Musselshell/Golden Valley Counties
Long Range Plan
Roundup Service Center

Written May 2019

Section I Introduction

Purpose

The purpose of this plan is to create a working document that describes the natural resources of Musselshell and Golden Valley Counties, inventories resource problems as they exist currently, and prioritizes projects for NRCS cost assistance programs.

The Roundup NRCS Field Office services both Musselshell and Golden Valley Counties. The Lower Musselshell Conservation District (LMCD) encompasses both counties as well. This long-range plan will be written to that scale and scope.

There are many conservation partners in Musselshell and Golden Valley Counties:

- Lower Musselshell Conservation District (LMCD)
- Farm Service Agency (FSA)
- Montana Fish, Wildlife & Parks (FWP)
- Montana Department of Natural Resources and Conservation (DNRC)
- Montana State University Extension Service (MSU Extension)
- Bureau of Land Management (BLM)
- Deadman's Basin Water Users Association (DMBWA)
- County Weed Districts (Musselshell and Golden Valley)
- United States Fish and Wildlife Service (USFWS)
- Musselshell Watershed Coalition (MWC)
- Delphia -Melstone Water Users Association (DMWUA)

This plan will look at priorities for conservation work in Musselshell and Golden Valley Counties over the next 5 to 10 years. However, this plan should be reviewed annually and adjusted as necessary, based on current events and changed resource concerns.

Section II Natural Resource Inventory

Humans

Musselshell and Golden Valley counties are located in Central Montana (see map), and have an area of 3,047 square miles. The counties share boundaries with the following seven counties: Petroleum and Fergus to the north; Wheatland to the west, Sweetgrass, Stillwater, and Yellowstone to the south; and Rosebud to the east. Musselshell and Golden Valley counties have a combined population of 5,610 (4,867 – Musselshell, 743 – Golden Valley). Golden Valley County is the third least populated county in Montana. Roundup is the county seat of Musselshell county. Ryegate is the county seat of Golden Valley county. Roundup is the largest town in the planning area.

Based on the Lower Musselshell Conservation District's (LMCD) long range plan, over 83 percent of Musselshell county, and over 89 percent of Golden Valley county is privately owned. Approximately 6 percent of each county is state owned. Approximately 10 percent of Musselshell county is federally owned, comprised of BLM and US Fish and Wildlife Service (Lake Mason National Wildlife Refuge). Approximately 4 percent of Golden Valley county is federally owned, comprised of BLM and US Forest Service (Helena-Lewis and Clark National Forest).

The land use for the planning area is about 91% grazing land (including grazed forest), 1% irrigated hay/cropland, and 7% dryland hay/cropland (See Ownership and Land Use Table for more details). Forest land is generally treated as grazing land due to the type and quality of the trees, primarily ponderosa pine and juniper. Little off-farm commercial value currently exists in these forest communities.

There are 513 farms within the planning area. The average farm size is approximately 3,685 acres. The predominant agriculture products in the area are beef cattle, wheat, and hay.

Northwestern Energy and Fergus Electric Cooperative serve power in the planning area. The distribution is unevenly divided between the two distributers. Some homes utilize alternative energy sources, with some being completely "off grid".

Soils

Musselshell county soil survey was published in 1995. Golden Valley county soil survey was published in 1942. Hard copies are no longer available at the field office. All remaining copies were destroyed during a major hailstorm that caused field office flooding in 2018. The published soil survey information is available on Web Soil Survey.

There is some prime farmland (if irrigated) in the planning area. The vast majority of the prime farmland occurs along the Musselshell River in the historic flood plains and valley bottoms in close proximity to the river.

Wetlands can, and do, exist within the planning area. The vast majority of the wetlands occur in old river oxbows, abandoned river channels, or odd areas within close proximity to the Musselshell River. Additionally, occasional large terminal basins can be found throughout the planning area.

Nearly all of the soils in the planning area are considered Highly Erodible Land (HEL) for wind erosion. All of the dryland soils, with very few exceptions, are HEL for wind erosion. Many of the other soils, including valley bottoms and irrigated ground, are HEL for wind erosion as well. After the 1985 Farm Bill, producers largely accepted developing and implementing HEL conservation compliance plans. The sodbuster provisions of the 1985 Farm Bill were developed as a result from action occurring just north into Petroleum county. Largescale sodbusting is something that most current producers can vividly remember and is something that most producers are very conscious of.

Musselshell County, the eastern county in the planning area, is bounded on the north by the Big and Little Snowy Mountains and on the south by the Bull Mountain Uplands. The highest elevation in Musselshell county is 5,500 feet and is found in the extreme northwest corner, on the slopes of the Big Snowy Mountains. From this point, elevations decrease both south and east until the Musselshell River is reached. Immediately south of the river, the Bull Mountain Uplands begin, with their highest elevation of 4,750 feet found in the southeast corner of the county.

The area between the Big and Little Snowy Mountains and the Musselshell River is much like that found in Golden Valley County: high, smooth, dissected limestone gravel benches grading into rolling residual plains. The gradient of these benches near the mountains is about 400 feet to the mile.

Golden Valley County, the western most county in the planning area, is bounded on the north by the Big Snowy Mountains and on the south by the Big Coulee-Hailstone anticline. The highest elevation in the county is 8,333 feet at the summit of Lost Peak in the Big Snowys. Elevations decrease to the south until the Musselshell River is reached. South of the river is higher land reaching an elevation of 4,300 feet at the southcentral boundary on the divide between Painted Robe Creek and a tributary of Big Coulee Creek.

The area between the Big Snowy Mountains and the Musselshell River consists of high, smooth, dissected limestone gravel benches and rolling residual plains. Near the mountains these benches have 300 to 500 feet per mile gradient. South of the mountains about 20 miles, this gradient flattens to about 20 feet per mile.

Water

The long-term planning area precipitation average is about 12.5 inches, trending upward in the last few years. Precipitation can be drastically different in portions of the planning unit. The

southern portion of the planning area (Bull Mountain area) and the areas into the Snowy Mountains, tend to get higher precipitation amounts. This leaves the areas to the east and west as the drier ecosystems. There are definite precipitation patterns within the planning area. Some areas just breaking over into the 10 to 14 inch rainfall belt, while others are pushing into the 15 to 19 inch zone, or even higher.

The planning area averages approximately 30 inches of snowfall annually, which is included in the average precipitation records. This amount is tracking upward in recent years as well. The winter of 2017/18 saw record snowfall for the area in excess of 110 inches. The winter of 2018/19 was significantly above average as well.

The Musselshell River Watershed contains approximately 9,500 square miles. The entire area is home to approximately 9,325 people. The main stem of the Musselshell River begins at the confluence of the North and South Forks of the Musselshell River near Martinsdale. Then it flows for nearly 340 miles to Fort Peck Reservoir and provides irrigation water for nearly 85,000 acres and 250 farms and ranches.

The Musselshell River flows through the entire width of the planning area and serves as a convenient reference point. Originally the river meandered throughout the valley floor. However, in 1907 the Milwaukee Railroad drove railroad tracks through the valley and disrupted this natural pattern, making over 100 channel changes along their right of way. This not only sped up the flow, but also blocked many of the natural drains. The valley floor varies from about ½ mile to 3 miles in width. It is comparatively level with average slopes of 0 to 2% draining towards the river downstream.

As a result of the historic management and disruption of the natural flow, the river channel and its flood plain have become increasingly unstable and unpredictable. In 2011, a combination of snowmelt and rain resulted in historic flooding along all reaches of the Musselshell. At its height, floodwaters reached two feet higher than the previous record flood in 1967. Roads and highways disappeared under water, fences were swept away, livestock drowned, the old abandoned Milwaukee Railroad grade that had served as a dike in past floods was breached in many places, and more than 50 homes were destroyed. Floodwaters remained standing on fields and in borrow ditches for 45 days, killing the vegetation it covered. The river environment was dramatically altered by the 2011 flood, as more than 35 miles of the river's length was lost due to cut-offs (avulsions) across oxbows.

Ice jams and unusually warm temperatures in March 2014 resulted in the second 100 year flood event in three years on the upper and middle Musselshell. Later in 2014, heavy rain in August at the lower end caused the flow rate of the river to increase from 150 cubic feet per second (cfs) to 20,090 cfs in two days near Mosby.

In 2018, the well above normal snowpack and near record spring and summer precipitation resulted in sustained high waters for more than three months, and another major flood event. Although the overall river height did not reach the records of 2011, the high flow for a longer sustained time had very similar damaging impacts to riverbanks, roads, fencing, irrigation infrastructure, and vegetation.

