoon, Fish Wildlife and Parks biologist, stated the main concerns on Sixteenmile Creek are flow depletion and elevated water temperature. The trout fishery (brown and rainbow trout) of the mainstem are fairly high quality. Channelization due to the old railroads a significant issue. A healthier watershed could provide better spawning and rearing of trout for the Missouri River. On Sixteenmile Creek, brook trout are most common and probably dominant in most areas upstream of Ringling. The lower reaches are dominated by brown and rainbow trout, with a few brook trout and rare observations of westslope cutthroat trout drifting down from the South Fork.

MEAGHER COUNTY ENDANGERED SPECIES from FWS October 2018

Lynx canadensis	Canada Lynx	Listed Threatened
Ursus arctos horribilis	Grizzly Bear	Listed Threatened
Gulo gulo luscus	Wolverine	Proposed
Pinus albicaulis	Whitebark Pine	Candidate

Elk, mule and white-tailed deer, pronghorn, and moose are common big game species. Elk numbers are high, and they consume large amounts of forage on private land with livestock grazing. Sharp-tailed grouse, sage-grouse, ruffed grouse, blue grouse, and Franklin's grouse are native upland birds of Meagher county. Pheasant and Hungarian partridge survive but do not thrive around cropland areas. Sage-grouse habitat has decreased across the county as sagebrush habitat is converted to introduced pasture and cropland. Sage-grouse populations are declining. Remaining sagebrush habitat is critical to maintain sage-grouse populations. See appendix for information on Montana Species of Concern for Meagher County.

Resource Concerns

Water Quality Degradation:

There are 17 streams listed for water quality impairments in Meagher County. Excess nutrients such as nitrogen and phosphorus, sediment in stream, and removal/alteration of riparian vegetation from grazing are common impairments. The Smith River has low flows some years that negatively impact water temperature and fish.

The DEQ has been holding public meetings and doing research work on algal blooms in the Smith River. It appears that these blooms are a result of warmer water temperature and phosphorus and nitrogen levels in the river during the early summer.

Example: Excess nutrients, such as phosphorus in surface water. Elevated water temperature

Insufficient Water
The major river valleys of the Musselshell and Smith River have limited water quantity. The Musselshell river water has been adjudicated. Fish wildlife and Parks has concerns about low flows for fish habitat.
Water users throughout the county with a later priority date have to stop irrigating earlier in the summer than would be best for optimal crop growth. Flood irrigation is common. Use of unlined ditches is common

Example: Inefficient use of irrigation water

Soil Erosion
Winter and spring are windy in Meagher County. Use of no till farming is slowly increasing. There is some fall tillage with fields left without cover for the winter. Burning to reduce disease problems on fields with multiple years of wheat or barley leave fields bare in the spring. Large wind events while fields have minimal cover can lead to excessive erosion.

Stream side herbaceous vegetation and willows have been reduced or removed in some areas. Reduction in stream side herbaceous vegetation and willows make stream banks more susceptible to erosion because there are less roots holding soil in place and less plants to slow water velocity during high flows.

Examples: Wind erosion on bare fields during the winter.
Excessive bank erosion from streams shoreline or water conveyance channels

Degraded Plant Condition- Plant Productivity and Health
Rangeland productivity could be higher on much of the rangeland in Meagher county. The average plant similarity index is 30%, or the present plants are producing 30% of what is possible in the historic climax plant community. Forbs replace grass with grazing pressure from cattle.

Hay fields with inadequate water, too much water or poor water distribution have poor plant productivity.

Examples: rangeland productivity lower than potential.
On cropland, poor crop vigor

Degraded Plant Condition-Excessive Plant Pest Pressure

Meagher County has done an incredible job maintaining noxious weeds such as knapweed, leafy spurge, toad flax, etc at low population levels, but the county will need to continue to be vigilant.

Spruce budworm has killed or severely defoliated thousands of acres of Douglas fir trees in Meagher Co. Mountain pine beetle has killed thousands of acres of lodgepole pine and

ponderosa pine. The dead and downed trees leave a fire hazard and make forage inaccessible for grazing.

Example: Spruce budworm damage on Douglas fir

Degraded Plant Condition- Wildfire Hazard, Excessive Biomass Accumulation

Because of the lack of fire in Montana's ecosystems, fuels have built up on forested lands. Many forests are overstocked with young trees. Douglas fir and ponderosa pine are encroaching on grasslands throughout the county.

Example: Tree density is higher than the forest site can maintain

Inadequate Habitat for Fish and Wildlife

Sagebrush habitat has decreased throughout the county. Thousands of acres of sagebrush habitat have been converted to cropland. Sagebrush cover can exceed30% cover in areas with greater than 15 inch precipitation. High sagebrush cover leads landowners to remove sagebrush from grasslands with herbicides or mechanically. Sagebrush is critical for Meagher County's small population of sage-grouse. Elk, deer, pronghorn, small mammals and small birds all use sagebrush for food or shelter.

Livestock Production Limitation- Inadequate Feed and Forage

Rangelands in Meagher Co. produce 10 to 75% of their potential climax plant community. Many acres of rangeland are producing less than 30% of their potential. Low elevation rangelands available for spring grazing often produce the lowest compared to their potential.

Inefficient Energy Use- Farming and Ranching Practices and Field operations

Irrigation pumps are used to irrigate fields that could be irrigated with gravity lines with smaller pumps and gravity.

Tillage could be reduced on some operations, reducing the amount of fuel needed to grow crops.

Natural Resource Problems and Desired Future Outcomes

Forest and Rangeland Health

What is the severity of the problem?

Over the past 10 years over half of Montana's forests have experienced epidemic proportions of insect and disease outbreaks. Mountain pine beetle has killed many acres of ponderosa and lodgepole pine in Meagher County. Spruce budworm has damaged or killed many acres of Douglas fir and some Engelmann spruce. It is estimated that over 85% of Montana's forests are at elevated risk for wildfire. Montana's fire season is 40 days longer than it was 30 years ago. The 2017 fire season was our largest on record since 1910 with 1.2 million acres burned state wide and the average number of acres burned per year has increased 15-fold of the last 20 years (Montana DNRC Forests in focus2.0 Cross Boundary).

Insects, disease and over stocking have led to deteriorating forest health throughout Meagher County. Catastrophic wildlife risk has increased on most forested acres in Meagher County. Douglas fir and ponderosa pine are encroaching on grasslands on the forest edge throughout the county. Trees encroaching onto rangeland reduce forage for livestock and wildlife. In areas where there has been severe mortality of trees from insects, forage is unavailable because of down trees. Forest land owners are greatly affected by increased fire risk. Homes, cabins and out buildings are at risk as is the forage and grazing infrastructure.

