MONTANA Focused Conservation

Jefferson County Long Range Plan

Section I. Introduction

- Vision: Develop partner relationships and networks to achieve quality and quantifiable action that achieves effective and sustainable land stewardship.

- Mission: NRCS staff in the Whitehall Field office are dedicated to build alliances with partners and landowners alike to strategically invest resources in order to effectively solve natural resource problems in Montana.

  Jefferson County's Long Range Plan will act as an overarching document to represent the resource concerns that were outlined by landowners, partners, and NRCS employees. The document will act as a working template for current and future conservation participants including NRCS employees to develop landscape level solutions for resource concerns within the county. This document will hold an inventory of the natural resources and agricultural assets in the county, previous and current conservation activities occurring in the county, and existing resource concerns that may need to be addressed in the coming years. This is a working document that will need to be updated and maintained periodically as necessary.

  ➢ Cooperating Entities:

  - Natural Resources Conservation Service (NRCS)
  - US Forest Service
  - Montana Department of Fish Wildlife and Parks (FWP)
  - Farm Service Agency (FSA)
  - Jefferson River Watershed Council (JRWC)
  - Jefferson Valley Conservation District
  - Montana State University Extension
  - Jefferson County Weed District
  - Montana Department of Natural Resources and Conservation
  - Tri-County Firesafe Working Group
  - Rocky Mountain Elk Foundation
  - Mule Deer Foundation
  - Golden Sunlight Mine (Barrick Gold)
  - Trout Unlimited, Jefferson River

Section II. Resource Inventory

Humans

Producers in Jefferson County are primarily operators that have daily involvement in the operation with about 92% having regular on farm decision making. The average age of these producers is 61. A large majority, about 97%, of these people identify as white race with 0.9% being more than one race, 1% being Hispanic, and American Indian or Alaskan native, Asian, and African American producers making up the rest with 0.1% of each. Eighty-three, or 11% of the producers have military service and they manage about 77,716 acres. There are also 181 new and beginning producers that manage 102,074 acres. (National Agricultural Statistics Service, 2019).

The data does not include landowners that have forested property but don't have livestock or sell timber. There is a presence of these landowners in the county, primarily focused North of Boulder and South of Montana City.

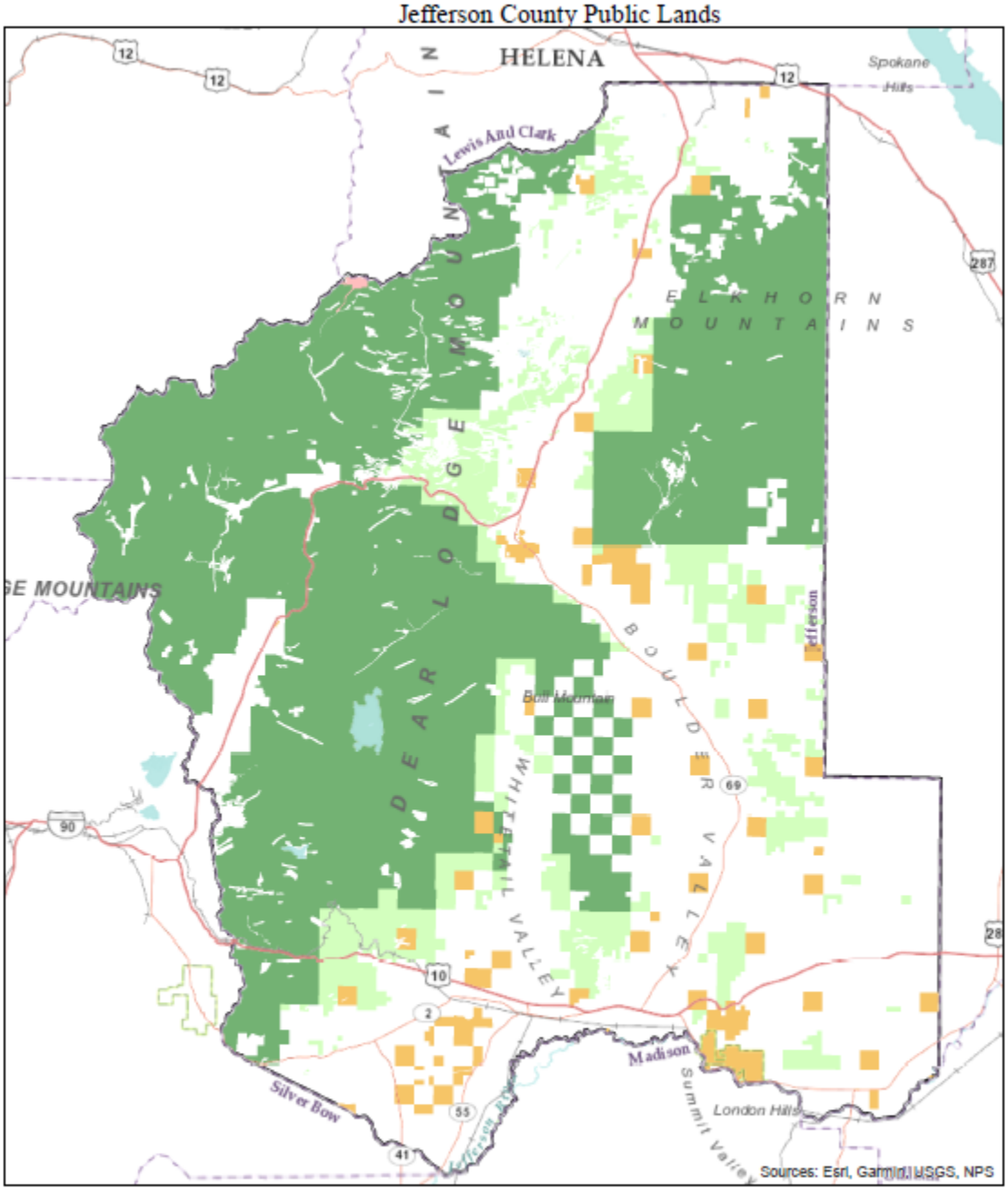
Land ownership

Jefferson County is comprised of 1,659 square miles or 1,060,990 acres. As outlined in Table 1 and Figure 1 approximately 43% or 460,987 acres are privately owned and 37%, or 391,248 acres are dedicated to agriculture. Jefferson County's primary economic base is production agriculture, wood-based products, and mining. Federally managed land in Jefferson County comprises approximately 52% of the total acreage, or 591,067 acres. Approximately 460,343 acres is under the management of the USDA Forest Service, approximately 92,135 acres are managed by the USDI Bureau of Land Management, approximately 1,612 acres are managed by the US Fish & Wildlife Service, approximately 2,530 acres are managed by Montana Department of Fish, Wildlife & Parks, approximately 940 acres are managed by Montana Department of Corrections and State lands comprise 3% of the total lands or approximately 31,526 acres.

