Long Range Plan
Sanders County, Montana

Section I. Introduction

Purpose

The Long-Range Plan is a working document outlining the natural resource data, status and trends from Sanders County. This plan represents a commitment to local and regional partnerships and outlines strategic approaches to solving complex natural resource issues. The plan will be used to prioritize projects for NRCS financial incentive programs.

The goal of the Long-Range Plan is to review natural resource characteristics and issues found throughout Sanders County and surrounding areas. Updated on a semi-annual basis, this document will be used to highlight resource concerns of high priority and will provide guidance on future planning of Targeted Implementation Plans (TIP).

The Sanders County Long Range Plan was developed by the NRCS Plains Field office with help from multiple partners. In addition, existing resource plans and management plans from partners have been referenced in completing this document. A full listing of resources can be found in the "Source" section.

Partners in Natural Resources

- Eastern Sanders Conservation District (ESCD)
- Green Mountain Conservation District (GMCD)
- Lower Clark Fork Watershed Group
- Avista Energy
- Natural Resources Conservation Service (NRCS)
    - Plains Field Office
    - Pablo Field Office
    - Ronan Field Office
- Confederated Salish and Kootenai Tribes (CSKT)
- Montana State University Extension
- U.S. Forest Service
- U.S. Fish and Wildlife Service (USFWS)
- Montana Fish, Wildlife & Parks (FWP)
- Flathead Indian Irrigation Project (FIIP)
- Kaniksu Land Trust
- Montana Dept. of Natural Resources and Conservation (DNRC)
- Trout Unlimited (TU)
- Intermountain West Joint Venture (IMJV)
- Montana Land Reliance
- The Nature Conservancy
- Soil and Water Conservation Districts of Montana (SWCDM)
- Montana Association of Conservation Districts (MACD)
- Sanders County Government

Section II. County Profile and Natural Resource Inventory

Sanders County is located in northwestern Montana sharing its western border with the Panhandle region of Idaho. This western border is home to the Coeur d'Alene Mountains which are part of the Bitterroot Range. The Bitterroot Mountains are in the southern part Sanders County while the Cabinet Mountains are in the north. The Clark Fork River, which is a tributary of the Columbia River runs the length of Sanders County flowing from southeast to the northwest. The county has a wealth of public land with two National Forests, the Kootenai National Forest and the Lolo National Forest in addition to the Cabinet Mountain Wilderness and the National Bison Range.

Sanders County boasts incredible diversity of landforms and ecosystems. In fact, the county is home to some of the wettest and driest areas of the state. The west-facing mountain slopes near the community of Heron, located in the northwest region of Sanders County receives nearly 40 inches of precipitation a year, while the southeastern edge of the county near the community of Dixon receives less than 12 inches of precipitation each year. The county has an abundance of lakes, rivers, streams and wetlands. From resource management perspective, this diversity of landforms creates unique challenges and opportunities.

Humans

Sanders County at a Glance

Sanders County has a total area of 2,690 square miles or 1,785,462 acres (1.9% of Montana), with 29 square miles being comprised of water. According to the most recent statistics available from the US Bureau of Census, the estimated population of Sanders County was 11,844 in 2018. The population density is 4.1 inhabitants per square mile. The racial makeup of the county was 92% white, 4.4% American Indian, 2.0% Hispanic or Latino, 0.3% Asian, 0.1% black or African American, 0.4% from other races, and 3.1% from two or more races. The largest city in the county is Thompson Falls which also serves as the county seat with a population of approximately 1,300 in the 2010 census.

According to the National Agriculture Statistics Service, 56% of land in Sanders County is publicly owned, of which the majority (52%) is owned by the US Forest Service. Only 18% of lands in Sanders County are held in private ownership (325,615 acres). The Flathead Indian Reservation boundaries encompass 26% of Sanders County, primarily on the eastern edges of the county which includes the Little Bitterroot Valley. The Reservation is home to three tribes, the Bitterroot Salish, Upper Pend d'Orielle and the Kootenai and together they are known as the Confederated Salish and Kootenai Tribes (CSKT). Historically the three Tribes maintained territories stretching from central Montana through eastern Washington and into Canada. The Flathead Reservation was established in 1855 by the Hellgate Treaty. The Reservation covers approximately 1.3 million acres. The majority of the Reservation is located within Lake County; however, the reservation also extends into Sanders and Missoula Counties. The 1904 Flathead Allotment Act eventually led to the opening of the Reservation to non-Indian homesteaders in 1910. According to CSKT's 2018 Annual Report the Reservation has approximately 8,087 enrolled tribal members, 5,000 of which live on or near the reservation (CSKT 2018 Annual Report). The city of Pablo serves as the seat of government for the CSKT.
Table 1 details ownership in Sanders County more closely. Appendix maps 1 and 2 in the appendix detail the boundaries and ownerships of Sanders County in detail.