Several streams exist within the watershed in addition to the Musselshell River. The predominant named streams within the watershed are as follows from west to east: Fish Creek, Careless Creek, Big Coulee Creek, Painted Robe Creek, Currant Creek, Horsethief Creek, Halfbreed Creek, South Willow Creek, Fattig Creek, and Hawk Creek. North Willow Creek also runs through the planning area, but it reaches the Musselshell River outside of the planning area.

The following streams are listed on the 303d list for impairments for multiple criteria: Musselshell River, Fish Creek, Careless Creek, Big Coulee Creek, Painted Robe Creek, North Willow Creek, and Halfbreed Creek. Most prominent impairments include E. Coli, nitrogen, nitrate/nitrites, salinity, and phosphorous. Streams listed with E. Coli as an impairment include the Musselshell River, Fish Creek, Big Coulee Creek, and Halfbreed Creek. Streams listed with nitrogen as an impairment include Fish Creek, Big Coulee Creek, Painted Robe Creek, North Willow Creek, and Halfbreed Creek.

The Musselshell River has historically been a dewatered stream. For obvious reasons, this created multiple resource concerns, largely habitat and irrigation concerns. The river's deeded water rights have been over-allocated for most of post-settlement history. Low stream flows prompted off-stream storage projects to supplement peak use stream flows. In 1939, the upper end of the Musselshell River water users completed two reservoir projects: Bair Reservoir, 7,300 acre feet storage capacity, and Martinsdale Reservoir, 23,348 acre feet storage capacity. In 1941, the water users in the middle section of the Musselshell River completed Deadman's Basin, which holds 76,900 acre feet of water. A significant step toward resolving water rights disputes and stream dewatering occurred in the early 2000s with the establishment of the Musselshell River Distribution Project. The project allowed the District Court to appoint four water commissioners, funded by the water users, to monitor and enforce water rights. Currently, all water taken from the Musselshell River is measured and monitored. This ensures water users take their legally entitled amount and secures everyone's right. This distribution project, accompanied with timely seasonal releases from the watershed reservoirs, has allowed for stream flows to remain higher for longer periods of time than ever in recorded history.

Although irrigated lands are a very small landmass component of the planning area, a significant amount of resources are used and produced on them. Alfalfa or alfalfa/grass hay is the top irrigated cropland product. Typically small grains of wheat, barley, and corn are used during renovation periods of perennial hay stands.

Several irrigation groups exist within the planning area. The primary groups consist of on farm, or area wide water distribution projects. The largest water users project is the Musselshell River Distribution Project. The Water Court was assigned to monitor and regulate the decreed and used water in the lower watershed of the Musselshell River, from the convergence of the North and South fork to the USGS stream flow gauge at Mosby.
Deadman's Basin Water Users Association is also another large project that covers the vast majority of the planning area. This group covers over 200 miles of meandering river from Shawmut to Mosby and encompasses over 110 water users.
The Delphia-Melstone Canal Users Association is located approximately 12 miles north of Melstone, serves 50 water users, and irrigates 6,085 acres.
The Musselshell Ditch Company was created in 1893, and has a maximum irrigated acres of 1,541.

The Musselshell River is largely considered the lifeblood of the planning unit. It is a significant component of operating units, even though the footprint of the river, and corresponding riparian area, are a very small component of the planning area. Approximately 1% of the area is irrigated, with the overwhelming majority coming from areas in close proximity to the Musselshell River. The production from these irrigated lands typically is a vital component of each ag producer's operation.

Along with the valued production and water that the Musselshell River provides come several major resource issues. Due to many factors, the Musselshell River is a very unpredictable, unstable river. Historic channelization, bank armoring, downcutting, "cut off" ditches, avulsions, and historic high flows have forced the river to make significant changes to itself, especially in recent years. Normal flows of far less than 1,000 cfs are prominent, with normal high flows rarely exceeding 7,000 cfs. The spring of 2011 brought flows of 15,100 cfs for periods of time. This caused significant river migration, numerous avulsions, severe river bank damage, and associated ag infrastructure damage. Since this 2011 event, flood events, and river migrating (destabilizing) events have become the norm and very extremely common. The river is attempting to adapt to its current environment and trying to find its preferred sinuosity. Bank armoring, riparian vegetation removal, and other restrictions have complicated the matter and have made the river more unpredictable than ever in history. Due to current management, paired with the historic management of the Milwaukee Railroad in the early 1900s, the river makes significant annual changes. When the railroad was installed in the early 1900s, historic documents show that they redirected the river in over 100 individual locations, cutting off countless miles of river channel and floodplain. After the railroad pulled out, and

stopped performing annual maintained on their railbed, or right of way, the river began to make major unchecked changes to return to its previous natural state.

The Musselshell River is a valued, important water source in the planning unit. Along with the water and production that it gives, major river migration and stabilization concerns exist.

Plants and Animals

Rangeland and other grazing lands account for 91% of the land use in the planning area. These lands are mostly comprised of sagebrush steppe communities with some grasslands. The majority of the rangeland historically had bluebunch wheatgrass, needlegrass species, and other native wheatgrasses. The rangelands are becoming more invaded by annual grasses each year, including cheatgrass and other non-native invaders. Rocky mountain juniper and ponderosa pine are native to the rocky outcrops, but have expanded outside their original area, and have invader tendencies in some areas.

The majority of the forested areas are ponderosa pine and Rocky Mountain juniper. Again, these species have encroached past their historic ranges into meadows and onto sagebrush plains. Most areas that are forested are not managed for forest production but are managed for grazing lands. The lack of a viable commercial value for ponderosa pine limits the forest management practices.

Overall, populations of upland wildlife species within the planning unit have been stable. Pronghorn populations have been stable, to slightly down. Specific pockets in north eastern Musselshell County have seen reduced fawn crops over the previous years due to unknown circumstances. But other populations have remained strong, bordering on increasing. Elk populations have shown drastic increases, while mule deer have shown stable numbers. Whitetail are showing large increases in population as well. Turkeys have a consistent upward trajectory on their population numbers, all be it albeit slowly. Occasionally a single moose, black bear, or small group of wolves are spotted in the planning unit but are largely considered to be moving through the area and not considered residents. Sage grouse numbers have shown marked improvement since the early 2000s, primarily due to voluntarily private lands conservation efforts. Upland game birds have also shown a stable trend in population.

Elk populations in the Bull Mountain portion and the northern Musselshell County portion of the planning unit are 400% over target population, with some estimates as high as 1,000% over target population goals. Herd size management has been a difficult goal to obtain with the majority of the range being private land where herd reduction opportunities are limited. Landowner/elk conflicts have become more prevalent every year with no end in sight.

Landowners are concerned about wildlife crop damage, haystack damage during low forage times, and elk/livestock disease interaction. Large herds of 100 to 200 or more are becoming more common.

Pronghorn in the north eastern portions of the work unit have suffered low fawn crops for several years. FWP biologists are concerned that due to extreme drought conditions in previous years, many does may have irreversibly and permanently damaged their reproductive organs during survival late term fawn abortions. This likely caused them to be barren for the remainder of their lives. This has impacted this specific population's recruitment. This is their working theory that has been documented in similar cases of pronghorn populations. Other pronghorn herds have been very successful.

Mule deer populations tend to be fairly stable. Whitetail numbers, area wide, are on a significant upward trend. Whitetail populations took a severe hit in 2011 during a large "blue tongue" or EHD (epizootic hemorrhagic disease) breakout. As whitetail tend to do, their populations have rebounded to near historic highs, with high recruitment and survivability numbers.

Sage grouse have been an item of focus for many agencies, wildlife groups, and landowners in this area for a number of years. This focus is largely due to the bird's potential listing on the Endangered Species list. In 2009, the Roundup Field Office began to address landowner resource concerns specifically related to sage grouse, their habitat, and management that might impact them. These efforts have continued to present day, and will continue for the foreseeable future through the Sage Grouse Initiative (SGI) and other planning endeavors. Previously implemented conservation plans and easements have protected and improved around 200,000 acres of sage grouse habitat. To cap things off, the sage grouse was not listed as an endangered species at its most recent opportunity. This is a showcase of exactly what is possible if federal, state, and local groups are willing to partner in voluntarily, private land conservation efforts with landowners for the benefit of all. Landowners benefited their operations by improving their infrastructure and management, and the grouse benefited by having improved wildlife habitat. This is a model for successful private lands conservation efforts.

While the upper portions of the Musselshell River have several species of trout, the lower portions of the river are much warmer and do not support trout. The portion of the river within the planning unit hold channel catfish, sauger, smallmouth bass, walleye, and three species of mussels, the river's namesake. Few ag producers manage specifically for these warm water fish. The primary limiting factors for fish in the river are river flow and obstructions. The Musselshell River is a historically dewatered stream, which can cause habitat loss (dewatering) for fish. This is largely monitored and reduced in current times. The Musselshell does have several irrigation diversions that are migratory barriers for fish. In recent years, efforts have been made to remove these structures, if landowners are agreeable to change their point of diversion and use pumps. Other structures have been reconstructed to have fish ladders.