Table 1: Jefferson County land ownership (GIS land ownership data layer)

Land Ownership	*Acreage*	*% Ownership of the County*
US Forest service	460,343	43%
Private Land	391,248	37%
Bureau of Land Management	92,135	9%
State of Montana	31,526	3%
MT Fish, Wildlife & Parks	1,612	0.1%
Misc. Other	84,126	8%
Total Ownership Acres	**1,060,990**	**100%**

Jefferson County Public Lands



Legend

Owner Name

- MT DEPT OF ENVIRONMENTAL QUALITY
- STATE OF MONTANA
- USDA FOREST SERVICE
- USDI BUREAU OF LAND MANAGEMENT

3.5 0 3.5 7 10.5 14 Miles

N

Agronomy:

Of the 1,060,990 acres in Jefferson County, approximately 371,205 acres or 35% is reported as cropland. This is comprised of 401 farms at an average of 926 acres each (Montana 2016 Agricultural Statistics). Of these cropland acres, 22,211acres are irrigated, which leaves 348,994acres of dryland. The irrigated acres are comprised of 7,284 acres or 32.85% that is flood irrigated, 12,108 acres or 54.5% of Pivot irrigated, and 2,819 acres or 12.7% of sprinkler irrigated land.

The primary commodity crops are comprised of spring wheat which is grown on three farms at a total of 5,600 acres and 236,984 bushels, and winter wheat which is also grown on three farms for a total of 4,545 acres with the bushels withheld to avoid disclosing data for individual farms (National Agricultural Statistics Service, 2019).

Forage production in the county comprises most of the acres reported as cropland. There are 151 farms producing haylage, grass silage, and green chop for a total of 23,668 acres and 61,612 tons. There are 146 farms producing hay which includes 22,902 acres that produced 59,293 tons of dry hay. Of this hay, 107 farms are producing Alfalfa hay for a total of 15,514 acres and 44,776 tons of dry hay (National Agricultural Statistics Service, 2019).

Pasture/ Rangeland:

Approximately 446,380 acres in Jefferson county are rangeland or grazable woodland. About 80% of farm income comes from cow/calf operations. Average ranch size is 952 acres. Most grazing is on range and grazable woodland, with some occurring on irrigated pasture. These grazing lands provide recreation opportunities and habitat for wildlife as well as domestic livestock.

Rangelands have moved away from climax plant communities in recent years due to grazing decisions such as season-long use and overstocking. Noxious weed invasion and changes in fire regime are also factors. There are still some examples of excellent climax plant communities in Jefferson county, but the percentage of good and excellent condition rangeland has dropped.

Other factors reducing grazing land viability include increased wildlife populations competing for available forage, conifer encroachment, fragmentation due to subdivision, and combinations of these pressures.

Noxious weeds and invasive plants common to grazing land and other areas in Jefferson county include spotted knapweed, leafy spurge, houndstongue, hoary alyssum, Canada thistle and whitetop. Weeds less common but present include

orange hawkweed, Dyer's woad, baby's breath, field scabious, Russian olive, and salt cedar. The most common invasive grass is cheatgrass, and ventenata has been discovered recently.

Early on, exotic species such as timothy, redtop, smooth brome and orchard grass were planted for hay and pasture and these plants displaced native rangeland vegetation in some areas, out competing many native grasses. Invasive species management and improved grazing management will improve rangeland resources and bring grazing levels closer to climax community production.

Forestry:

Jefferson County is divided between two forest regions as defined by Arno: the southwestern and the central. Being on the border of this demarcation emphasizes the ecological diversity in Jefferson County. The valleys are grasslands with black cottonwood, quaking aspen, ponderosa pine, and Douglas-fir in the draws and bordering streams and rivers. Above the valley floor, grasslands give way to forest. Ponderosa pine occupies the warm-dry end of the climatic gradient, and the south slopes. As elevation rises, and on north slopes, Douglas-fir, lodgepole pine, spruce, and finally subalpine fir is on the cool moist end at the highest elevations. Aspen groves can be found throughout as seral stands that are often overshadowed by conifers in the absence of disturbance.

As outlined in Figures 1 and 2, Jefferson County is 54% forested; 75% of which is federal, and state owned; about 163,674 acres private. The University of Montana forestry extension reports 84,352 acres in non-industrial private forest in 10 acre and above ownerships.

The lowland ponderosa pine forest natural fire regime would be frequent, low intensity fires with fire free intervals of 5 to 25 years. In the Douglas-fir forests, the natural, uninhibited fire regime would be fire free intervals of about 45 years, with low to moderate intensity fires that maintained forests in a state where the tree species present, spacing between trees, and understory vegetation are well adapted to fire in healthy state. Lodgepole pine and the other higher elevation forests experience a longer duration fire interval from 100 to 500 years and of course are stand replacing.

A century of fire suppression and manipulation of the natural disturbance mechanisms leave many forests, both public and private, in a state that fires quickly surpass the historic norm and become high severity, stand replacement

fires. The wildfire threat and trend toward more catastrophic fire to the urban interface is common knowledge. The county has a Community Wildfire Protection Plan (a tri-county plan that includes Lewis & Clark, and Broadwater Counties) that discusses this topic in detail, so it is not repeated here.

Forest insect and disease issues are ever-present and in a constant state of flux. There was a mountain and western pine beetle outbreak some 15 years ago that incurred significant mortality, elevating the wildfire fuel loads to dangerous proportions. Spruce budworm is known to occur regionally. Douglas-fir bark beetle is not a significant problem yet but is on the rise in Montana. Western pine beetle (or Ips) is a constant irritant and requires deliberate slash treatment to mitigate potential outbreaks. The aforementioned manipulation of disturbance mechanisms has increased the number of trees per acre far beyond the natural system sustainability and skewed the forest tree species composition toward those more susceptible to insects, disease, and wildfire. This situation, and the significant federal forest presence in the county complicates and limits forest management options.