Who is willing to help with the problem?

The US Forest Service continues to try and improve wildlife habitat and reduce wildfire danger but faces many hurdles in applying their projects. They have three projects that they are trying to implement, one around Moose Creek in the Little Belt Mountains, one throughout the Castle Mountains, and one project called Horsefly in the Little Belt Mountains in the Miller Gulch area.

What are the resource trends?

In the last 30 years timber harvest has decreased significantly as local mills have closed. However, in the past 25 years there has been an increase in timber harvest on private lands. In some cases loggers are taking dead trees and merchantable timber in exchange for removing non-merchantable dead trees. More merchantable timber was harvested in 2018 due to strength in the lumber market.

During some of the private land logging completed in the1950's through 1980's forest stands were high graded, or the best trees were taken, and poor form and diseased trees were left. Pre-commercial thinning is not typically done on private forest land after harvest in Meagher county. It takes 80 to 120 years for a stand to grow back to merchantable size after harvest.

What are the goals?

- Take trees out of rangeland
- Improve forage availability for livestock and wildlife
- Reduce insect and disease infestations
- Reduce over stocking of trees
- Reduce overall wildlife risk
- Maintain aspen stands
- Continue weed control

NRCS can focus on treating fuels and rangeland encroachment in the Castle Mountains first. The Forest Service plans to start treatments in 2020 or 2021 in the Castle Mountains. NRCS could treat 1000 acres per year of over stocked and encroaching forest. If 500 acres per year gets treated Forest Stand Improvement (666) at $374/acre and Woody Residue Treatment (384) at $373 per acre, it would require $375,000/year. If 500 acres of Brush Management (314) are used to treat tree encroachment at $107 per acre it will cost approximately $55,000/year. A rough estimate of the number of acres that need to be treated on private land in the Castle Mountain is 3900 ac.

The second location NRCS could focus is surrounding the Big Belt Mountains. The Forest Service plans to do fuels reduction work in the Big Belt Mountains in 2022 or 2023. If 500 acres a year gets treated Forest Stand Improvement (666) at $374/acre and Woody Residue Treatment (384) at $373 per acre, it would require $375,000/year. If 500 acres of Brush Management (314) are used to treat tree encroachment at $107 per acre it will cost approximately $55,000/year. A rough estimate of the number of acres in Meagher County that need to be treated on private land in the Big Belts between Grassy Mountain subdivision and Wagner Gulch is 11,000 ac. In all of the Big Belts it is estimated that there are 20,200 ac that need to be treated.

The third location NRCS could focus is surrounding the Studhorse/ Miller Gulch area. The Forest Service plans to do fuels reduction work in what they call the Horsefly project in 2022 or 2023. If 500 acres a year gets treated Forest Stand Improvement (666) at $374/acre and Woody Residue Treatment (384) at $373 per acre, it would require $375,000/year. If 500 acres of Brush Management (314) are used to treat tree encroachment at $107 per acre it will cost approximately $55,000/year. A rough estimate of the number of acres that need to be treated on private land in the Miller Gulch/ Studhorse area is 8,600 ac.

Rangeland Health

What is the severity of the problem?

The sustainability of rangelands in Meagher county is critical to the ranching economy. Plant productivity and health could be improved on most rangelands. Plant community similarity index collected during range inventories shows plants composition to be 30% of what the historical climax plant community would produce.

Who is willing to help with the problem?

Landowners

What are the resource trends?

Rangeland health is static, decreasing or improving depending on the location, season of use, and landowner.

What are the goals?

- Continue weed control
- Remove conifers from rangelands
- Improve feed and forage balance
- Use facilitating practices such as stock water and fences to utilize unused forage, increase plant recovery and improve rangeland health

Stocking rate is the most important factor in when developing a sustainable grazing operation. Many good grazing systems have already been put in place. The average RMS grazing system for 6000 ac EQIP contract cost is $150,000. The average farm size is 6000 ac, there are 136 farms in Meagher County according to ag statistics. If we were to do grazing system projects on ¼ of the farms at $150,000 per farm we would need $5,100,000.

Where?

Throughout the county. Prioritization will be given to areas or watersheds with willing landowners.

Water Quality and Quantity

What is the severity of the problem?

Numerous streams in Meagher County are listed as impaired on the 303d list. The Smith and the Musselshell Rivers have times during the summer where they become critically low. The north and south fork of the Smith River, Camas Creek, Birch Creek, Sheep Creek and the North and South Forks of the Musselshell River are considered dewatered streams by Montana Fish Wildlife and Parks. In conversation with the local fisheries biologists many of the tributaries that go into the Smith and Musselshell Rivers as well as Sixteenmile Creek have low enough water at times to be a concern. Some current irrigation systems are 2% efficient with water use. When pipelines replace open ditches and sprinklers replace flood irrigation, irrigation systems can be designed to be 70-80% efficient with water use. Nutrients enter streams and rivers through winter feeding and grazing in areas that flood. Application of nutrients on fields with high potential to run off or leach into the water table is also an issue. Over utilization of stream riparian areas for grazing during the summer can add nutrients. Most riparian areas in Meagher County are grazed.

Who is willing to help with the problem?

There are numerous funding sources to help improve riparian vegetation and or reduce the amount of time livestock have access to rivers and streams. The Department of Environmental quality has 319 Project Program to fund on-the-ground projects that reduce or prevent nonpoint source pollution. To improve the long-term sustainability of nonpoint source reductions, projects should focus on restoring natural processes (e.g., channel migration, floodplain connectivity, native riparian revegetation). Fish Wildlife and Parks has a Future Fisheries Program that could be used for things like riparian fences. There are funds collected

from floaters on Smith River called the Smith River Corridor Habitat Enhancement Account that could be used for riparian enhancement projects. The Continuous Conservation Reserve Program, a Farm Service Agency program, pays for fence, offsite water, and rental rate for not grazing within in the established stream buffer for up to ten years. Montana Conservation Districts has a program called Ranching for Rivers that provides cost share for making riparian pastures.

What are the resource trends?

Water quality values appear relatively steady in Meagher County. DEQ compared water quality information from the 1970's and 1990's to data from 2017 and 2018 for nitrate/nitrite and total phosphorus and found the values to be similar. Public perception of how Montana's stream and rivers should be managed have shifted towards importance of recreation in the last 50 years. Increased algae reports come from floaters on the Smith River. Regardless of trend there could be much improvement in water quality and quantity in Meagher County.

What are the goals?