Some additional fish ladders have been proposed, but budgetary constraints and landowner participation have been the limiting factors.

Wildlife is typically an important resource concern for landowners within the planning unit. Many absentee landowners actually purchased land in the area due to the high diversity and populations of wildlife. Almost all conservation plans written within the planning unit contain at least one wildlife objective or have a proposed wildlife benefit.

Section III Natural Resources Analysis

In the past 20 years, NRCS has made over $18.5 million in incentive payments from the Roundup Field Office through EQIP, CSP, and WHIP programs. These payments have been the result of almost 706,000 acres of conservation plans through 259 separate contracts. These payments have resulted in substantial conservation benefits, including: 135,000 acres of prescribed grazing, 230 miles of cross fencing, 208 miles of livestock pipeline, 483 off stream water facilities, 5,600 acres of range or pasture planting.

Results from Conservation Activities

Rangelands are being improved through weed control, livestock water system development, and prescribed grazing. Livestock distribution and grazing management are also being aided by cross fencing. Some sections of forest have been thinned and are now more resilient to fires and drought. Irrigators are more water efficient, and streams have more water, through irrigation improvements and irrigation water management. Sage grouse are not listed as an endangered species as a result of habitat management, minimalization of land conversion, and overall implementation of conservation plans. However, there are innumerable projects still remaining to address a myriad of resource concerns.

Remaining Treatment Needs:

Rangeland needs: Noxious weed control, proper grazing use, livestock water improvements, invading conifer control.

The resource issues on rangeland include noxious weed invasion, conifer encroachment, poor grazing practices, often complicated by the lack of livestock water. These issues result in degraded wildlife habitat, increased wildfire hazard, reduced livestock forage availability, and impaired hydrologic cycle.

Pasture and Crop needs: Irrigation system improvements, soil health (tillage and organic matter depletion), land use conversion

The resource issues on irrigated ground result in inefficient use of water on irrigated land. Poor crop rotations and management practices that lack diversity and adequate residue are resulting in degraded soil conditions. Rangeland conversion to cropland or pasture is also a threat to wildlife.

Forestland (grazed forest): Thinning and fuels reduction, additional grazing improvements, including grazing rotations and enabling infrastructure.

The resource issues on forestland (grazed forest) result in reduced forest resistance and resilience, heavy fuel loads increase the risk of catastrophic wildfires. Fire return intervals on ponderosa pine forests should be far more frequent than what is currently occurring on the landscape.

Wildlife: Upland species need habitat improvements (see Rangeland). Aquatic species need better quality habitat including riparian area improvements and access to habitat that is inaccessible due to manmade barriers. Sage grouse habitat improvements, and sagebrush-steppe ecosystem improvements are a continuing need.

Land protection: Preserving and protecting the high value properties from subdivision, or general degradation is imperative. There are ecologically high value private lands in the planning area that should be protected. These lands are at risk of subdivision or habitat degradation. These lands are important to wildlife habitats, including Threatened and Endangered species, species of concern, and high value wildlife species.

Section IV Natural Resource Problems and Desired Future Outcomes

Invasive Species and Proper Grazing Use

What is the severity of the problem?

Nearly every rangeland owner in the work area has varying levels of sustainability issues. Noxious weed invasion (including annual grasses), conifer encroachment, upland and aquatic species in need of habitat improvements, and poor grazing management, typically as a result of poor livestock water distribution, are just a few of the contributing factors associated with the declining rangeland health. Improper grazing use is detrimental to the watershed because

depleting riparian vegetation as well as sediment and nutrient loading decrease stream and riparian health and vigor.

Who is willing to help with this resource concern?

Consistent partners, in cooperation with NRCS, on the rangeland health concern are the Lower Musselshell Conservation District, Musselshell Watershed Coalition, Montana Fish Wildlife & Parks, and county weed districts. This is an issue that is a high priority because the consequences of taking no action include: wildlife habitat degradation, continued loss of native plant diversity, forage loss for livestock, increased soil erosion, continued degradation of riparian areas, interrupted hydrologic cycle, reduced in stream flows, and reduced economic viability of agricultural operations.

Resource Trends

Invasive species have continued to increase despite practices used to enhance the rangeland that include: brush management, riparian fencing, cross fencing, livestock water improvements and prescribed grazing. Although many of the invasive species have been in the area for decades, there has been an exponential increase over the past decade, including several new species. The increases may be due to fire suppression, improper grazing, climate adaptation, and increased dispersal pathways for plant seed. Pressure from increased utilization of grazing lands has also increased over the past several decades. Overgrazing is, in part, likely responsible for declining resource trends. Part of this is due to poor water distribution on grazing lands.

What are the goals?

Improve rangeland health and create sustainable range lands by limiting the spread of invasive species and increasing AUM production by 20% by improving rangeland health.

To make a significant impact on rangeland in the work area, between 10 and 30 percent of the acreage needs to be treated. This would mean between 195,000 and 585,024 acres would need to be treated for grazing management, livestock water improvements, and weeds. To accomplish this, we would need outreach, herbaceous control, prescribed grazing, along with facilitating practices such as cross fencing and water developments.

How much funding is required?

NRCS has identified 250,000 acres that need treatment and it will cost up to $40 million dollars to implement the necessary improvements, including outreach and technical assistance.

Forest Health (grazed)

What is the severity of the problem?

Overstocking, fire removal, and encroachment has contributed to a deteriorating forest health in thousands of forestland acres in the work area. Catastrophic wildfire risk has increased, ponderosa pine and juniper have invaded into new areas, and fuels need to be reduced. Forest

landowners, neighbors, and towns near forests are all greatly impacted by the increased risk of wildfire. Wildlife habitat also declines when forest health deteriorates. Finally, there is an increased probability of catastrophic wildfire.

Who is willing to help with this resource concern?

Consistent partners, in cooperation with NRCS, on the forest health concern are Lower Musselshell Conservation District, Musselshell Watershed Coalition, Montana Department of Natural Resources (forestry), Bureau of Land Management (fire and land management), county fire councils, local county commissioners, along with ongoing discussions with wildlife groups. This group will help identify means to eliminate wildlife habitat degradation, increase economic viability, improving grazing utilization on forest lands, and identify any marketable timber products.

Resource Trends

In recent years, timber harvests have reduced dramatically, primarily due to no merchantable products from ponderosa pine. Market prices have reduced the incentive for landowners to thin stands, which is necessary to maintain healthy forests. Previous pulp markets have moved further from the area, and ponderosa is regarded as a poor building product. Thickening of forest stands, and encroachment into new areas have led to decreased livestock and wildlife forage.

What are the goals?

Reduce tree encroachment into non-forest areas
Reduce overall fuels to decrease wildfire risk
Improve overall wildlife habitat

The NRCS could be able to treat between 500 and 1,000 acres per year in the planning area. Progress will not be easily visible for quite some time, but outreach will be in place, and pretreatment inventories will be carried out to identify current and appropriate stand treatments and other site-specific issues that need to be addressed. Focusing on removing small stands, encroaching trees on better soils, and working on flatter slopes gives the best chance to return to a healthy and productive system.

How much funding is required?

NRCS can treat between 500 and 1,000 acres per year in the project area. At $500/acre for thinning, and $350/acre for slash treatment, the annual investment would be between $425,000 and $850,000. Treating even 20% of the approximately 511,000 acres of grazed forest would be 102,000 acres. This would take many years of additional funding assistance, including that from partners. This could increase the potential size of the resource treated. Prioritizing areas of ready/willing/able producers, along with areas of available partner investments will improve overall resource impact.

Water Quality and Quantity

What is the severity of the problem?

The Musselshell River, and its tributaries, offer valuable aquatic and terrestrial habitat, and is home to several species of concern, including spiny softshell turtle, silver minnow, and others. Therefore, the declining stream and river quality is a significant concern. Several streams, including the Musselshell River are listed for impairments, including sediment, E coli, and nutrients. Chronic de-watering is also a major concern.

Crops also rely on steady flows within the Musselshell River, along with its tributaries. With low rainfall in the region, irrigation is needed to support hay and crop production. Within the work area, approximately 19,500 acres are irrigated. The majority of these acres are located along the Musselshell River, with some falling along some of the larger tributaries. All of the acres are supplied with surface water diverted from perennial and seasonal streams.