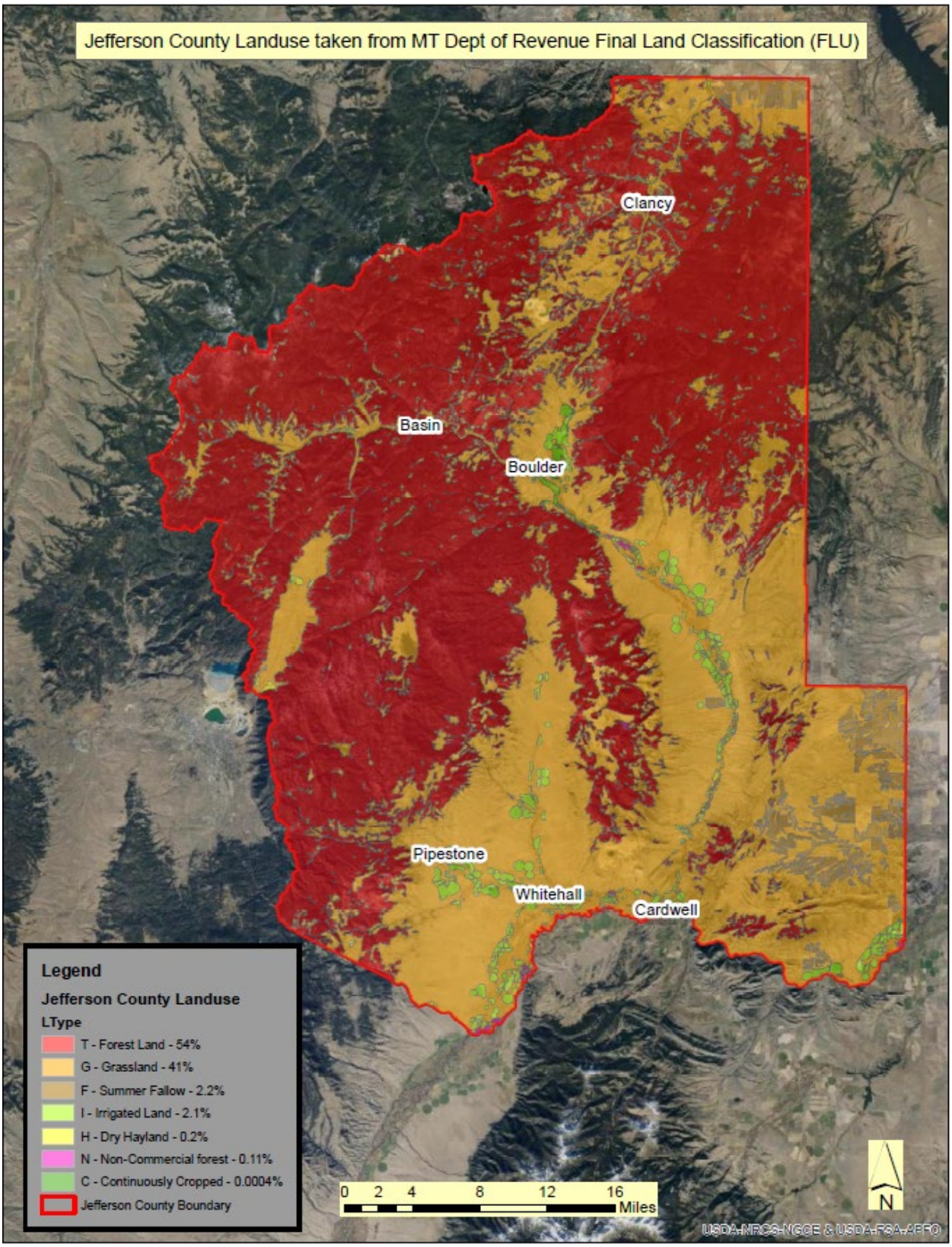


Figure 2: Jefferson County Land Use.

Soil

The field work for the Jefferson County Soil survey (Soil Survey Area MT627) was completed in 1996 and published in 1998. Much of the information in this section is taken from the Soil Survey Manuscript. Jefferson County contains parts of other soil survey areas, including: the Deer Lodge National Forest (MT635), the Helena National Forest (MT631), and Silver Bow County (MT670).

Parent Material

Surficial geologic units in the survey area range in age from Precambrian to Recent. The most prevalent rock units are the Boulder batholith, the Elkhorn Mountain volcanics, and the Tertiary sediments. Tertiary basin-fill sediments, eroded from adjacent mountains, cover a large portion of southern Jefferson County, including most of the Little Whitetail, Boulder, and Jefferson River valleys. Glacial deposits include till and outwash typically composed of coarse boulders derived from intrusive and volcanic rocks. Recent deposits include travertine, associated with hot springs, and alluvium along Little Whitetail Creek, the Boulder River, and the Jefferson River.

The soils in the survey area formed in a wide variety of parent materials. Soils that formed in sandstone are sandy while soils derived from shale tend to be clayey. Soils that formed in mixed alluvium are mainly loamy. Soils that formed in material weathered from limestone have a high content of lime. Finally, soils that formed in material weathered from igneous rocks are generally loamy and have a high content of rock fragments.

Important Farmland

Farmland of Local Importance – These are primarily found on high terraces and fan remnants along the major river valleys in areas where hay and forage are grown.

Farmland of Statewide Importance - These soils occur on broad alluvial fans and terraces and on Tertiary aged sediments in the eastern part of the county.

Prime if Irrigated - As shown in Figure 3, these areas are mainly along river corridors, including a large area southwest of Whitehall.

Prime farmland – As shown in Figure 3, these are extremely limited in Jefferson County due to climate constraints.

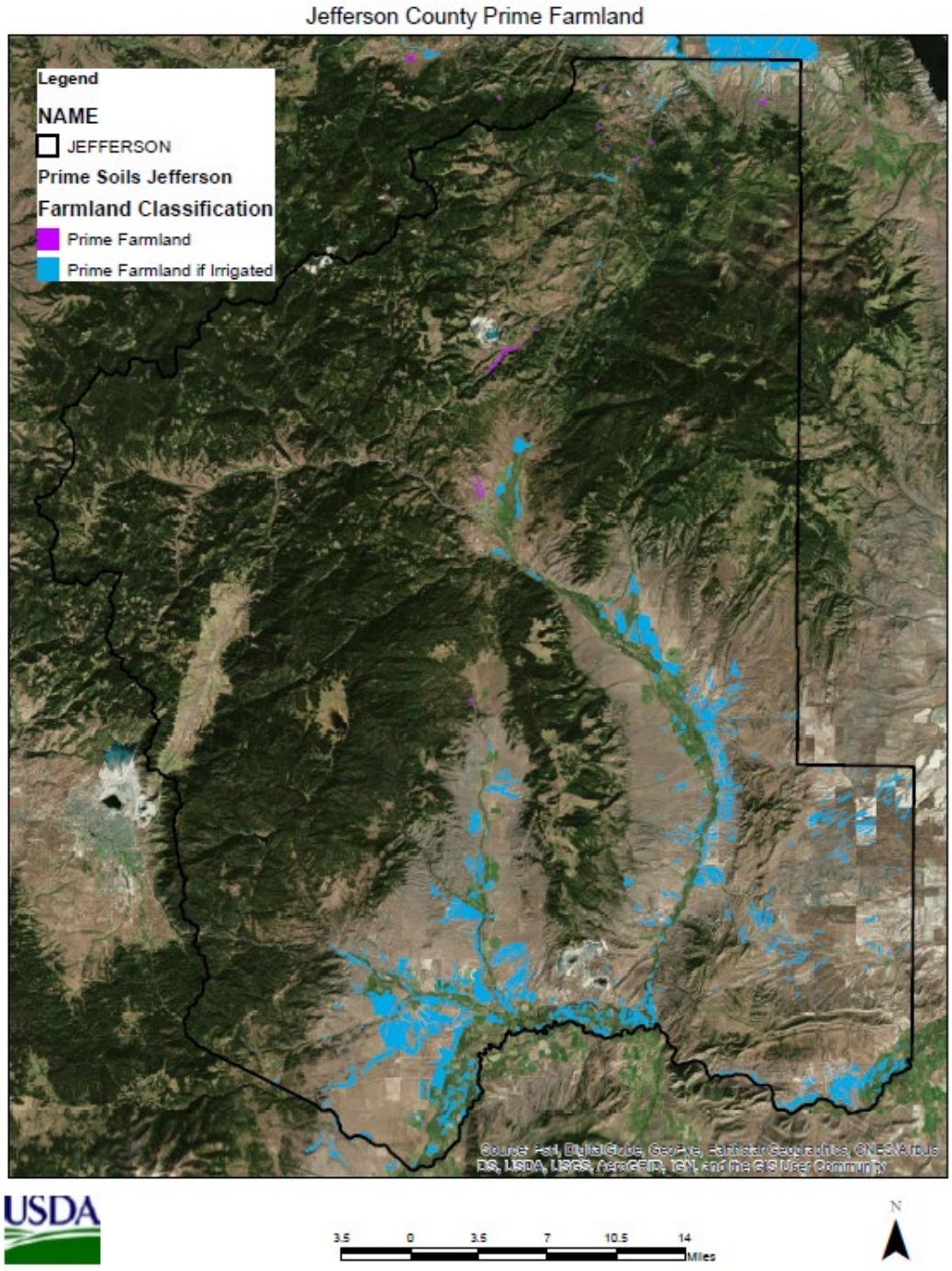


Figure 3: Jefferson County Prime farmlands.