Table 1: Sanders County Land Management Summary

Sanders County Land Management SUMMARY			
		Total Acres	**Land Percentage**
Public Lands		**997,560**	**56%**
	U. S. Forest Service	921,489	52%
	U. S. Fish and Wildlife Service	10,101	< 1%
	Montana State trust Lands	61,282	3%
	Montana Fish, Wildlife & Parks	3,328	<1%
	Montana Department of Transportation	164	<1%
	State of Montana	9	<1%
	Local Government	1,187	<1%
CSKT Ownership		**462,275**	**26%**
Private Lands or Unknown Ownership		**325,615**	**18%**

Agriculture

The primary agricultural land use in Sanders County is pasture and range (50%), followed by woodlands (37.9%) and cropland (10.1%). The total number of farms has held steady over the past ten years near 500. The acres in farmland jumped significantly between 2012 and 2017; this is likely an anomaly and a result of survey or classification error instead as the amount of farmland did not change that significantly during a 5-year period in Sanders County. Primary agricultural products include livestock (primarily cattle) and forage (grass and alfalfa). There is limited small grain production (spring and winter wheat, oats and barley) and a small number of acres in diversified vegetable production (often on small 'truck farms' and high tunnels) as well as some small orchards and fruit producing operations. Most of the agriculture takes place in the southern portion of the county. The northern end of the county has some cattle producers but is more generally forested and of lower suitability for agriculture.

Table 2: Agricultural Statistics

SANDERS COUNTY, MONTANA	2017	2012	2007
Number of Farms	521	492	508
Land in Farms (acres)	642,640	338,725	341, 913
Average Size of Farm (acres)	1,233	688	673

Table 3: Sanders County Land Uses

Sanders County Land Use	2017 (acres)	% of Land use
Pasture & Rangeland	188,235	30%
Woodland	397,028	63%
Cropland	43,265	7%

Geology and Soils

The field work for the Sanders County Soil Survey (Soil Survey Area MT651) was completed in 1995 and the survey was published in 1996. Much of the information in this section is taken from the Soil Survey. The county lies within two Major Land Resource Areas (MLRA) including 44A – Northern Rocky Mountain Valleys and 43A – Northern Rocky Mountains.

Most of the soils in the valleys are formed in mixed alluvium, lake sediments, or glacial till. The mountains and bedrock-controlled hills may have soils formed in one of the following parent materials: argillite, igneous volcanic, limestone, or quartzite. Many of the soils have distinctive pale layers of volcanic ash originating from volcanic eruptions in the Cascade Range.

During the Pleistocene Epoch, a large body of water backed up behind an ice dam that was 2,000 feet high and was filled by the rising waters in the Clark Fork and Flathead Valleys. This body of water has been named Glacial Lake Missoula. Lakebed deposits occur both in valley bottoms and high in the foothills. The ice dam was breached multiple times, releasing huge floods which scoured valley walls and left unique flood deposits, including “giant ripple marks” in the Camas Prairie and Rainbow Lake areas.

There are relatively small acreages of Prime Farmland in Sanders County and almost all occur in the western part of the county along the Clark Fork River between Thompson Falls and the Idaho border. Some of these soils are forested. Some soils are classified as ‘prime if irrigated’ meaning they do well under irrigation and should be prioritized for this purpose. Soils that are prime if irrigated lie mainly along river corridors, including a large area surrounding the town of Plains. Farmlands of Statewide Importance occur mainly in the Hot Springs Valley and include some forested sites along the Thompson River. Farmlands of Local Importance are widely scattered in areas where hay and forage are grown and occur mainly in the Hot Springs and Camas Prairie areas. See Appendix map 3, ‘Sanders County Soils of Importance’ in appendix.