Only three off-stream water storage sites exist in the Musselshell River system. These capture water during high water events and peak runoff and release this water periodically during peak water use periods throughout the summer. The most feasible opportunity for increasing stream flows is to improve and maintain upland health or create storage reservoirs. Small storage reservoirs have been discussed for decades. Some properties have small irrigation storage reservoirs. Many opportunities exist with potential small, on farm storage in old river oxbows. Larger reservoirs are costly, and almost certainly wouldn't be able to fill without outside additional water. While large reservoirs would benefit a few landowners, the larger benefit would be to focus on individual water use and manage upland health to improve the overall water cycle. This approach is more methodical, slower, and less satisfying, but can yield better long-term results. Upland health management can increase stream flows by increasing effective precipitation, increasing infiltration rates, and improving soil water holding capacity, including activities such as forest thinning, which have shown to increase effective precipitation and improved stream flows. Soil health is key to retaining water in the Musselshell River system.

Off-stream livestock water is also a need. The previous drought years have resulted in land managers with pastures they are unable to use or can only use in early months when water is available. The lack of off stream late season reliable water is a significant concern, leaving land managers to rely on streams, or moving cattle to pastures with available water. Fields that only have water in streams are more prone to riparian area degradation from livestock. Previous efforts have fenced riparian areas in the work area, but the resource concern is still vastly untreated.

Who is willing to help with this resource concern?

The main agencies partnering with NRCS on this resource concern are Lower Musselshell Conservation District, Montana Fish Wildlife & Parks, and Musselshell Watershed Coalition.

Water users groups are interested as well, and would provide individual vocal support, as well as written support.

Resource Trends

The number of systems needing improvements has decreased as more and more systems are upgraded. However the problem still persists as less water is available, and less funding opportunities exist. Upland improvements continue to be completed adding to the effective precipitation. Riparian areas continue to be a concern. Although there are several riparian fencing projects completed annually, riparian vegetation is slow to respond. Off-stream water developments continue to be a priority, but there is a substantial need in the planning area.

What are the goals?

Improve upland water retention through forest thinning and practices needed to improve soil health and retain water in the uplands.
Upgrade and improve irrigation efficiency on the irrigated acres in the planning area that are inefficient.
Improve overall soil health and on farm water use on water users farms.
Identify watersheds where off-stream water would be beneficial, along with riparian fencing.

Addressing this resource concern will take the cooperation from partners and landowners. Outreach needs to occur to promote cost assistance programs and to determine which landowners are willing to participate.

How much funding is required?

Approximately $6 million is needed to address the financial assistance portion of the irrigation and management systems on the irrigated acres in the planning area. This would include sprinkler systems, irrigation pipeline, structures for water control, irrigation water management and other facilitating practices. These practices could treat 5,000 identified acres.

Additional grazing land improvements will be addressed through other resource priorities within the work area. This resource concern will only focus on water quantity and quality on irrigated lands.

Land Protection

What is the severity of the problem?

High value lands can be defined as lands with large contiguous acres with few developments, lands with unique or high value habitat for endangered species or species of concern, or lands in pristine condition. Some of the land within the planning area falls into one of these categories. Risk of subdivision and loss of wildlife habitat are chief among these concerns.

Who is willing to help with this resource concern?

Along with NRCS, the following have interest, some with financial obligation, in applying toward

easements: Lower Musselshell Conservation District, Montana Fish Wildlife & Parks, Montana Land Reliance, The Nature Conservancy, Musselshell Watershed Coalition, and a number of different private wildlife groups.

Resource trends

Although the trend is not very apparent, there are conversions from high value lands (ex-sagebrush steppe to dryland crop). Over 2,500 acres are being sodbusted and converted, and more than 500 acres are being subdivided annually. Significant financial investments are made annually for restoration, or habitat improvement. Properties are bought, divided, and resold, reducing the economic independence of the property, and increasing the number of developments. As the next generation inherits these ranches, they often consider diving and selling all or portions of the property for inheritors that have no interest in the operation.

What is the goal?

Protect high value properties as necessary to prevent conversion and preserve investments by natural resource agencies.

How much funding is required?

Funding will vary wildly, depending on interest, availability, and landowner opportunities. GARC rates and land appraisals will dictate individual funding costs. NRCS has identified 100,000 acres of potential protection opportunities. Landowner participation and funding opportunities will be the limiting factors.

Section V Prioritization of Natural Resource Problems and Desired Outcomes

The Local Working Group (LWG) identified and prioritized the natural resource problems within the Lower Musselshell Conservation District, or Musselshell and Golden Valley Counties. The following five (5) natural resource concerns were identified as the top priorities within the work area. In order:

1. Fuel Mitigation and Forestry Health.
   This concern includes all the forestland in the county. The vast majority of the forestland is on private land. NRCS does not have the ability to work on the public forestland.
   The LWG identified forest health and fuel mitigation as a concern due to its impact on overall watershed health, negative economic impacts, increased fire hazard, and loss of grazing land. The highest priorities are areas on private lands that would be near public lands partners participating in addressing the priority resource concern. The primary goals would be to increase healthy forests, decrease fuels, and improve grazed forests. Priority will also be given to groups of landowners who are ready, willing, and able to address the resource concern in a focused manner.

2. Invasive Weeds and Grasses

   The LWG continues to identify invasive species as a priority due to the rate at which the problem grows, the negative economic impact, degradation of ecosystem function and habitats, and risk of crossing thresholds. Invasive species will continue to grow rapidly if nothing is done to stop them. At this point, some species are present in all of the work area. Weed containment will also be a portion of addressing this resource concern. Acres may not be reduced, but the expectation is to stop areas from increasing in weed populations.

3. River and Stream Heath and Protection

   The LWG identified river and stream health and protection as a resource concern due to the volatility of our river and stream systems in recent years. Much of the causes have come from over a century of river corridor manipulation, but fully addressing the resource concern will be much more inclusive. In-stream work will likely be out of scope for NRCS, but working in areas of forestry health, rangeland health and irrigation efficiency project will have a compounding impact within the river system. Focusing on water users and river recharge areas will likely result in the biggest resource cost benefit return. Addressing other identified priorities directly addresses the priority resource concern.

4. Rangeland Health

   This resource concern gets at the root of proper grazing use and wildlife habitat. This was identified as a concern by the LWG due to loss of grazing for livestock, loss of income to the landowner/community, and loss of wildlife habitat. Improper grazing use was noted as also contributing to an increase of invasive species. It is almost as important to promote proper grazing use as it is to help treat the invasive species. Education and cost assistance for facilitating practices is needed to address the resource concern.

5. Irrigation Efficiency

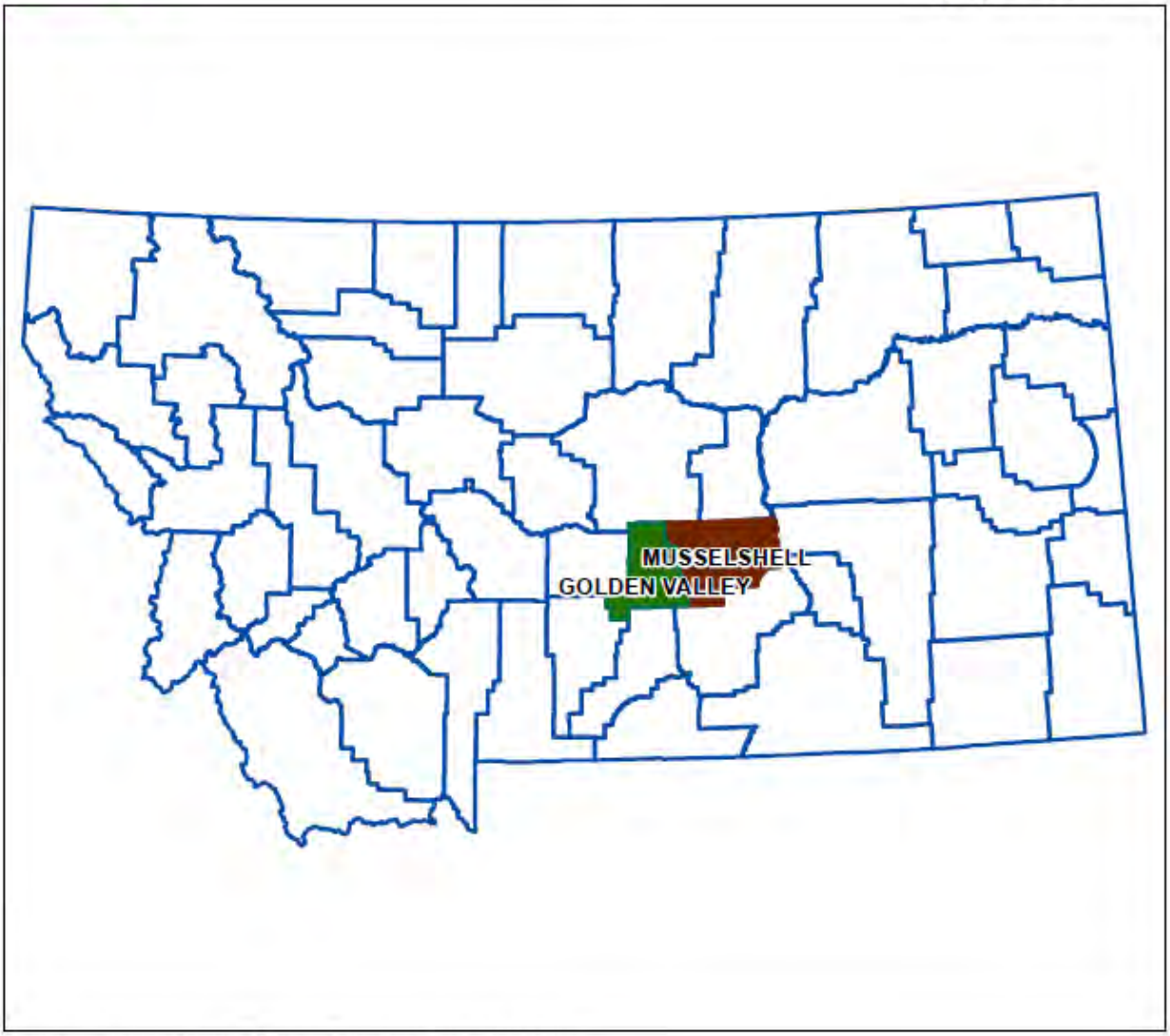
   The primary discussion in placing this concern at fifth was due to the overall land use footprint that irrigated lands have in the work area. Throughout previous years, irrigation efficiency improvements have been discussed thoroughly. This led to the development of the Musselshell Watershed Resiliency Initiative. This initiative began in 2018 after several years of development and continued through the 2019 funding year. The target was to improve on-farm water use and incentivize better management practices within a watershed that has been significantly impacted by major flooding and water events. The initial goal was to have this initiative as a 3-year investment. This