Water

The average precipitation in Jefferson county ranges from up to ~40" in the high mountain peaks to 8-12 inches in the valleys as shown in Figure 4. Snowpack is the main contributor of irrigation water.

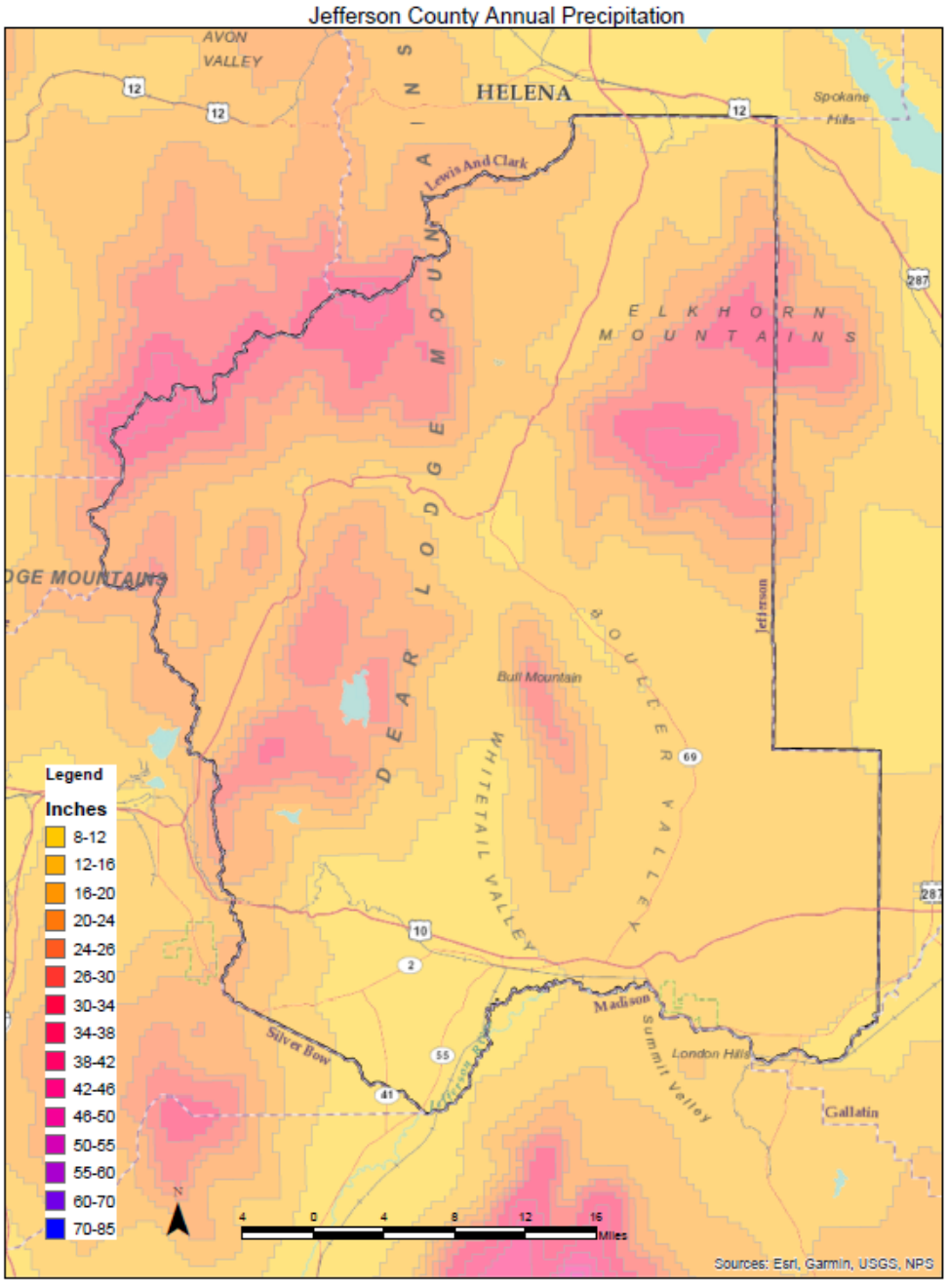


Figure 3: Annual precipitation ranges in Jefferson County.

Figure 5 depicts the watersheds of Jefferson County and surrounding areas. The northern and western boundaries of the county are on the continental divide. The entire drainage area in Jefferson County consists of creeks and rivers that are indirect or direct tributaries of the Missouri River. The Jefferson River is the largest river in the county and is at the southern boundary of the county that splits Jefferson and Madison County. The two largest ditches that are fed from the Jefferson River are Fish Creek Ditch and the Jefferson Canal. Combined, these ditches divert water to irrigate primarily hay ground in an extensive area north and west of the river.

There are four main tributaries to the Jefferson river including Fish Creek, Pipestone Creek, and its tributary Little Pipestone Creek, Whitetail Deer Creek, and the largest tributary, the Boulder River. The first tributary, Fish Creek has a few private ditches above its confluence with the Jefferson River and although Fish Creek was adjudicated in Jefferson County, most of the water rights are used in Silver Bow and Madison Counties. The next tributary, Pipestone Creek and its tributary Little Pipestone Creek, are furnished with water from Delmoe Lake. These feed the Pipestone Ditch which is adjudicated and irrigates the bench land on either side of the creek. Whitetail Deer Creek is the next tributary to the Jefferson River. The Little Whitetail and Cottonwood Creeks drain into the Whitetail Deer Creek and attribute to irrigation by the Whitetail Water Users Association along the Whitetail Valley. The largest tributary of the Jefferson River is the Boulder River which has multiple smaller tributaries including Bison Creek, Basin Creek, Cataract Creek, Muskrat Creek, the Little Boulder River, Elkhorn Creek, Cottonwood Creek, and a series of large springs. The Boulder River has not been adjudicated, but several ditches that are fed from the river have been adjudicated. (Water Resource Survey Part I, June 1956)