- Improve riparian vegetation on stream sides
- Leave large buffers between streams/rivers and winter grazing
- Reduce erosion and sediment in streams
- Improve irrigation efficiency in a way that leaves water in stream
- Reduce application of nutrients in spring before runoff

On average contract costs for converting from flood to pivot in this region are approximately $1300/ac. Using aerial photographs, and local knowledge it is estimated that there are approximately 850 acres of flood irrigated ground within the Smith River watershed that could be converted to sprinkler irrigation with the Environmental Quality Incentive Program. This would cost about $1,105,000 for a Smith River flood to pivot water savings Targeted Implementation Plan (TIP).

It is estimated that 500 acres of flood irrigated ground within the Musselshell River watershed could be converted to sprinkler irrigation. This would cost about $650,000 for a Musselshell River flood to pivot water savings TIP.

It is estimated that 400 acres of flood irrigated ground within the Sixteenmile Creek watershed could be converted to sprinkler irrigation. This would cost about $520,000 for a Sixteenmile Creek flood to pivot water savings TIP.

There are 100's of miles of streams in Meagher County where cattle have access to water. Fencing all streams from cattle access is unrealistic. Providing additional water sources so cattle have other choices for water and limiting time that livestock are in a field so that there is adequate vegetation to protect the stream vegetation to utilize the nutrients should be the focus. Riparian pastures can be constructed so livestock can utilize the forage in a field, but operators can assure that utilization is appropriate to maintain riparian health. There may be specific locations where fencing cattle from streams would be useful. Barbed wire fence cost share is $1.28/ft.

There are 25,473 acres of flood irrigated ground in Meagher county, if 25% of these acres were fertilized there would be 6400 acres that would benefit from nutrient management. At $6/ac for nutrient management this would cost $38,400.

Prescribed grazing plans that were applied with stream health as a priority would help improve water quality. The average RMS grazing system for 6000 ac EQIP contract cost is $150,000. The average farm size is 6000 ac, there are 136 farms in Meagher County according to ag statistics. If we were to do grazing system projects on ¼ of the farms in the Smith river watershed at $150,000 per farm we would need $2,812,500. If we were to do grazing system projects on ¼ of the farms in the Musselshell watershed at $150,000 per farm we would need $937,500. If we were to do grazing system projects on ¼ of the farms in the Sixteenmile watershed at $150,000 per farm we would need $562,000.

Where?

The Smith River watershed, The Musselshell watershed and Sixteenmile watershed. Prioritization of watershed will be based on location of willing participants.

Soil Health

What is the severity of the problem?

The majority of the cropland in Meagher County is in a hay rotation and these can be quite long. There is a lack of tillage equipment in the county as the cost is difficult to justify and knowledge of more intensive farming techniques is limited.

Who is willing to help with the problem?

Landowners.

What are the resource trends?

No till farming is being utilized with increasing frequency.

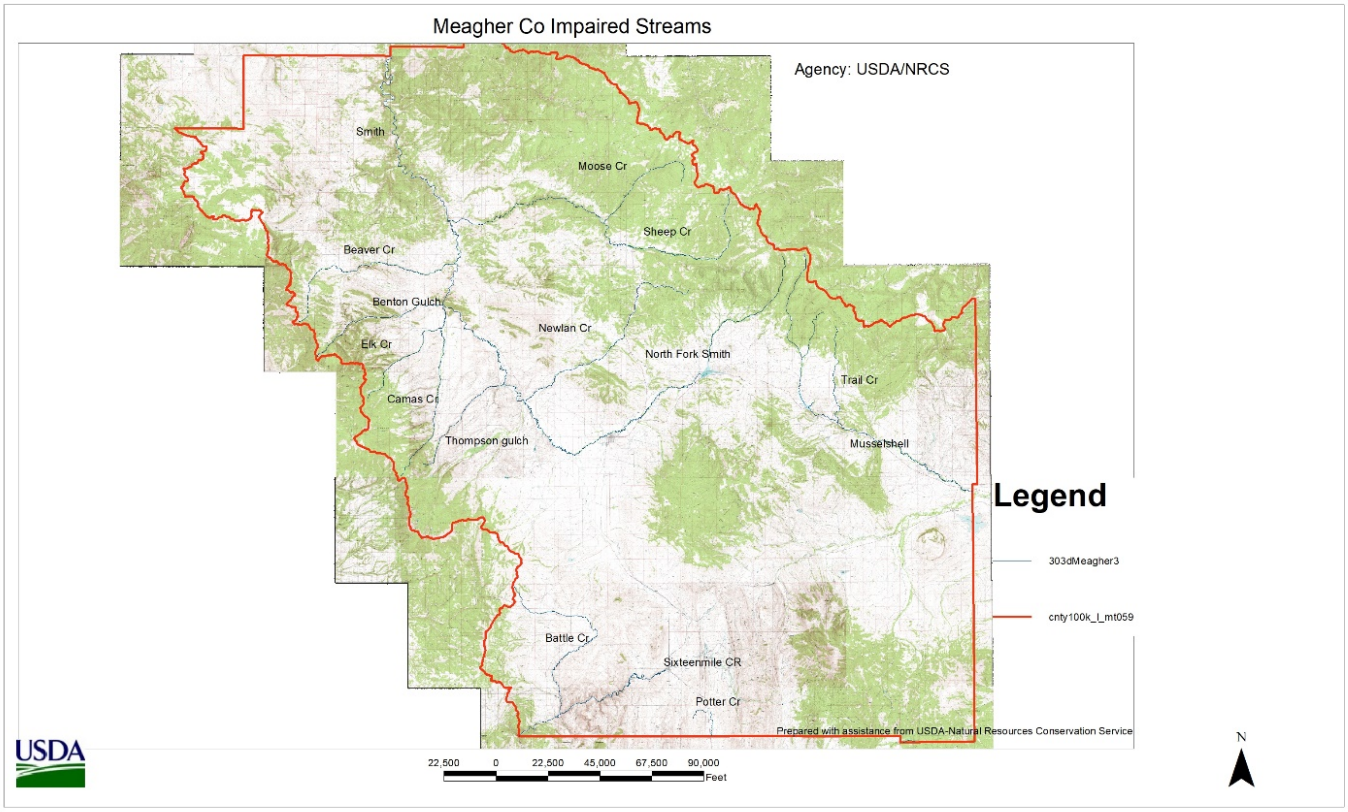
What are the goals?

- Reduce tillage of cropland
- Reduce burning of cropland
- Utilize more crops in rotation

Where?

Throughout the county. Prioritization will be given to areas or watersheds with willing landowners.