proposal will have to be rewritten for 2020 as a 1-year Targeted Implementation Plan. This will fulfill the original 3-year investment term, as originally described to the producers and supporting partners.

Golden Valley & Musselshell Counties
Montana

USDA

Date: 7/17/2019
Agency: USDA-NRCS



Prepared with assistance from USDA-Natural Resources Conservation Service

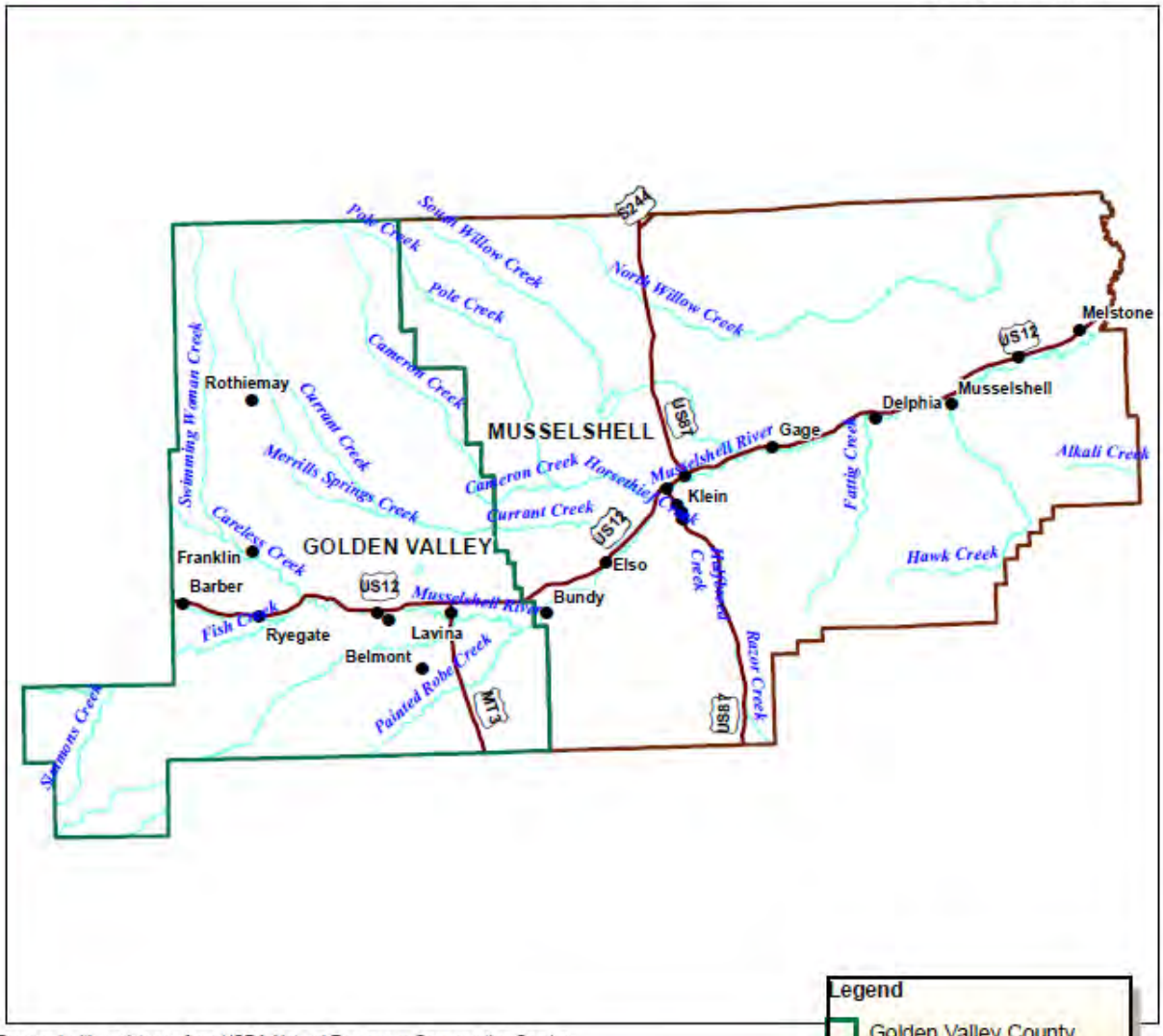
40 0 40 80 120 160
Miles

N
W E
S

Legend
- Golden Valley County
- Musselshell County
- Montana County Boundary

Golden Valley & Musselshell Counties
Montana
Cities and Roads

Date: 7/17/2019
Agency: USDA-NRCS



Prepared with assistance from USDA-Natural Resources Conservation Service

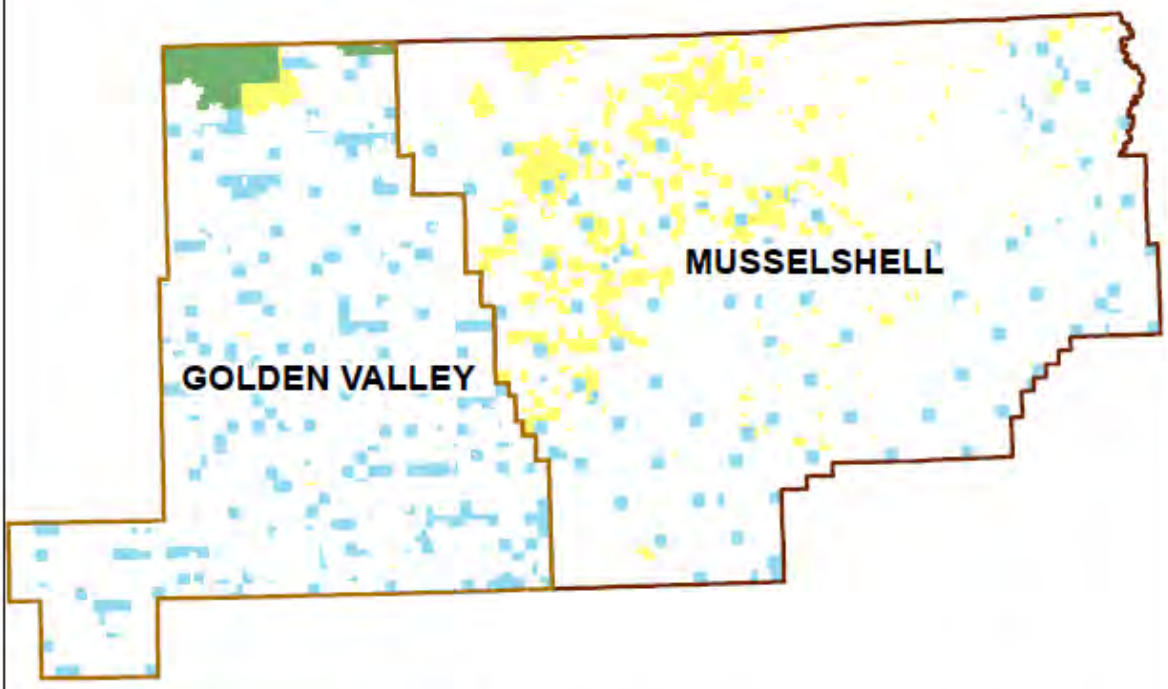
6.5 0 6.5 13 19.5 26 Miles

N W E S

Legend
- Golden Valley County
- Golden Valley Cities
- Major Roads Golden Valley
- Hydrography Golden Valley
- Musselshell County
- Musselshell Cities
- Major Roads Musselshell
- Hydrography Musselshell