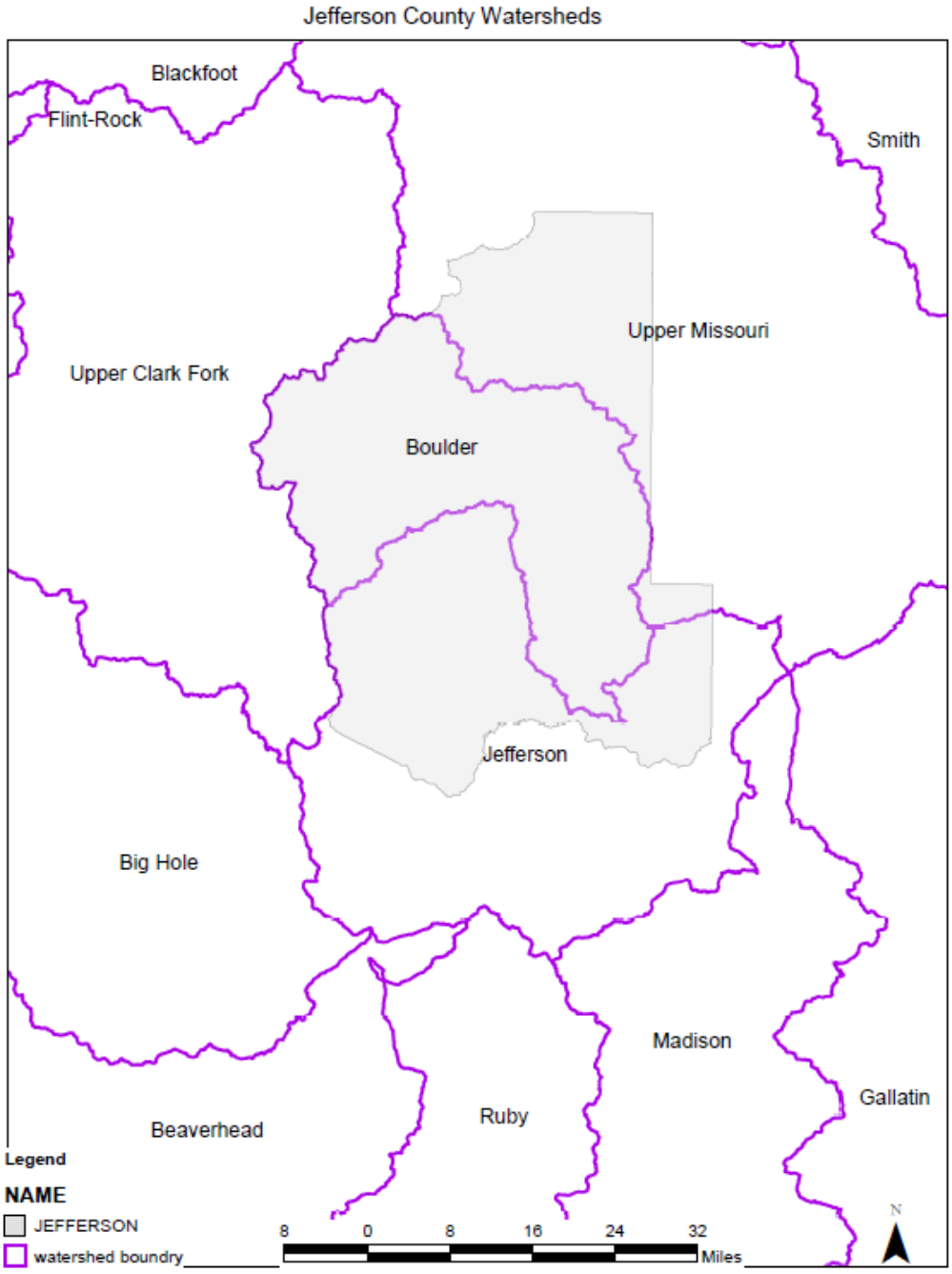


Figure 4: Watersheds in Jefferson County and surrounding areas.

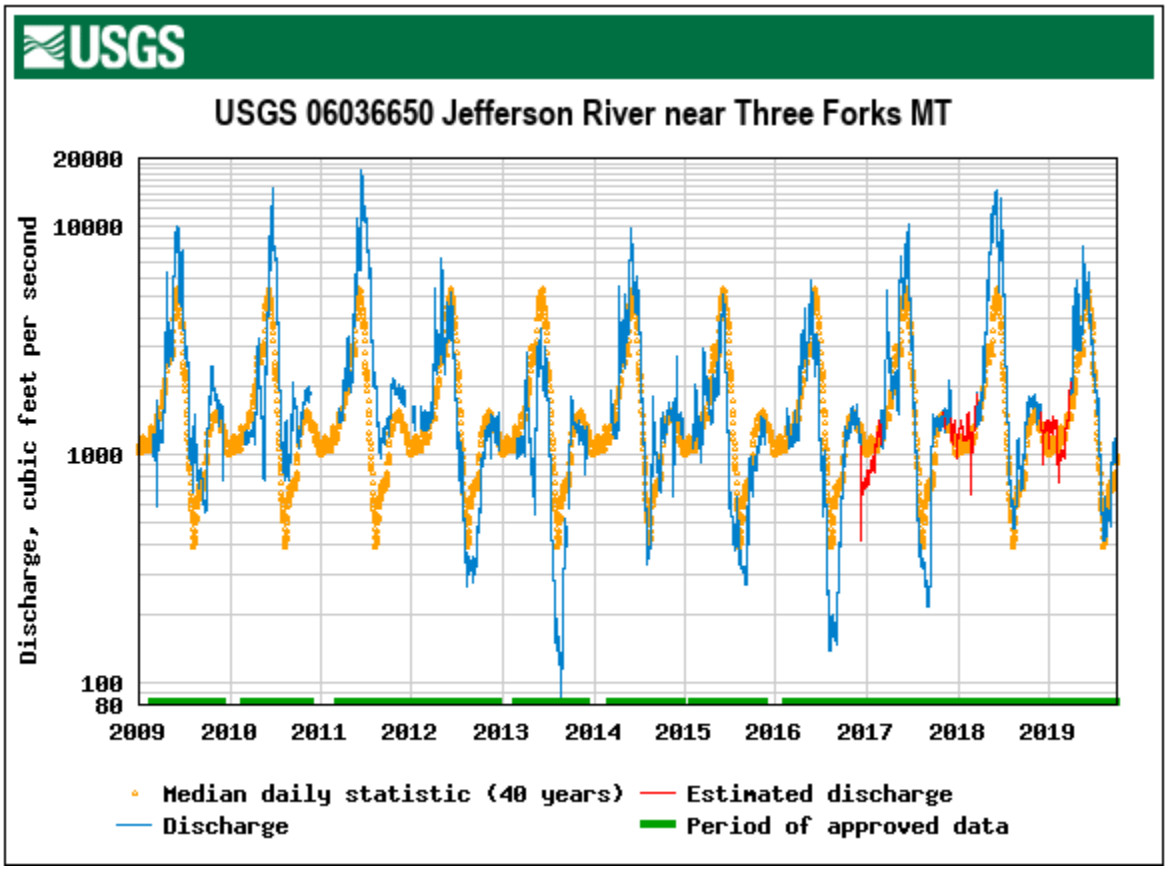


Figure 5: USGS discharge readings for the Jefferson river from 2009-2019

In the county, the DEQ 303d list has multiple stretches of the rivers and streams listed as impaired on the 2018 impaired waters list. A full description of impairments can be found at https://deq.mt.gov/Portals/112/Water/WQPB/CWAIC/Reports/IRs/2018/Appendix_A.pdf.