Appendix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Agency: USDA/NRCS
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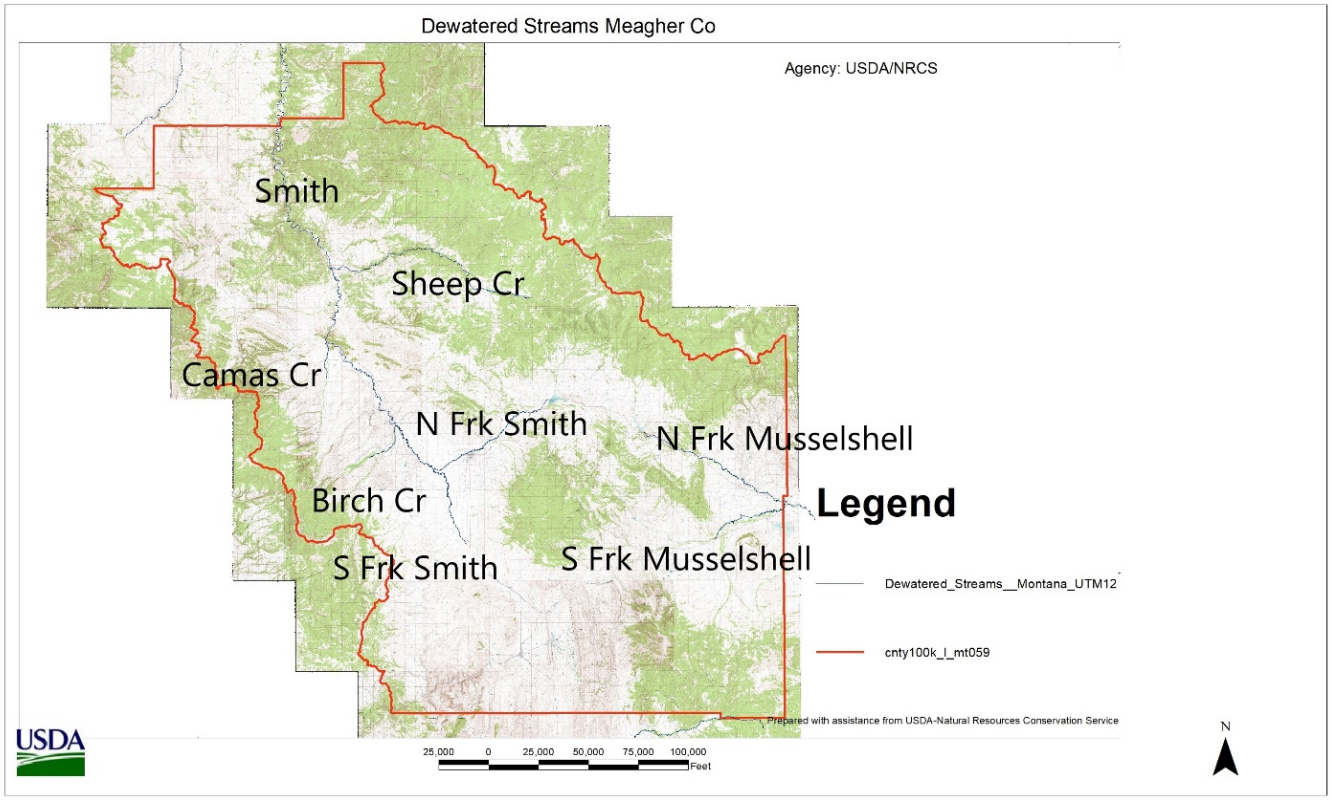
Sheep Cr
Beaver Cr
Benton Gulch
Newlan Cr
Elk Cr
North Fork Smith
Trail Cr
Camas Cr
Thompson gulch
Musselshell
Legend
303dMeagher3
cnty100k_l_mt059
Battle Cr
Sixteenmile CR
Potter Cr
Prepared with assistance from USDA-Natural Resources Conservation Service
USDA
22,500 0 22,500 45,000 67,500 90,000
Feet
N