Golden Valley & Musselshell Counties
Montana
Ownership

Date: 7/17/2019
Agency: USDA-NRCS



Legend

- Golden Valley County

Owner

- PRIVATE
- STATE OF MONTANA
- USDA FOREST SERVICE
- USDI BLM
- Musselshell County

Owner

- PRIVATE
- STATE OF MONTANA
- USDI BLM

Ownership	Percentage	
Golden Valley		Musselshell
Private	89%	83%
Federal	4%	10%
State	6%	6%

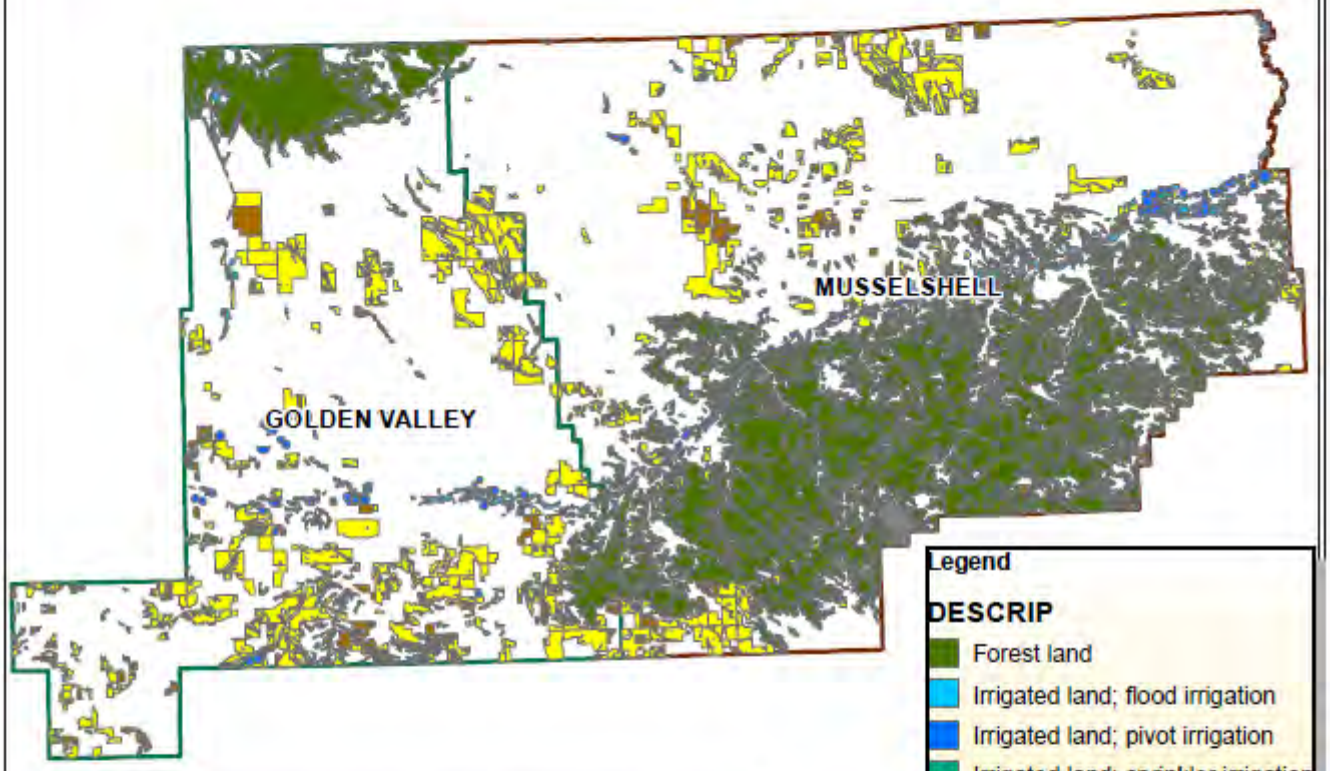
Prepared with assistance from USDA-Natural Resources Conservation Service

6.5 0 6.5 13 19.5 26 Miles

N W E S

Golden Valley & Musselshell Counties
Montana
Land Use

Date: 7/17/2019
Agency: USDA-NRCS



Land Use in Golden Valley and Musselshell Co.	
Ownership	Percentage
Grazing Land (including grazed forest)	91%
Dry hay/crop	7%
Irrigated hay/crop	1%

Legend

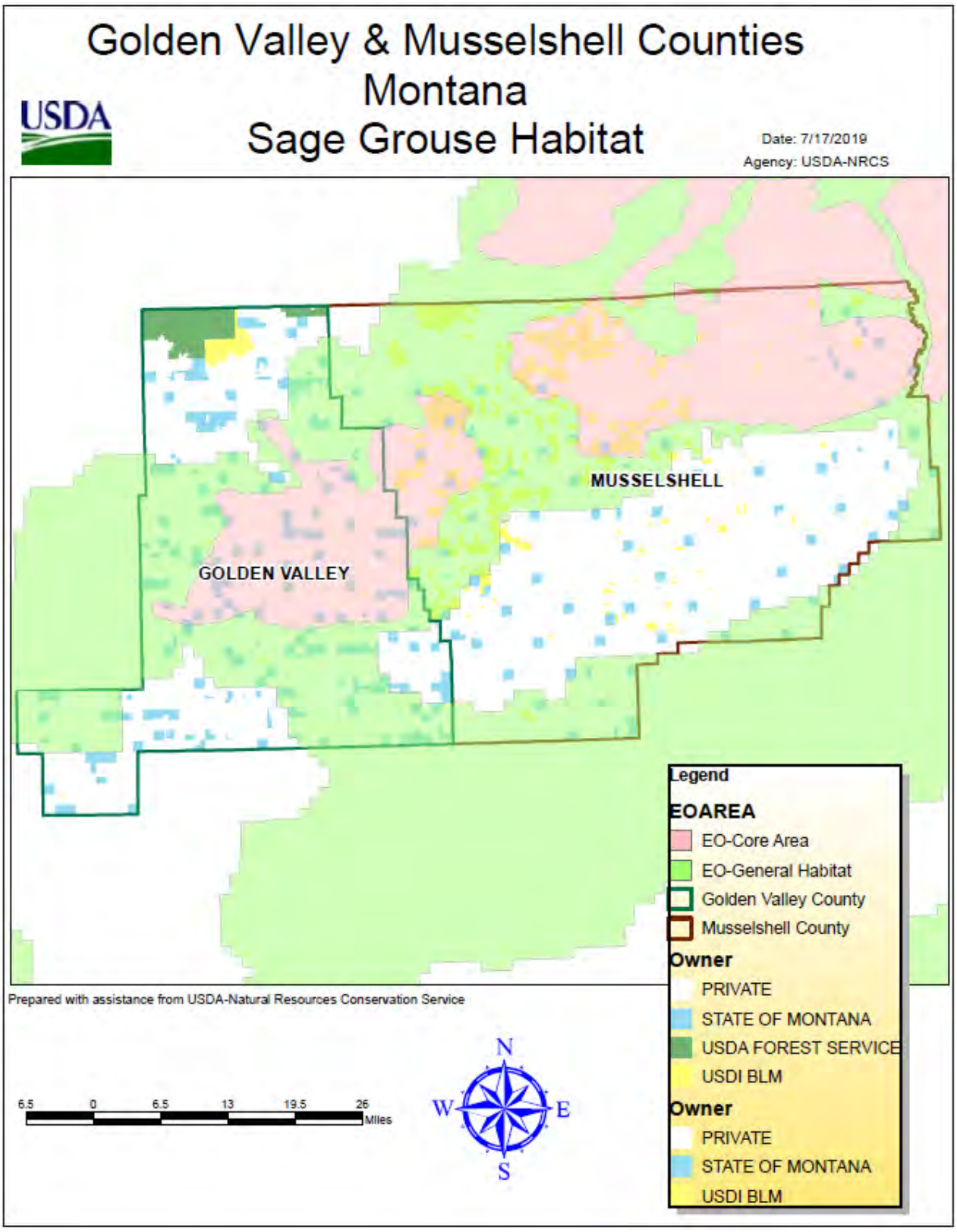
DESCRIP
- Forest land
- Irrigated land; flood irrigation
- Irrigated land; pivot irrigation
- Irrigated land; sprinkler irrigation
- Non-commercial forest land
- Non-irrigated hay land
- Summer fallow farmland