In summary, the Jefferson river is impaired for the following, due to the listed causes:

Jefferson River and tributaries impairment	Source of Impairment
Flow Regime Modification	Crop Production (Irrigated) Dam or Impoundment Channelization Impacts from Abandoned Mine Lands (Inactive) Acid Mine Drainage Forest Roads (Road Construction and Use) Grazing in Riparian or Shoreline Zones Water Diversions
Iron	Dam or Impoundment
Lead	Impacts from Abandoned Mine Lands (Inactive) Crop Production (Irrigated) Impacts from Hydrostructure Flow Regulation/modification Water Diversions
Physical substrate habitat alterations	Impacts from Hydro structure Flow Regulation/modification Grazing in Riparian or Shoreline Zones Silviculture Activities Highway/Road/Bridge Runoff (Non-construction Related)
Sedimentation/Siltation	Loss of Riparian Habitat Highway/Road/Bridge Runoff (Non-construction Related) Unspecified Unpaved Road or Trail Water Diversions Impacts from Abandoned Mine Lands (Inactive) Grazing in Riparian or Shoreline Zones
Temperature	Natural Sources Streambank Modifications/destabilization Highways, Roads, Bridges, Infrastructure (New Construction) Crop Production (Irrigated) Impacts from Abandoned Mine Lands (Inactive)
Copper	Crop Production (Irrigated) Contaminated Sediments Impacts from Abandoned Mine Lands (Inactive)
Alteration in stream-side or littoral vegetative covers	Agriculture Grazing in Riparian or Shoreline Zones Channelization Animal Feeding Operations (NPS) Crop Production (Irrigated)
Arsenic	Channelization Acid Mine Drainage Impacts from Abandoned Mine Lands (Inactive) Crop Production (Irrigated)
Nitrogen, Total	Dam or Impoundment Grazing in Riparian or Shoreline Zones Water Diversions
Other anthropogenic substrate alterations	Forest Roads (Road Construction and Use)
Phosphorus, Total	Grazing in Riparian or Shoreline Zones Highway/Road/Bridge Runoff (Non-construction Related) Impacts from Abandoned Mine Lands (Inactive) Water Diversions
Physical substrate habitat alterations	Habitat Modification - other than Hydromodification Impacts from Abandoned Mine Lands (Inactive) Subsurface (Hardrock) Mining Natural Sources
Total Suspended Solids (TSS)	Loss of Riparian Habitat Municipal Point Source Discharges Sediment Resuspension (Clean Sediment) Source Unknown
Mercury	Grazing in Riparian or Shoreline Zones Mine Tailings
Aluminum	Subsurface (Hardrock) Mining Rangeland Grazing
Ammonia, Un-ionized	Subsurface (Hardrock) Mining
Chlorophyll-a	Upstream Source
Nitrate/Nitrite (Nitrite + Nitrate as N)	Water Diversions
Cadmium	Impacts from Abandoned Mine Lands (Inactive)
Zinc	Impacts from Abandoned Mine Lands (Inactive) Water Diversions

Boulder River and tributaries impairment	Source of Impairment
Flow Regime Modification	Grazing in Riparian or Shoreline Zones Habitat Modification - other than Hydromodification Silviculture Activities Sediment Resuspension (Clean Sediment)
Iron	Impacts from Abandoned Mine Lands (Inactive) Highways, Roads, Bridges, Infrastructure (New Construction)
Lead	Impacts from Abandoned Mine Lands (Inactive) Impacts from Hydrostructure Flow Regulation/modification Mill Tailings Mine Tailings Subsurface (Hardrock) Mining Loss of Riparian Habitat Highways, Roads, Bridges, Infrastructure (New Construction) Streambank Modifications/destabilization
Physical substrate habitat alterations	Grazing in Riparian or Shoreline Zones
Sedimentation/Siltation	Loss of Riparian Habitat Water Diversions Impacts from Hydrostructure Flow Regulation/modification Subsurface (Hardrock) Mining Mine Tailings Rangeland Grazing Impacts from Abandoned Mine Lands (Inactive) Silviculture Activities Watershed Runoff following Forest Fire
Temperature	Loss of Riparian Habitat Mill Tailings
Copper	Impacts from Abandoned Mine Lands (Inactive) Acid Mine Drainage Highways, Roads, Bridges, Infrastructure (New Construction) Grazing in Riparian or Shoreline Zones Forest Roads (Road Construction and Use) Loss of Riparian Habitat
Alteration in stream-side or littoral vegetative covers	Agriculture Grazing in Riparian or Shoreline Zones Channelization Acid Mine Drainage Forest Roads (Road Construction and Use) Dam or Impoundment
Arsenic	Channelization Acid Mine Drainage Impacts from Abandoned Mine Lands (Inactive) Contaminated Sediments Forest Roads (Road Construction and Use)
Nitrogen, Total	Grazing in Riparian or Shoreline Zones Highways, Roads, Bridges, Infrastructure (New Construction)
Total Suspended Solids (TSS)	Mine Tailings
Aluminum	Acid Mine Drainage Agriculture Contaminated Sediments Dredge Mining Grazing in Riparian or Shoreline Zones
Nitrate/Nitrite (Nitrite + Nitrate as N)	Subsurface (Hardrock) Mining Forest Roads (Road Construction and Use)
Cadmium	Impacts from Abandoned Mine Lands (Inactive) Habitat Modification - other than Hydromodification Crop Production (Irrigated) Forest Roads (Road Construction and Use) Contaminated Sediments Dredge Mining
Turbidity	Subsurface (Hardrock) Mining
Fish Passage Barrier	Grazing in Riparian or Shoreline Zones
Zinc	Mill Tailings Mine Tailings Loss of Riparian Habitat Subsurface (Hardrock) Mining Rangeland Grazing Silviculture Activities Silviculture Harvesting

Wetlands

Wetlands are among the most important and beneficial ecosystems on the landscape. Wetlands provide critical biological, ecological, and economic benefits including flood attenuation, water filtration, carbon sequestration, and drought resiliency. Further, wetlands are home to 31% of all U.S. plant species, half of all North American bird species use wetlands as some point in their lifecycle, and nearly half of all threatened or endangered species in the US are also associated with wetlands. (US EPA, 1995b. America's wetlands: Our vital link between land and water. Office of Water, Office of Wetlands, Oceans and Watersheds. EPA843-K-95-001) Jefferson County contains a moderate amount of wetlands but a diverse array of wetland types. A total of 41,992 acres of wetlands can be found within the county borders. Of these, 28,375 (68%) acres are palustrine (lacking flowing water), 1,293 (3%) are lacustrine (lake associated) in nature, 1,944 (5%) acres are riverine (river associated), and 10,380 (24%) acres are located within riparian zones.

Air and Energy

Jefferson County is not within any non-attainment areas for any pollutants. The power supply for the county is provided by Northwestern Energy and Vigilante Electric REA Cooperative. A few homes and other improvements are off-grid and powered by generators and solar systems. Opportunities exist to reduce energy use by replacing stockwater and irrigation pumps with gravity flow and solar energy systems.