Water

Precipitation

Due to the unique nature of the county, there are three distinct regions: Eastern semiarid valleys (near Hot Springs), Paradise-Thompson Falls area and the Thompson Falls – Heron area. A common problem throughout these areas is the lack of growing season precipitation; only 30% of the total precipitation falls during the growing season while the rest accumulates as winter precipitation. Because most of the precipitation comes during the winter, irrigation is critically important agronomic purposes in Sanders County. The lack of growing season precipitation significantly reduces crop yield potentials on non-irrigated sites. The semiarid valleys receive annual precipitation of less than 14 inches. The Paradise-Thompson Falls area receives approximately 17 inches of precipitation each year. The Thompson Falls-Heron area is moister and cooler than the other two regions and receives approximately 25 inches with

a correspondingly shorter growing season (Sanders County Soil Survey). Appendix map 4, 'Relative Effective Precipitation for Sanders County' details the precipitation patterns for Sanders County.

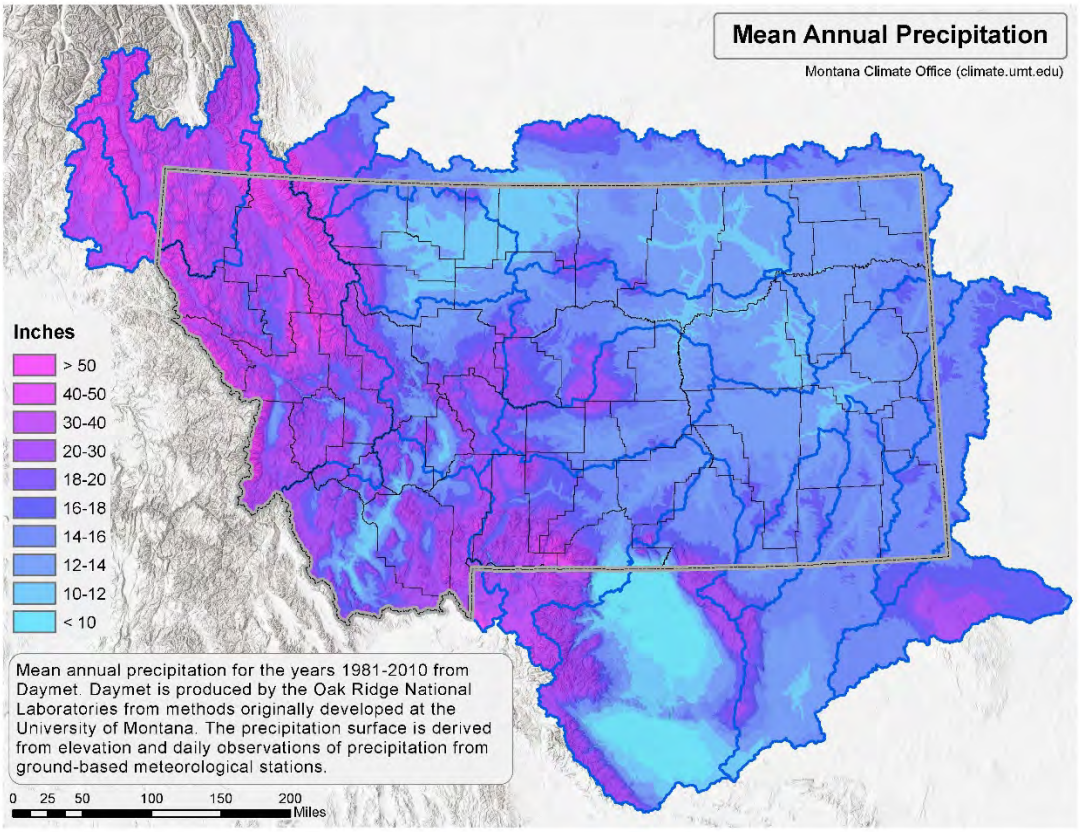

Figure 1: Mean annual precipitation in Montana

Watershed and Streams

Sanders County lies at the lower end of the Clark Fork Basin which drains over 22,000 square miles of Montana and Idaho into the Clark Fork River before it reaches Lake Pend Oreille. The Clark Fork enters Sanders County near the town of Paradise, which is also the confluence of the Clark Fork and Flathead Rivers. From there the Clark Fork River travels through the remainder of Sanders County over three dams (Thompson Falls, Noxon Rapids and Cabinet Gorge) before finally entering Idaho and emptying into Lake Pend Oreille. Past Lake Pond Oreille the Clark Fork then joins with the Colombia River which eventually reaches the Pacific Ocean. During its path through Sanders County numerous tributaries contribute to the Clark Fork River.