DESCRIP
- Commercial land
- Forest land
- Irrigated land; flood irrigation
- Irrigated land; pivot irrigation
- Irrigated land; sprinkler irrigation
- Non-commercial forest land
- Non-irrigated hay land
- Summer fallow farmland
- Golden Valley County
- Musselshell County

Prepared with assistance from USDA-Natural Resources Conservation Service

6.5 0 6.5 13 19.5 26 Miles

N W E S


Golden Valley & Musselshell Counties
Montana
Sage Grouse Habitat
USDA
Date: 7/17/2019
Agency: USDA-NRCS
MUSSELSHELL
GOLDEN VALLEY
Legend
EOAREA
EO-Core Area
EO-General Habitat
Golden Valley County
Musselshell County
Owner
PRIVATE
STATE OF MONTANA
USDA FOREST SERVICE
USDI BLM
Owner
PRIVATE
STATE OF MONTANA
USDI BLM
Prepared with assistance from USDA-Natural Resources Conservation Service
6.5 0 6.5 13 19.5 26
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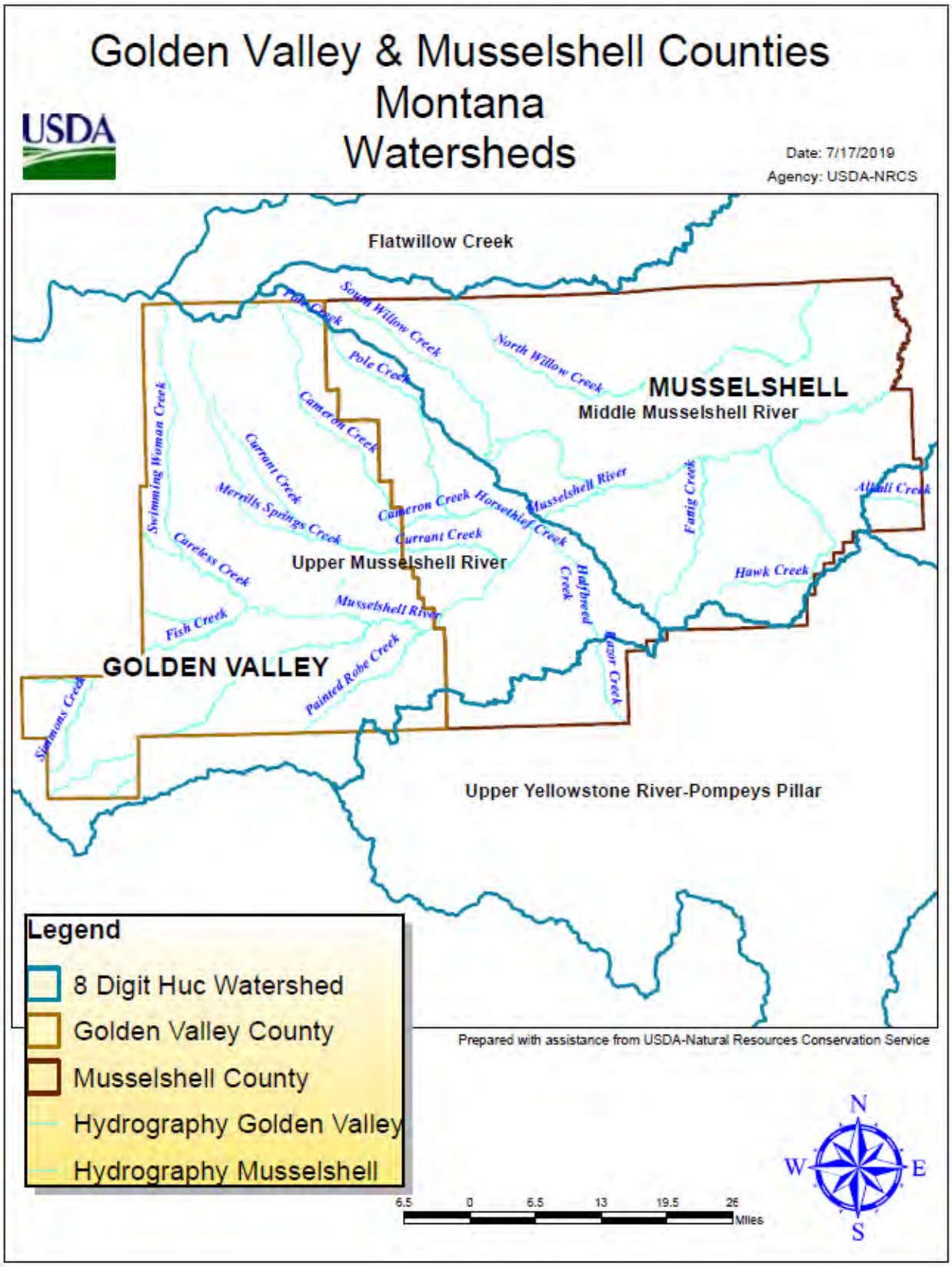
Golden Valley & Musselshell Counties
Montana
Watersheds
USDA
Date: 7/17/2019
Agency: USDA-NRCS
Flatwillow Creek
South Willow Creek
North Willow Creek
Pole Creek
Cameron Creek
Swimming Woman Creek
Current Creek
Merrills Springs Creek
Careless Creek
Fish Creek
Painted Robe Creek
Sixmons Creek
MUSSELSHELL
Middle Musselshell River
Cameron Creek
Horsethief Creek
Musselshell River
Currant Creek
Upper Musselshell River
Musselshell River
Halfbreed Creek
Razor Creek
Fattig Creek
Alkali Creek
Hawk Creek
GOLDEN VALLEY
Upper Yellowstone River-Pompeys Pillar
Legend
8 Digit Huc Watershed
Golden Valley County
Musselshell County
Hydrography Golden Valley
Hydrography Musselshell
Prepared with assistance from USDA-Natural Resources Conservation Service
N
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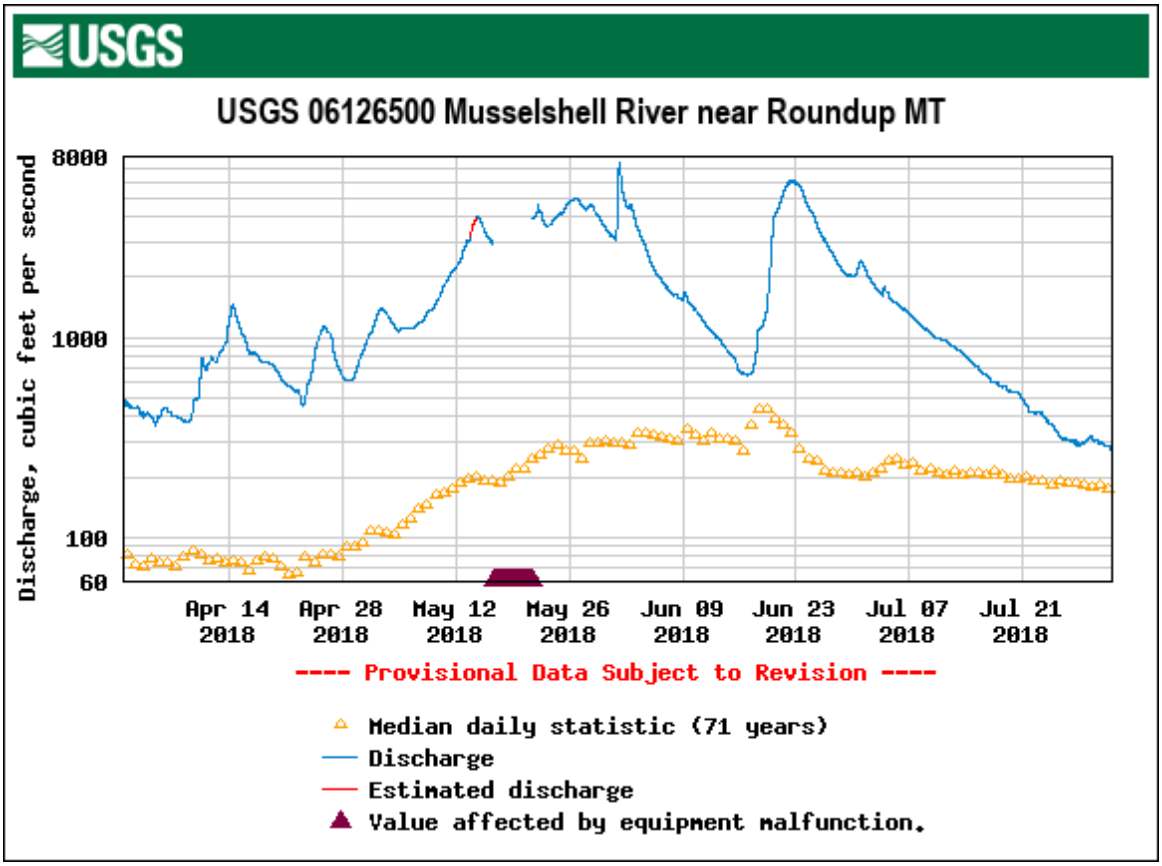
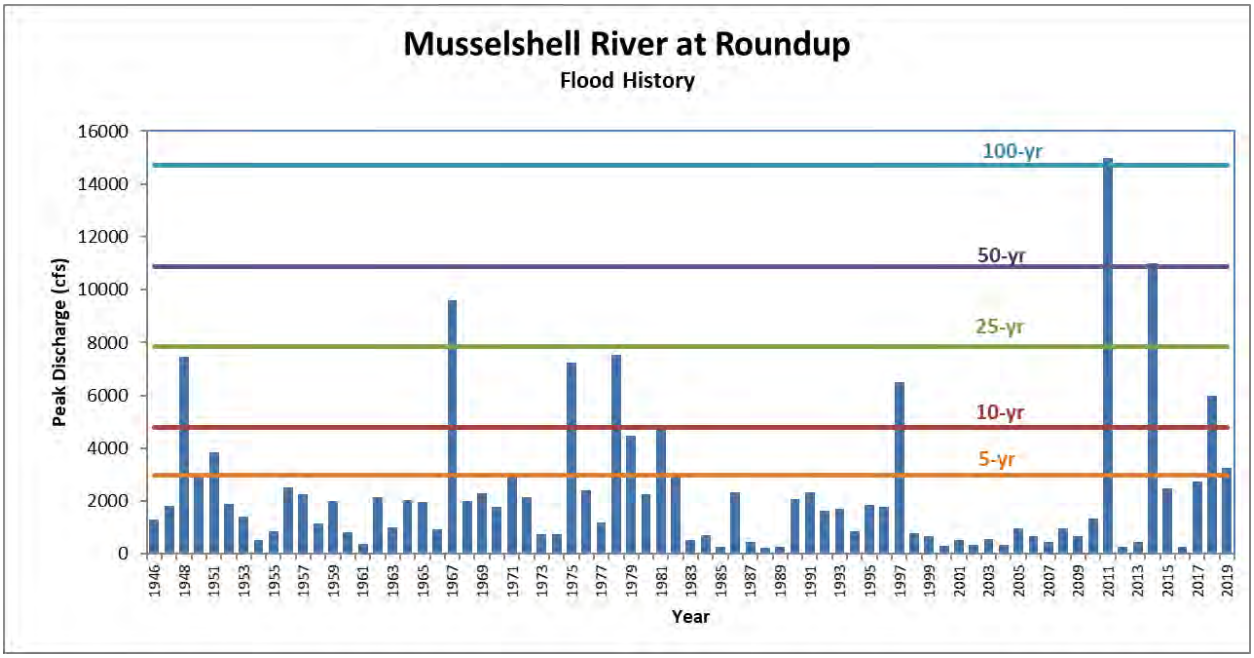
6.5 0 6.5 13 19.5 26
Miles