Plants and Animals

Where they are found, federal and state listed plant and animal species offer valuable opportunities to partner with landowners and conservation partners to protect and improve associated habitats. The US Fish and Wildlife Ecological Services Division lists the following Threatened species as present within areas of Jefferson County: Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horibilis*), and Ute Ladies' Tresses (*Spiranthes diluvialis*). None of Montana's federally Endangered species are known to reside within the county but one Proposed (Wolverine, *Gulo gulo luscus)* and one Candidate species (Whitebark Pine, *Pinus albicaulis*) are considered present.

According to the Montana Natural Heritage Program, Jefferson County contains 41 state listed animal Species of Concern. These species consist of 8 mammal species, 26 bird species, 1 amphibian, 1 fish species, 3 insect species, 1 mollusk species, and 1 arachnid. Habitats generally associated with these species are diverse including both terrestrial and aquatic types and comprise mountain

streams, rivers, lakes, grasslands, riparian forests, conifer forests, wetlands, and sagebrush. More specialized species on the list can be found only in association with Jefferson County's rocky cliffs, alpine zones, and limestone caves.

A total of 14 state listed plant Species of Concern also can be found within Jefferson County. They are generally comprised of 1 fern specie, 1 conifer specie, 11 flowering dicot species, and 1 flowering monocot specie. Most of these species subsist in Jefferson's common general habitat types (grasslands, riparian, forests) but a few specialized species can only be found in more limited habitats including rock talus and alpine zones.

Section III. Conservation Activity Analysis

The Whitehall NRCS Field Office has been involved in many different types of projects throughout Jefferson County in recent history. Projects have been implemented to improve grazing management including fencing, livestock watering systems, and prescribed grazing. Projects intended to mitigate fire hazards and improve forest health include fuel breaks, forest stand improvement, and woody residue treatment. Efforts to improve water quantity and quality include irrigation projects converting flood irrigation to sprinkler irrigation such as wheel lines and center pivots. Improving water quality on 303d Impaired waters has been a recent focus. Some of the measures taken to improve resource concerns such as sediment and nutrient impairments include riparian fencing. Reducing unneeded nutrient application and timing application of nutrients and herbicides to reduce runoff have been implemented. Improving habitat for wildlife has been a direct focus of some installed practices such as tree/ shrub establishment, conservation cover, upland wildlife habitat management and an indirect benefit of practices such as range planting, forestry practices, and herbaceous weed control. NRCS has helped producers increase the growing season and improve crop production through multiple high tunnel projects in Jefferson County. Recent efforts have improved the pollinator habitat through plantings to increase and improve the amount of habitat and food for selected pollinator species.

Jefferson County contains a total of 15,547 acres under some form of conservation easement. Of these, 8,015 acres are associated with private easement holders (land trusts, animal conservation organizations, etc.). The remaining easements are federally owned (140 acres) and state or locally owned (7,392 acres). Of the federal acres, the United States Department of Agriculture currently holds all of the 140 acres under easement within the county. Other privately-owned designated conservation lands in the county encompass 33 acres owned by The Prickly Pear Land Trust.

Agreements between NRCS and the Forest service called the Ten Mile South (2014-2016) and Capital 360 (2018-2020) Joint Chiefs projects were completed to focus efforts across private and public land boundaries to reduce fire hazards in high and severe fuel hazard areas. Fuel break, forest stand improvement, woody residue treatment, and brush management continue to be implemented across private land to match Forest Service efforts on public lands in the same region.

The Jefferson River Watershed Council (JRWC) is a non-profit organization that is comprised of irrigators, recreationalists, sportsmen's groups, federal and state agencies that seeks to work together and develop solutions to problems associated with the upper Jefferson River. JRWC obtains grants to do projects such as improve irrigation turnouts, stabilize stream banks, and enhance river functions. JRWC helps producers with developing drought management plans as well as collecting streamflow data and helping to manage flow gages. The group has developed resources such as maps that delineate the Jefferson River channel migration zones.

The irrigators on the four big canals, in cooperation with the Jefferson River Watershed Council and the Montana Department of Fish, Wildlife and Parks have implemented the Jefferson River Drought Management Plan on dry years since 2000. Trigger flows of 280 cfs at the Twin Bridges gage and 73-degree F water temperature initiate voluntary reductions in water withdrawals, to achieve the minimum 50 cfs at the Parsons Bridge gage on the Jefferson River for the purpose of fish survival.

Section IV. Natural Resource Problems and Desired Future Outcomes

Outreach opportunities revealed a multitude of resource concerns from local landowners representing different parts of the county as well as partners that would be interested in collaboration of efforts or looking to complete projects with the assistance of NRCS.

With the diversity of Jefferson county land use types, there was a clear distinction between the primary resource concerns associated with the geographic area and the specific land use minus a few county wide concerns.

Dryland Pasture/Rangeland:

Rangeland health and water quality are major resource concerns of the landowners. Cattle operations account for about 80% of the agricultural

enterprise in the county, and the majority of these operations rely on native rangeland and dryland pasture for grazing.

Conifer encroachment and Grazing management are considered the main contributors to a decline in range production and health. Some of the symptoms associated with these activities are an increase in herbaceous weeds, an increase in erosion, and a decrease in plant production and therefor a decrease in AUMs.

Landowners realize that a change in the fire regime has caused an increase in conifers on rangeland. Conifers such as the Rocky Mountain Juniper and Douglas fir then use resources such as water and sunlight that then can't be used by the surrounding grasses. The conifers also take up valuable space that was once used for growing grass. Depending on the density of the conifers, this can be a major reduction in grass production which amounts to less AUMs for the producers.

Grazing management is a major factor in plant health. Poor grazing distribution is a contributing factor in the decline of range health. Due to a lack of infrastructure such as cross fences or livestock watering facilities, many landowners are seeing overgrazing in some areas of the grazing units, and underutilization in others.

A lack of livestock watering facilities also causes landowners to rely on streams, rivers, and springs for livestock water. This causes overgrazing in riparian areas that in turn weakens banks which widens the water body causing warmer shallow water and sedimentation to increase. There are multiple water bodies in the county that are impaired on the 303d list for sedimentation that can be attributed to livestock (See Jefferson County 303d List).

Implementing practices that address conifer encroachment, grazing distribution with proper timing and intensity, livestock watering facilities, and riparian fencing can benefit both the resource and the producer by reversing the rangeland trend from declining to improving. This may assist in returning the rangeland to the climax plant communities that are able to support more healthy and native plants. The producer will benefit from having a more productive rangeland that allows them to possibly increase AUMs over time. These benefits can also have some positive impacts for wildlife habitat and sustainability of the soils due to a reduction in erosion.

No action will result in the resources continuing to decline and being harder to restore. This is a large-scale issue across multiple landowners that will take time and joint efforts to start to amend.

Forest:

The portion of Jefferson county north of Boulder, MT is primarily forested. The majority of the privately-owned land are forested properties that have permanent residences on them. The landowners in this area are primarily concerned with fuels reduction to lower wildfire risk and forest health. Herbaceous weeds are also a concern.