Dewatered Streams Meagher Co
Agency: USDA/NRCS
Smith
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Camas Cr
N Frk Smith
N Frk Musselshell
Birch Cr
S Frk Smith
S Frk Musselshell
Legend
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Prepared with assistance from USDA-Natural Resources Conservation Service
USDA
25,000 0 25,000 50,000 75,000 100,000
Feet
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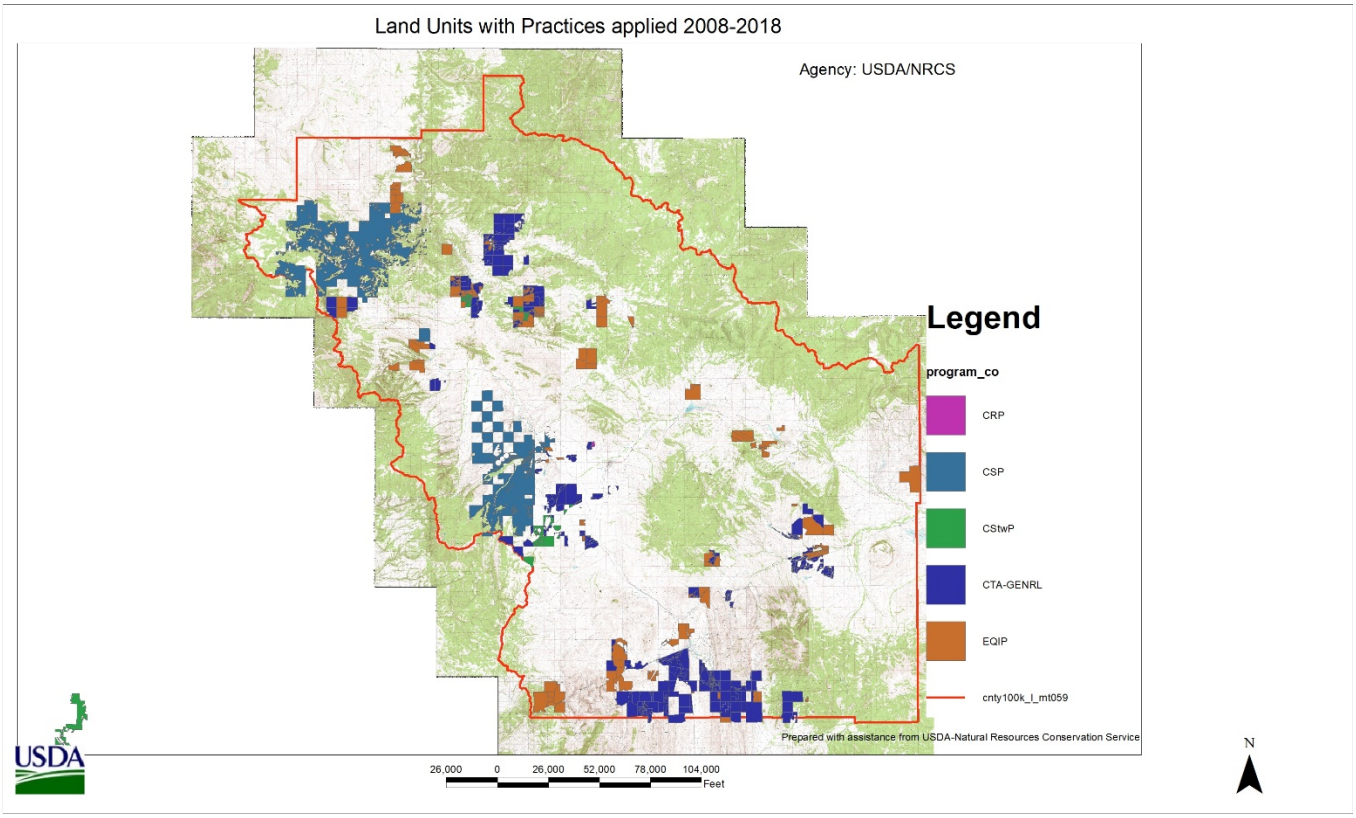
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CStwP
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EQIP
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Feet
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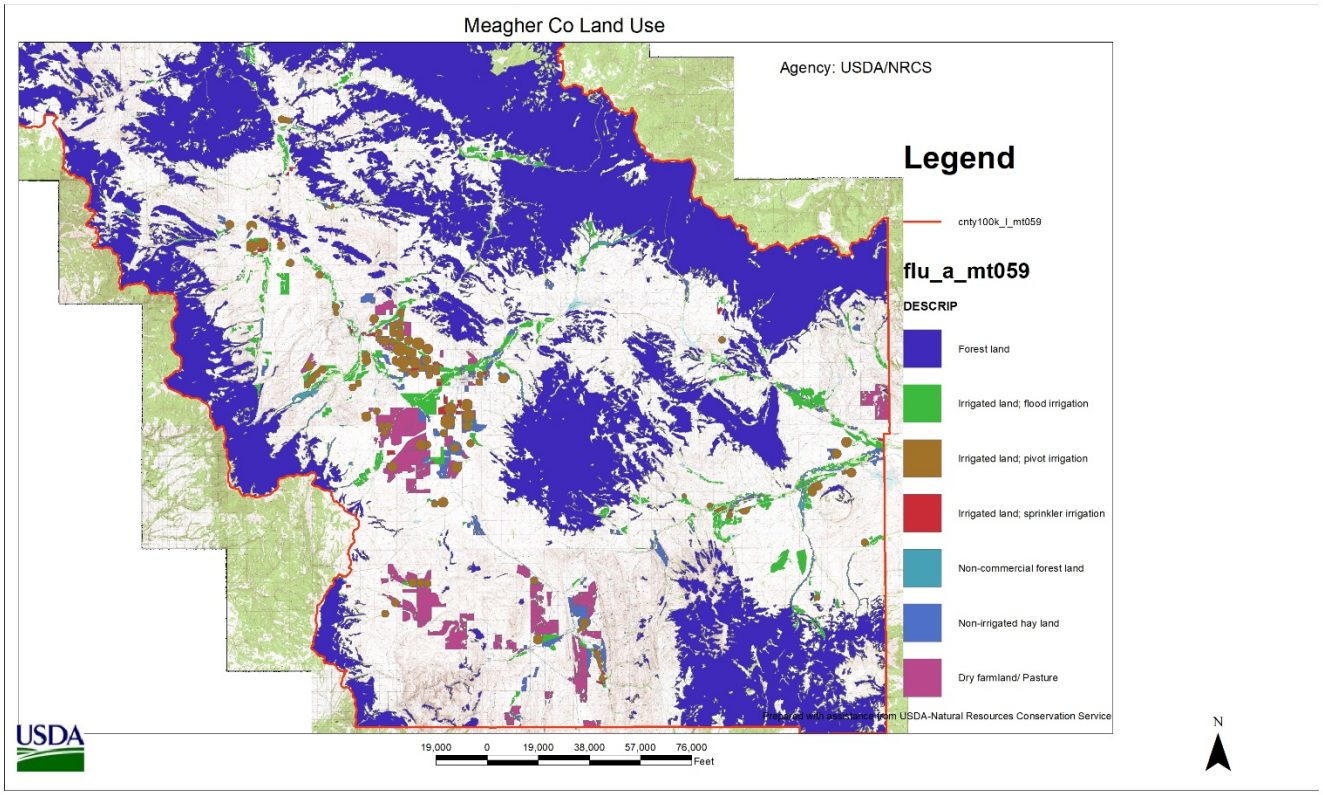
Meagher Co Land Use
Agency: USDA/NRCS
Legend
cnty100k_l_mt059
flu_a_mt059
DESCRIP
Forest land
Irrigated land; flood irrigation
Irrigated land; pivot irrigation
Irrigated land; sprinkler irrigation
Non-commercial forest land
Non-irrigated hay land
Dry farmland/ Pasture
Produced with assistance from USDA-Natural Resources Conservation Service
USDA
19,000 0 19,000 38,000 57,000 76,000
Feet
N

MEAGHER COUNTY CONSERVATION DISTRICT
4147 U.S. Highway 12, P.O. Box 589
White Sulphur Springs, Montana 59645-0589
Phone: 406-547-3633, Ext. 5

LOCAL WORK GROUP MINUTES
February 11, 2019

The Local Work Group of the Meagher County Conservation District met at the USDA Service Center in White Sulphur Springs, Montana on February 11, 2019, with the following-named people present:

Jenney Paddock, NRCS DC
Ted Nelson, NRCS Supervisory District Conservationist
Dave Molebash, NRCS
Tyson Hill, Supervisor
Otto Ohlson, Supervisor
Robert Dupea, Supervisor
Rob Brandt, Supervisor
Vance Voldseth, Supervisor & FSA County Committee
Jay Kolbe, FWP
Wally Bailey, County Weed Board
Libby Johnston, FSA County Committee
Matt Strauch, CD Technician
Lacey Rasmussen, MCCD District Administrator
Bob Sager, County Extension

The Local Work Group meeting was called to order at 6:00 p.m.

Paddock and Molebash began the meeting discussing the new direction of NRCS contracting, planning process, and long range plans. The goals for the LWG were then discussed such as prioritizing an area of the county and a resource concern within that area. Paddock asked the LWG what they would say the state of natural resources in Meagher County are in. Resources brought up by members included plant productivity, ranch sustainability, water quantity and water rights (Bailey), and energy conservation (utilizing gravity in irrigation pipeline).
Paddock distributed an example of this type of planning in Oregon and displayed maps of land use and programs in Meagher County from 2008-2018.