USGS
USGS 06126500 Musselshell River near Roundup MT
Discharge, cubic feet per second
8000
1000
100
60
Apr 14 2018
Apr 28 2018
May 12 2018
May 26 2018
Jun 09 2018
Jun 23 2018
Jul 07 2018
Jul 21 2018
---- Provisional Data Subject to Revision ----
Median daily statistic (71 years)
Discharge
Estimated discharge
Value affected by equipment malfunction.


Musselshell River at Roundup
Flood History
Peak Discharge (cfs)
16000
14000
12000
10000
8000
6000
4000
2000
0
100-yr
50-yr
25-yr
10-yr
5-yr
1946
1948
1951
1953
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
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2011
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2015
2017
2019
Year

2019 Local Working Group Meeting

Lower Musselshell Conservation District
109 Railway East
Roundup, Montana 59072
March 21, 2019

A public meeting of the Local Working Group followed a lasagna luncheon served by Donna Pedrazzi, LMCD Administrator at 12:00 on Thursday, March 21, 2019 at the USDA Service Center in Roundup. Austin Shero explained the reason for the meeting and asked everyone to introduce themselves. Present for the meeting were LMCD Supervisors Tim Bruner, Joe Stahl, Steve Tyrrel, Shirley Parrott, and Pat Riley; Austin Shero, Landon Krogstad, Hayden Nelson, Scott Anderson, and Zack Adams of NRCS; Michelle Blegen, FSA; Terry Frost and Matt Roen, FSA COC; Laura Nowlin, Musselshell Watershed Coalition; Meriel Beck, Musselshell County/Golden Valley County Weed Coordinator; Dean Blomquist, Golden Valley County Commissioner; Mark Szczypinski and Mike Newberg of FWP; Floyd Fisher, Musselshell County DES; Diane Pennell, Snowy Mountain Development Corporation; Jeff Hermanns, DNRC SLO; Larry Elder, BLM; Mary Cooley and Toby Dahl, Ranchers; and Donna Pedrazzi, LMCD Administrator.

After introductions, Austin Shero played a powerpoint showing data about Musselshell and Golden Valley Counties and explaining the purpose of the Local Work Group (LWG). NRCS is able to offer technical assistance and financial assistance for resource goals identified by local landowners and partners. The state has a new program called Montana Focused Conservation (MFC) which recognizes the highest resource priorities that yield the best returns. Targeted Implementation Plans (TIPs) identify specific projects that could benefit the most from technical and financial assistance. NRCS uses the results of this meeting to prioritize funding for local projects and develop TIPs for consideration in 2020.

The first resource concern to be addressed was fuel mitigation: controlled fires, decadent forests, too many trees. We need to clear water corridors through hills, and let fires burn but be controlled. We could combine resources: county fire plan, forest health study. Pick areas or drainages as focused resource. This would include not just timber but brush, sage grouse and grazing. There would need to be a policy change on how fires are handled in the state. When forests are healthy the grass production increases. A TIP needs to have narrow focus, so as the focus grows, there would be opportunity for partner buy in. Ninety five percent of the wood from our forests is only good for pulp. There is a pulp market west of us, but it has to be shipped. We could write a TIP called Healthy Forests 2.0, that would choose a specific drainage, get buy in from landowners and partners, do thinning and understory removal, ship pulp to market, control burn, treat weeds, etc. After fires, springs return after years of being dry. This would lead to change in how the state fights fire. A prescribed burn in two counties, using the fire department would be a good project.

Invasive weeds is a huge problem for landowners. A TIP could be written for a specific species or an area. Salt cedar, white tip, toad flax are examples of species causing problems for landowners. In order to help landowners, a project should be larger area, and longer term. Weather events cause delays in treatment and re-introduction of weeds along

the river corridor. We need more buy-in from the producers, and a long term commitment. We could partner with other grants, and include biocontrol. Austin said if we go after weeds, how would we quantify and what is the outcome.

Austin said the Musselshell Initiative, which helps with irrigation infrastructure, was grandfathered in, but he plans to write a TIP for the third year of the program.

Soil health and rangeland water have been concerns in the past. Also pests, impaired streams, riparian pastures and livestock water. It is good to set targets, because many producers are happy with where they are in CSP, and need to move on to new concerns. Austin said the State Conservationist saw success in Oregon with this program and wants to bring the same success to Montana.

Partners that could benefit from these TIPs include BLM, DNRC, SMDC, Weed Districts, DES, Fire Departments, Fire Council, Rocky Mountain Elk Foundation, Mule Deer Foundation, etc.

Stream health, riverbed stabilization and whole stream restoration are concerns of some of the landowners. The cost falls on the landowner who doesn't own the river. Projects to protect infrastructure would be a good project. Whole stream restoration could include riparian buffers, set backs, off-stream watering sites. CMZ mapping could aid the future plans of placement of infrastructure along the river. River stabilization is not an easy fix. We must be aware of what happens downstream. Smaller projects, like diversion dams and canal washouts could be considered as projects.

Invasive annual grasses is an issue. Ventenata is coming, which causes production loss. This could be defined and quantified easily.

A TIP is designed to implement a plan, not quantify it. Quantifying can increase the score with TIPs. Measurability, quantifiability and partner buy-in increase the score for the TIPs.

Austin said the Long Range Plan for Musselshell and Golden Valley Counties will be done this summer. He will us the rest of the summer to write TIPs, which are due in December.

The ranking of our concerns was as follows:

1. Fuel Mitigation and Forestry Health
2. Invasive weeds and grasses
3. River and stream health and protection
4. Rangeland water and fencing
5. Irrigation efficiency

Respectfully submitted

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Donna Pedrazzi, LMCD Administrator