The Clark Fork drainage has been severely affected by historic mining activities. High levels of arsenic, cadmium, zinc, aluminum and copper have been detected in the Clark Fork River. Sanders County, Montana has 21,547 records of mining claims on public land managed by the Bureau of Land Management and 423 records of mineral deposits listed by the United States Geological Survey (The Diggings, 2019).

According to Montana Department of Environmental Quality (DEQ), Sanders County resides in the Pend Oreille Sub-Major Basin (a basin of the Columbia River). Three Hydrologic Unit Codes (HUC) comprise

Sanders County: Middle Clark Fork, Lower Clark Fork and Lower Flathead. Appendix Document 5 lists the waters that are designated as impaired by DEQ in Sanders County. Common impairments for waters within Sanders County include sedimentation/siltation, nitrogen/nitrate, phosphorus, flow alterations, heavy metals, temperature and alterations to streamside vegetation. Causes of impairments are commonly a result of historical mining, silviculture activities, livestock grazing and other agricultural practices.

Many partners are actively working to improve water quality and riparian function within Sanders County including the Lower Clark Fork Watershed Group (CFWG), FWP, Avista Energy, USFWS, Trout Unlimited, CSKT, Green Mountain and Eastern Sanders Conservation Districts, NRCS and the Soil and Water Conservation Districts of Montana, among others. The NRCS is an active participant in many of these discussions and projects when they occur on private lands.

Table 4. DEQ-listed impaired streams, causes of impairment, and impaired uses (DEQ 2016). Indented streams are tributaries to the non-indented streams above them.

Tributary	Causes of Impairment										Impaired Uses		
	Sediment	Temperature	Antimony	Lead	Zinc	Arsenic	Alteration in streamside vegetation	Physical substrate habitat alteration	Other anthropogenic substrate alterations	Chlorophyll-a	Aquatic Life	Primary Contact Recreation	Drinking Water
Beaver Creek, Headwaters to mouth (Clark Fork River)							X				X		
White Pine Creek, Headwaters to mouth (Beaver Creek)	X	X					X				X		
Bull River, North Fork to mouth (Clark Fork River – Cabinet Gorge Reservoir)	X							X			X		
Dry Creek, Headwaters to mouth (Bull River)	X										X		
Elk Creek, Headwaters to mouth (Clark Fork River – Cabinet Gorge Reservoir)	X										X		
Graves Creek, Headwaters to mouth (Clark Fork River)							X				X		
Marten Creek, Headwaters to mouth (Clark Fork River – Noxon Reservoir)	X							X			X		
Pilgrim Creek, Headwaters to mouth (Clark Fork River)								X			X		
Prospect Creek, Headwaters to mouth (Clark Fork River)	X		X	X	X		X				X		X
Antimony Creek, Headwaters to mouth (Prospect Creek)			X	X		X					X		X

Table 4 continued

Tributary	Causes of Impairment										Impaired Uses		
	Sediment	Temperature	Antimony	Lead	Zinc	Arsenic	Alteration in streamside vegetation	Physical substrate habitat alteration	Other anthropogenic substrate alterations	Chlorophyll-a	Aquatic Life	Primary Contact Recreation	Drinking Water
Clear Creek, Headwaters to mouth (Prospect Creek)	X						X				X		
Cox Gulch, Headwaters to mouth (Prospect Creek)			X	X							X		X
Dry Creek, Headwaters (confluence of East and West Forks) to mouth (Prospect Creek)	X						X			X	X	X	
Rock Creek, Headwaters to mouth (Clark Fork River – below Noxon Dam)									X		X		
Swamp Creek, Cabinet Mountains Wilderness boundary to mouth (Clark Fork River – Noxon Reservoir)	X										X		
Vermillion River, Headwaters to mouth (Clark Fork River – Noxon Reservoir)							X				X		

Table 5. Native species can be found within 19 different tributary watersheds within the LCF watershed. Bull trout (BLT), westslope cutthroat trout (WCT), and mountain whitefish (MWF). Table adapted from the Lower Clark Fork River Drainage Habitat Problem Assessment (GEI 2005).