- Ohlson stated that one area of the county needing attention is the Martinsdale/Checkerboard area, although several landowners might not qualify for assistance because of their adjusted gross income. Resource concerns identified for this area include range and forest health.
- Kolbe talked about inadequate flows and high water temperature within the Smith river
- Kolbe stated that the Forest Service is focusing on some conifer control in the Castle's. Paddock talked about the Two Chief's program she has been working

with in that area. Voldseth also thought a project in the Castles would be a good idea.

- Voldseth relayed concerns the FSA County Committee had including: plant productivity & health, livestock inadequate feed and forage, wildfire
- Jenney talked about forestry thinning projects in the Big Belts, and work FS may be doing in the future
- Sager offered any advertising about NRCS programs at Extension's September program.

No definitive decision was made at this meeting. The CD board will discuss concerns and possibly hold another LWG meeting in the following months.

LWG meeting was adjourned at 7:20 p.m.

Table. Animal species of concern report for Meagher County from Montana Natural Heritage Program 2019

Subgroup	Scientific Name	Common name	State Rank	State Rank Reasons	US Endangered Species Act	MT Status	% MT is breeding range	Habitat
Mammals	Corynorhinus townsendii	Townsend's Big-eared Bat	S3	Species is widespread, but uncommon and appears to occur at low densities. Disturbance of cave and mine roosts and the hard closure of occupied mines threaten long-term persistence.		SOC	87	Caves in forested habitats
Mammals	Gulo gulo	Wolverine	S3		P	SOC	37	Boreal Forest and

								Alpine Habitats
Mammals	Lasiurus cinereus	Hoary Bat	S3			SOC	100	Riparian and forest
Mammals	Myotis lucifugus	Little Brown Myotis	S3	Species is common and widespread, but under significant threat of catastrophic declines due to White-Nose Syndrome, a fungal disease responsible for the collapse of populations of this species in the eastern US.		SOC	100	Generalist
Mammals	Myotis thysanodes	Fringed Myotis	S3	Although this species is distributed across much of Montana, recent surveys have found it to be uncommon within range. Species occasionally uses caves to over-winter so threats to persistence from White-Nose Syndrome are a concern, but due to its western distribution the extent of		SOC	64	Riparian and dry mixed conifer forest

				impacts are as yet unknown.				
Birds	Accipiter gentilis	Northern Goshawk	S3		MBTA	SOC	68	Mixed conifer forests
Birds	Anthus spragueii	Sprague's Pipit	S3B	Although population trends in Montana appear to be relatively stable in recent years, populations have been in decline over the long run and the species faces threats from covertype conversion, overgrazing, exotic plant invasions, altered fire regimes, and mowing prior to fledging of young.	MBTA; BCC11; BCC17	SOC	67	Grasslands
Birds	Aquila chrysaetos	Golden Eagle	S3		BGEPA; MBTA; BCC17	SOC	100	Grasslands
Birds	Ardea herodias	Great Blue Heron	S3	Small breeding population size, evidence of recent declines, and declining regeneration of riparian cottonwood	MBTA	SOC	100	Riparian forest

				forests due to altered hydrology and grazing.				
Birds	Artemisiospiza nevadensis	Sagebrush Sparrow	S3B		MBTA; BCC10; BCC17	SOC	13	Sagebrush
Birds	Buteo regalis	Ferruginous Hawk	S3B		MBTA; BCC10; BCC17	SOC	95	Sagebrush grassland
Birds	Catharus fuscescens	Veery	S3B		MBTA	SOC	100	Riparian forest
Birds	Centrocercus urophasianus	Greater Sage-Grouse	S2			SOC	75	Sagebrush
Birds	Centronyx bairdii	Baird's Sparrow	S3B	Montana populations were declining until recently and the species is declining in most or the surrounding states and provinces.	MBTA; BCC11; BCC17	SOC	67	Grasslands
Birds	Certhia americana	Brown Creeper	S3		MBTA	SOC	53	Moist conifer forests
Birds	Coccothraustes vespertinus	Evening Grosbeak	S3	Populations in Montana and across North America have experienced rangewide declines, although the causes of these declines are unclear (Bonter and Harvey 2008).	MBTA	SOC	100	Conifer forest
Birds	Dolichonyx oryzivorus	Bobolink	S3B	Species has undergone recent large population	MBTA	SOC	100	Moist grasslands

				declines in Montana and a patchwork of declines and increases have been documented in surrounding states and provinces.				
Birds	Dryocopus pileatus	Pileated Woodpecker	S3		MBTA	SOC	27	Moist conifer forests
Birds	Falco peregrinus	Peregrine Falcon	S3		DM; MBTA; BCC10; BCC11; BCC17	SOC	100	Cliffs / canyons
Birds	Haemorhous cassinii	Cassin's Finch	S3	Data show recent short-term declines in population for this species	MBTA; BCC10	SOC	62	Drier conifer forest
Birds	Ixoreus naevius	Varied Thrush	S3B	The Varied Thrush has undergone recent population declines in Montana and across the Northern Rockies and where timber harvest, insect outbreak, and fire result in a loss of suitable breeding habitat.	MBTA	SOC	37	Moist conifer forests
Birds	Lanius ludovicianus	Loggerhead Shrike	S3B		MBTA; BCC10; BCC17	SOC	100	Shrubland
Birds	Leucosticte atrata	Black Rosy-Finch	S2		MBTA; BCC10	SOC	20	Alpine

Birds	Nucifraga columbiana	Clark's Nutcracker	S3		MBTA	SOC	84	Conifer forest
Birds	Numenius americanus	Long-billed Curlew	S3B		MBTA; BCC10; BCC11; BCC17	SOC	100	Grasslands
Birds	Pipilo chlorurus	Green-tailed Towhee	S3B	Populations in Montana and across the Northern Rockies have undergone recent declines.	MBTA	SOC	60	Shrub woodland
Birds	Spizella breweri	Brewer's Sparrow	S3B	Species faces threats from loss of sagebrush habitats it is dependent on as a result of habitat conversion for agriculture and increased frequency of fire as a result of weed encroachment and drought.	MBTA; BCC10; BCC17	SOC	100	Sagebrush
Birds	Strix nebulosa	Great Gray Owl	S3		MBTA	SOC	46	Conifer forest near open meadows
Birds	Troglodytes pacificus	Pacific Wren	S3		MBTA	SOC	39	Moist conifer forests

Amphibian	Anaxyrus boreas	Western Toad	S2	Over the last few decades this species has undergone serious declines in abundance due primarily to infection with Chytrid fungus. While declines in breeding site occupancy appear to have stabilized in the last decade, changes to abundance across the species range within Montana remain unknown. Significant threats to the persistence of this species remain from continued impacts of disease and mortality of adults and young during breeding and local migration.		SOC	38	Wetlands, floodplain pools
Fish	Chrosomus eos	Northern Redbelly Dace	S3	The Northern Redbelly Dace is currently listed as an S3 species of concern in		SOC	27	Small prairie rivers