Human impact to the fire regime has increased the density of regenerative, sapling, and pole sized trees on the landscape. This has a multitude of impacts to the health of the forest as well as the fire behavior in that forest. It poses a major risk to those who reside in or near the forest and impacts the habitat for species that rely on these forests. An increase in trees causes more competition for the already limited resources that are available such as water, nutrients, space and sunlight. The denser forests are also more likely to be infested with insects and disease because the trees are likely to be more stressed and consequently let off more stress signals that attract these insects. This in turn can have a large-scale negative impact on the health of the trees and cause large killings. Although some snags are important for good habitat, a large number of standing dead trees pose a threat of falling and increasing the fuel load in the case of a fire. Due to a larger human population and human frequency along the interstate, there is also a higher risk of human caused fire that threatens the forest.

Work by the BLM and Forest Service continues to take place on federal public lands to reduce wildfire hazards and improve forest health. Work has also been done through NRCS to help landowners address these concerns on their properties, but there is still a vast concern in the area. No action will result in a continued decline in forest health and overstocking that results in an increased fire hazard, threatening many homes and the communities along I-15 including Boulder, Jefferson City, Clancy, Montana City, and our state capital Helena, located just over the Lewis and Clark County line.

Irrigated cropland:

The crop production in the county is primarily irrigated hay. The main concerns associated with irrigated crop are related to water quantity, water quality, irrigation efficiency, irrigation infrastructure, including late season water quantity in the rivers. One of the symptoms of these concerns is low production on the irrigated cropland that ultimately results in limited feed for livestock.

Improving irrigation infrastructure, replacing pumped systems with more efficient pumps or gravity fed main lines, and lining or piping water in ditches are some of

the improvements that the landowners would like to see in order to improve irrigation efficiency, use less water, and have water for irrigation later in the season. Replacing head gates and turn outs that are past their life expectancy would allow for better irrigation application and a possible increase in yields. Another option that will be explored will be pumping directly from streams and rivers, rather than having water provided by ditches and canals.

No action will cause the current infrastructure to decline further in the short and long term which will emphasize the concerns that the landowners and resources are already experiencing.

County Wide:

Landowners realized that there were some resource concerns that were large scale and not specific to a land use or area. Some county wide concerns were tied to weed control including species not listed on the noxious weed list such as cheatgrass. All landowners in the county are exposed to herbaceous weed control issues to some extent. The extent that it impacts them may vary widely based on the land use of the property, but an increase of herbaceous weeds degrades native plant conditions, negatively impacting rangeland heath, livestock forage, wildlife habitat, and fine fuel loads in the forest. Landowners, agencies, and the Jefferson County Weed District have worked to minimize the spread of herbaceous weeds. Efforts have made a difference but work to be done and maintenance will persist. With enough collaboration, herbaceous weed control could become much more manageable for the individuals addressing the problem in the short and long term.

Another concern identified is conifer encroachment in riparian areas. This concern was tied to a decrease in species such as aspen, willow and cottonwood trees that are choked out by competing conifer species. These conifers are also using resources such as water that reduces the amount available to more desirable riparian species and reduces the amount of water available in the watershed. Landowners also showed interest in wildlife and pollinator habitat across the whole county. This included upgrading fences to make them more wildlife friendly, creating habitat that is available and preserved for wildlife, and changing management to better suit wildlife. Plantings for pollinator habitat was discussed as a need in the county. Some small plantings currently being maintained were mentioned, but the landowners desired to make these more continuous and on a larger scale to make it better suitable for pollinators.

Section V. Prioritization of Natural Resource Problems and Desired Outcomes

The Jefferson County Local Work Group met June 15, 2021, and retained the same top four priority resource concerns:

1. Forest Health and Wildfire Hazard

The targeted area will be the Wildland Urban Interface not included in two 3-year Joint Chiefs funding areas. Partners include the US Forest Service, the Montana Department of Natural Resources and Conservation, the Bureau of Land Management, and Tri-County Firesafe Working Group.

The desired outcomes will be a healthy forest adapted to drought, insect infestations, and wildfire. Success will be measured by the number of acres treated, and an estimate of tonnage of wood removed.

2. Noxious Weeds and Cheatgrass

The targeted area will be all Targeted Implementation Plans county-wide across all land uses except cropland, where ground-disturbing practices will be installed. Partners include the Jefferson County Weed District, the Whitehall High School Insectary, and the Jefferson Valley Conservation District.

The desired outcome will be containment and control, and in some cases eradication of invasive species. Success will be measured by comparing before and after acreage of weed infestations and monitoring the establishment of bio-control agents released.

3. Rangeland, Pasture and Riparian Health

Grazing land including rangeland and expiring CRP in the eastern part of the county will be targeted for grazing management plans and facilitating practices. Partners include the Farm Service Agency and the Jefferson Valley Conservation District.

The desired outcome will be improving and maintaining healthy grass stands and developing the retired cropland into viable grazing units.

A collaborative effort is forming to address conifer encroachment on rangeland and in riparian areas on ranches between Boulder and Whitehall. Partners include Mt. Dept. of Fish Wildlife & Parks, Jefferson River Watershed Council, the Rocky Mountain Elk Foundation, and the Mule Deer Foundation.

The desired outcome will be increased ground and surface water, increase in seral species such as aspen, willow and cottonwood, and improvements in

grassland production for livestock and wildlife. Success will be measured by groundwater monitoring and surface water flow measurements before and after riparian treatments, photo monitoring to track woody species composition changes, and monitoring to track changes in rangeland composition and production. Monitoring will be completed by the landowners and representatives from the organizations involved.

4. Irrigation Improvements

Water users, mainly in the south half of the county, will be approached to make them aware of potential EQIP assistance. Several irrigation districts, including the Pipestone Water users, Jefferson, Fish Creek, Creeklyn, and Pleasant Valley canal systems, and irrigators in the Boulder Valley have expressed concerns about water quality and quantity, such as sediment and fall return flows. A diversion impedes fish migration between the Jefferson River and the Cold Springs, an important resource for brown trout spawning and rearing. A plan is in place to obliterate this fish barrier, discontinue canals, and pump directly from the stream to improve migration, eliminate fish entrainment in ditches, as well as increase efficiency on the fields. Partners include the Mt. Dept. of Fish Wildlife & Parks, the Jefferson River Watershed Council, Trout Unlimited, and the Jefferson Valley Conservation District. More desired outcomes will be improved late season stream flow, reduced sediment and temperature, and improved crop quantity and quality.

The decision-making process for selecting these top four priority resource concerns was based on EQIP applications already on hand, the landowner outreach meetings, outreach from partners, and interest expressed. Determining the level of landowners being ready, willing, and able to participate is in-process now but started with the landowner outreach meetings in the summer of 2019.

Towns in Jefferson County have long served as "bedroom communities" for Butte, Bozeman, and Helena. As home and property prices increase in those cities, there is likely to be more demand for housing developments in Jefferson County. Wetland and ag land easements offered by NRCS could be a solution to keep agricultural land and wildlife habitat from being fragmented and removed from production.

Section VI. Targeted Implementation Plans (TIP) and Investment Portfolios

Interest has been expressed in the north end of the county for forming TIP areas that would address forest health, wildfire hazard, and noxious weeds. Interest has also been expressed in conifer removal from rangeland and riparian areas. Irrigation improvements on the Jefferson and Boulder Rivers also have the potential for TIPs, but due to the need for planning and engineering, as well as the need for season-specific installation of practices, TIP development for irrigation is likely to progress more slowly.

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