Watershed Name	Native Species Present
Beaver Creek, Bull River, Deep Creek, Graves Creek, Marten Creek, Pilgrim Creek, Prospect Creek, Swamp Creek, Vermillion River	BLT, WCT, MWF
Rock Creek	BLT, WCT
Dead Horse Creek, East Fork Blue Creek, McKay Creek, Squaw Creek, Trout Creek, Tuscor Creek	WCT
Elk Creek	WCT, MWF
Mosquito Creek, Stevens Creek	Unknown

Flathead Reservation Water Resources

- ✓ 963 miles of perennial streams
- ✓ 3,118 miles of intermittent and ephemeral streams
- ✓ 71,849 lake surface acres
- ✓ 103,133 Wetland Acres

Table 6. Water resources on the Flathead Indian Reservation.

The Flathead Indian Reservation contains a vast and diverse array of water resources as shown in the table on the left. A report issued by the CSKT tribe titled "CSKT Water Quality Assessment Report" benchmarks the existing surface water quality conditions on tribal waters. According to the report, 72% of perennial streams and 87% of intermittent streams are impaired for one or more uses. On the Reservation the sources for impairment of water quality are generally related to land use practices which generate nonpoint sources of pollution. Tables 7 and 8 below, from the CSKT report, outline the causes and sources of impairment as well as their estimated extents.

Table 7. Causes of impairment of Reservation streams and rivers

Causes	Perennial		Intermittent	
	Stream miles	Percent of total stream miles	Stream miles	Percent of total stream miles
Flow alteration	567	59 %	1,538	49%
Habitat alteration	729	76%	2,692	86%
Nutrients	393	41%	1,897	61%
Siltation	661	69%	2,655	85%
Suspended solids	623	65%	2,655	85%
Turbidity	455	47%	2,261	73%
Thermal modification	298	31%	1,223	39%
Pathogens	224	23%	1,196	38%
Ammonia	11	1%		

Table 8. Sources of impairment of Reservation streams and rivers

Causes	Perennial		Intermittent	
	Stream miles	**Percent of total stream miles**	**Stream miles**	**Percent of total stream miles**
Silviculture	175	18%	896	29%
Hydromodification	632	66%	1,718	55%
Habitat modification	667	69%	2,659	85%
Agriculture – grazing	660	69%	2,691	86%
Agriculture – crops	382	40%	1,255	40%
Other urban runoff	356	37%	1,523	49%
Ground water loading	11	1%		
Minor municipal sources	7	1%		
Resource extraction	3	0.3%		

The "CSKT Water Quality Assessment Report" reviews the watersheds and the streams within them that are on the reservation and looks at four beneficial uses including Aquatic Life, Drinking Water, Primary Contact and Recreation, and Agricultural and Industrial. For each of the uses a "Level of Use Support" is given. The "Level of Use Support" is defined as follows in the "CSKT Water Quality Assessment Report":

- *Fully Supporting (FS) – All designated beneficial uses are fully supported. Water quality condition is good.*
- *Fully Supporting but Threatened (FS-T) – All designated beneficial uses are fully supported but may not in the future unless pollution prevention or control actions are implemented. Water quality condition is good.*
- *Partially Supporting (PS) – Water quality fails to meet designated beneficial use criteria at times. Water quality condition is fair.*
- *Not Supporting (NS) – Water quality frequently fails to meet designated beneficial use criteria. Water quality condition is poor.*
- *Evaluated (E)*

Table 9. All the streams that are at Partially Supporting or Not Supporting levels in Sanders County on the Flathead Indian Reservation.

Stream Name	Beneficial Use	Support
Little Bitterroot River (Reservation boundary to mouth)	Aquatic Life	NS
Little Bitterroot River (Reservation boundary to mouth)	Primary Contact & Rec Use	NS
Little Bitterroot River (Reservation boundary to mouth)	Drinking Water Uses	NS-E
Little Bitterroot River (Reservation boundary to mouth)	Agricultural & Industrial Use	PS
Hot Springs Creek (town to mouth)	Aquatic Life	PS
Hot Springs Creek (town to mouth)	Primary Contact & Rec Use	NS
Hot Springs Creek (town to mouth)	Agricultural & Industrial Use	PS
Little Bitterroot Watershed Tribs (forested)	Aquatic Life	PS
Little Bitterroot Watershed Tribs (forested)	Primary Contact & Rec Use	PS
Little Bitterroot Watershed Tribs (valley)	Aquatic Life	NS
Little Bitterroot Watershed Tribs (valley)	Primary Contact & Rec Use	NS
Little Bitterroot Watershed Tribs (valley)	Drinking Water Uses	NS-E
Little Bitterroot Watershed Tribs (valley)	Agricultural & Industrial Use	PS