				Montana because they are potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.				
Fish	Chrosomus eos x Chrosomus neogaeus	Northern Redbelly X Finescale Dace	S3	The Northern Redbelly/Fine scale Dace Hybrid is currently listed as an S3 species of concern in Montana because they are potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.		SOC	20	Small prairie streams
Fish	Oncorhynchus clarkii bouvieri	Yellowstone Cutthroat Trout	S2	The Yellowstone Cutthroat trout is currently ranked S2in Montana because it is at risk because of very limited and/or potentially declining		SOC	12	Mountain streams, rivers, lakes

				population numbers, range and/or habitat, making it vulnerable to extirpation in the state.				
Fish	Oncorhynchus clarkii lewisi	Westslope Cutthroat Trout	S2	The Westslope Cutthroat trout is currently ranked S2 in Montana because it is at risk due to very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to extirpation in the state.		SOC	34	Mountain streams, rivers, lakes
Invertebrates - Mollusks	Discus shimekii	Striate Disc	S1			SOC	36	Aspen, mesic/moist conifer woodlands
Invertebrates - Mollusks	Margaritifera falcata	Western Pearlshell	S2	The Western Pearlshell is currently ranked a S2 Species of Concern in MT and is at risk because of very limited and/or potentially declining population		SOC	26	Mountain streams, rivers

				numbers, range and/or habitat, making it vulnerable to extirpation in the state. This species is widespread in geographic area, but is declining in terms of area occupied and the number of sites with viable individuals; populations showing repeated reproduction least several age classes are now the exception rather than the rule. Montana currently has only 14 viable populations out of ~200 known locations Short term trends show populations declining by ~20% over the last decade				
Invertebrates - Mollusks	Oreohelix strigosa berryi	Berry's Mountains nail	S1S2			SOC	1	Limestone talus

Table. Plant species of concern report for Meagher County from Montana Natural Heritage Program 2019

Scientific Name	Name	State Rank	State Rank Reasons	Habitat
Equisetum pratense	Meadow Horsetail	S2	*Equisetum pratense* has accurately been identified to occur in a few places within three counties of Montana. This species can be easily mis-identified. Specimens deposited in herbaria outside of Montana will need to be examined before it can be demonstrated that this plant is more widely distributed.	
Pinus albicaulis	Whitebark Pine	S3	Whitebark pine is a common component of subalpine forests and a dominant species of treeline and krummholtz habitats. It occurs in almost all major mountain ranges of western and central Montana. Populations of whitebark pine in Montana and across most of western North America have been severely impacted by past mountain pine beetle outbreaks and by the introduced pathogen, white pine blister rust. The results of which have been major declines in whitebark pine populations across large areas of its range. Additionally, negative impacts associated with encroachment and increased competition from other trees, primarily subalpine fir have	Subalpine forest, timberline

			occurred as a result of fire suppression in subalpine habitats.	
Adoxa moschatellina	Musk-root	S3	Sparsely distributed across southwest Montana. Populations are generally small, though they occur in habitats not generally impacted by human disturbance or invasive weeds. Building of roads and trails may potentially impact populations.	Rock/Talus
Castilleja gracillima	Slender Indian Paintbrush	S2	This plant is a regional endemic, known in Montana from a limited number of populations, with most being relatively small. No threats have been observed, though it could be vulnerable to hydrologic alterations or noxious weeds.	Wetland/Riparian
Cirsium longistylum	Long-styled Thistle	S2S3	Population estimates of approximately 30,000 plants, including seven high quality populations, scattered over four mountain ranges are promising for the long-term viability of the species. Habitat in the largest populations is generally of high quality with few if any problem weeds posing significant and immediate threats. Soon, little change in habitat quality is expected in these populations. Sites are mostly on National Forest lands that provide a degree of protection and two large populations on private lands that have a history of light to moderate grazing appear stable. Also of benefit at this time is the active weed control program employed by the private landowners on their lands. Long- and short-term population trends are difficult to gauge due to the lack of good survey data over many years. However, available data and observations provide some evidence that population levels have at least remained fairly stable over the past decade, with significant yearly fluctuations possible. Threats posed by invasive weeds and the introduced bio-control agent do provide reason for concern.	Meadows (Montane-subalpine)

Downingia laeta	Great Basin Downingia	S2S3	Rare in Montana, where it is currently known from a few scattered sites in the western half of the state, most of these sites were documented several decades ago and need follow-up surveys. Current population levels and trends are unknown.	Wetland/Riparian (Shallow water ponds, lakes)
Erigeron flabellifolius	Fan-leaved Fleabane	S3	Restricted to rocky, alpine habitats in the mountains of south-central Montana. Though uncommon and restricted in distribution, the high elevation habitat tends to reduce the potential for any impacts to the species.	Alpine
Eriogonum caespitosum	Mat Buckwheat	S2S3	Rare in Montana, where it is has been documented from a few sites from Beaverhead County. Trends are unknown, though the potential for negative impacts to known populations appears to be low.	Sagebrush steppe (Montane)
Noccaea parviflora	Small-flowered Pennycress	S3	*Noccaea parviflora* is a regional endemic, known in Montana from several southwestern counties. It is a small, short-lived plant that likely requires some disturbance to maintain its habitat.	Meadows (Moist, Montane to alpine)
Penstemon humilis	Low Beardtongue	S1S3	Known in Montana from 1 collection from Beaverhead County	Sagebrush steppe (Montane)
Phlox kelseyi var. missoulensis	Missoula Phlox	S3	Missoula phlox is a state endemic known from over 2 dozen occurrences in west-central Montana, most of which are moderate to large-sized. Populations occur on a mix of ownerships, including private lands which host several occurrences. The Waterworks Hill population is infested with several noxious weeds and heavy recreational trail use also occurs within the occupied habitat. Other populations appear to be at much less risk though some impacts from invasive weeds, recreational use and development are possible.	Slopes/ridges (Open, foothills to subalpine)
Physaria klausii	Divide Bladderpod	S3	State endemic restricted to central-Montana with most populations occurring in the Big Belt Mountains and extending north to the southern end of	Slopes (Open, Montane/subalpine)

			the Rocky Mountain Front. Many large populations exist and the species typically occurs on gravelly slopes that are not usually subject to human disturbance.	
Primula incana	Mealy Primrose	S3	*Primula incana* is known from a few dozen extant occurrences in Montana, including several moderate to large populations. However, most known populations are small, and the status of several populations is uncertain. Ownership of the occupied areas is varied and includes federal, state and private lands, including several locations managed or protected for their conservation values. However, unprotected private lands host many occurrences. Cattle grazing may have some negative effects on the species including the direct effects of herbivory and trampling. The species is also vulnerable to activities that alter the hydrology of the wetlands it occupies. Continued threats and potentially declining trends, particularly in regards to habitat quality make the species' vulnerable to local extirpation.	Wetland/Riparian
Ranunculus grayi	Arctic Buttercup	S3	Also includes *R. verecundus,* which was formerly tracked as a separate Species of Concern.	Alpine
Salix serissima	Autumn Willow	S3	This willow is primarily found in Montana along the Rocky Mountain Front. Approximately half the occurrences are on lands managed in part for their conservation value. The species is primarily susceptible to impacts associated with heavy grazing and changes in the hydrology of the fens and wet meadows which it occupies.	Wetland/Riparian
Senecio hydrophilus	Alkali-marsh Ragwort	S3	Senecio hydrophilus is present in alkaline habitats within a portion of southwest Montana. Plants are not that common, and occur in low-elevation wetlands that can be victim to dewatering.	

Eleocharis rostellata	Beaked Spikerush	S3	Known from over a dozen extant sites and a few historical locations. Private and state lands host many occurrences that are vital to the viability of the species in the state. The species is vulnerable to hydrologic alteration and development.	Wetlands (Alkaline)
Goodyera repens	Northern Rattlesnake-plantain	S3	A widespread species that is found in Montana in the Little Belt and Big Snowy Mountains and at one site in Glacier National Park. The species occupies moist, montane forests with a mossy understory. Occurrences are vulnerable to disturbances that open or reduce the canopy such as timber harvesting and fire. Monitoring of the species in the Little Belt Mountains have documented negative impacts associated with both disturbances. However, *Goodyera repen*s is known from approximately 20 moderate to large-sized populations and many additional, smaller occurrences. Recent trends are unknown.	Mesic Forest
Veratrum californicum	California False-hellebore	S2	Rare in Montana, where it is known from a very localized area in the southwestern corner of the state.	Wetland/Riparian

State and Meagher County Noxious Weed List

A & B. Noxious weed List, with estimated acreage, as adopted by Meagher County Commissioners, Updated by changes in 1998, 2000, 2006, 2007, 2013 (last revision - April, 2018)									
Noxious Weed Species		**State Designation (S) County Designation©**						**Est Co Acres**	
Common Name	**Scientific Name**	**Pr. 1A**	**Pr. 1B**	**Pr. 2A**	**Pr. 2B**	**Pr. 3**			
Blueweed	*Echium vulgare*		S					0	
Brazilian Waterweed	Egeria densa					S		0	
Canada Thistle	*Cirsium arvense*				S,C			7500	
Cheatgrass	*Bromus techtorum*					S		40,000	
Common Buckthorn	*Rhamnus cathartica L*			S				0	
Common Reed	*Phragmites australis*	S						0	
Common Tansy	*Tanacetum vulgare*				S,C			500	
Curlyleaf pondweed	*Potamageton crispu*				S			0	
Dalmatian toadflax	*Linaria dalmetica*				S			5	
Diffuse Knapweed	*Centaurea diffusa*				S, C			50	
Dyer's Woad	*Isatis tinctoria*	S		S				0	
Eurasian Watermilfoil	*Myriophyllum spicatum*							0	
Field Bindweed	*Convolvulus arvensis*				S			800	
Flowering Rush	*Butomus umbellatus*			S				0	
Hawkweed, Orange	*Hieracium aurantiacum L*			S				0	
Hawkweed, Meadow	*Hieracium pratense, floribundum*			S				0	
Hoary Alvssum	*Berteroa incana*				S,C			650	
Hoary Cress (Whitetop)	*Cardaria draba*				S,C			990	
Houndstongue	*Cynoglossum officinale L.*				S,C			11,000	
Hydrilla	*Hydrilla verticillata*					S		0	
Japanese Knotweed comp	*Polygonum cusp, such., poly.*	S						1	
Leafy spurge	*Euphorbia esula*				S,C			15,000	
Mudusahead	*Taeniatherum caput-medusae*	S						0	
Oxeye Daisy	*Chrysanthemum leucanthemum L*				S			800	
Perennial pepperweed	*Lepidium latiffolium*			S				0	
Purple Loosestrife	*Lythrum salicaria, virgatum*		S,C					1	
Rush Skeltonweed	*Chondrilla juncea*		S, C					0	
Russian Olive	*Elaeagnus angustifolia*					S		1	
Russian Knapweed	*Centaurea repens*				S, C			50	
Saltcedar (tamerisk)	*Tamerix aphylla*				S, C			0	
Scotch Broom	*Cytisus scoparius*		S					0	
Spotted Knapweed	*Centaurea maculosa*				S, C			42,500	
St. Johnswort	*Hypericum perforatum*				S,C			100	
Sulphur Cinquefoil	*Potentilla recta*				S			50	
Tall Buttercup	*Ranunculus acris L.*			S				0	
Tansy Ragwort	*Senecio jacobea L.*			S				0	
Yellowflag iris	*Iris pseudacorus L*			S				0	
YellowToadflax	*Lanaria vulgaris*				S			200	
Yellow Starthistle	*Centaurea solstitialis*	S						0	
Absinth wormwood	*Artemisia absinthium*				C			460	
Black Henbane	*Hyoscyamus niger*				C			275	
Bladder cam pion	*Silene vulgaris*				C			50	
Bull Thistle	*Cirsium vulgare*				C			360	
Common Burdock	*Artcium minus*				C			900	
Common Mullein	*Verbascum thapsus*				C			75	
Field Scabious	*Knautia arvensis*				C			5	
Musk Thistle	*Carduus nutans*				C			1110	
Perennial sowthistle	*Sonchus arvensis*				C			80	
Poison Hemlock	*Conium maculatum*				C			5	
Scentless Chamomile	*Matricaria maritime va agrestis*				C			150	
Scotch Thistle	*Onopordum acanthium*				C			0	
Yellow mignonette	*Reseda lutea*				C			0	
Priority 1A weeds are not present in Montana. Management criteria will require eradication if detected, education and prevention.									
Priority 1B weeds have limited presence in Montana. Management criteria will require eradication or containment and education.									
Priority 2A weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by weed districts.									
Priority 2B weeds are abundant in Montana and widespread in many counties. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by weed districts.									
Priority 3 are regulated plants: (NOT MONTANA LISTED NOXIOUS WEEDS). These plants have the potential to have significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. The state recommends research, education, and prevention to minimize the spread of the regulated plant.									