Stream Name	Beneficial Use	Support
Flathead River (Outlet of Lake to Reservation boundary)	Aquatic Life	PS
Flathead River (all other Tribs)	Aquatic Life	NS
Flathead River (all other Tribs)	Primary Contact & Rec Use	PS
Flathead River (all other Tribs)	Drinking Water Uses	PS-E
Camas Watershed (all)	Aquatic Life	NS
Camas Watershed (all)	Primary Contact & Rec Use	NS
Camas Watershed (all)	Drinking Water Uses	PS-E
Camas Watershed (all)	Agricultural & Industrial Use	PS

Irrigation

There are approximately 22,000 acres of irrigated lands in Sanders County most of which are located in the Little Bitterroot Valley near Hot Springs, on the Flathead Reservation. Water delivery to these lands is operated by the Flathead Indian Irrigation Project (FIIP). The irrigation infrastructure was authorized by Congress in 1908 and constructed to provide irrigation water to approximately 150,000 acres of land on the Flathead Indian Reservation. The project started construction in 1908 and was completed 56 years later in the early 1960s (Bureau of Reclamation – The Flathead Project). During this time there was construction of an extensive network of over 1,200 miles irrigation canals and seventeen reservoirs. The FIIP serves over 127,000 acres in the Mission, Jocko and Little Bitterroot Valleys. Appendix Maps 6 details the irrigated lands served by the FIIP. Appendix map 7 details the irrigation canal system, and types of irrigation present within the Littler Bitterroot service area.

In 2015 after more than a decade of negotiation the State of Montana Legislature ratified the CSKT Montana Compact outlining water usage for irrigation and instream flows on the CKST reservation and beyond. The Compact currently awaits approval by the United States Congress. The Compact protects historical irrigation uses while at the same time providing for Tribal in-stream flow targets. One of the key goals of the Compact is to improve irrigation efficiencies within the target area.

Due to the age of FIIP, much of the infrastructure suffers from deterioration. In fact, according to the Department of Interior, Bureau of Reclamations Dam Safety Program, in 1991, ten of the Flathead Reservation's dams were ranked within the top 150 nationwide for posing the greatest level of hazard (CSKT Comprehensive Plan Vol 1). Loss of water through seepage within canals from porous soils and deteriorated banks is another major concern.

The vast majority of irrigated lands in Sanders County grow perennial forages including pasture, grass hay and alfalfa. Most of the irrigated soils in the heavily-irrigated Little Bitterroot Valley are silty clay loams. These soils have low infiltration rates and are particularly susceptible to runoff if irrigation water is over-applied or applied at rates that are greater than the intake rates of the soils. In addition, many soils, particularly those in the Little Bitterroot Valley have high levels of sodium salts and are low in organic matter and are best suited to growing perennial forages. Soils along the Clark Fork River between Paradise and Thompson Falls are generally more productive and are often Prime Farmland if irrigated (Sanders County Soil Survey).

Along with irrigation in the Bitterroot Valley, irrigation is present throughout the county mainly in the valley bottoms. Sources for irrigation water are most frequently surface-derived but a small number of irrigation systems use wells to pump from aquifers. Irrigation occurs primarily via impact sprinkler and

flooding. Many irrigators have already converted from flood irrigation to sprinkler which includes hand lines, wheel lines, k-lines and pivots. However, a large number of fields are still irrigated by flooding. Most flood irrigation in Sanders County can generally be characterized as 'wild flood' meaning the flooding is often completed via a series of contour ditches over uneven topography. This uneven irrigation causes numerous dry areas within each field while also causing over-irrigation and ponding in other areas. Flood irrigation on uneven topography often creates significant amounts of runoff. This runoff not only wastes water but also reduces water quality in streams and waterbodies as the runoff often carries elevated levels of nutrients, sediments and higher water temperatures directly into impaired waterways.

Groundwater

The aquifers within the Little Bitterroot Valley are quite unique. The town of Hot Springs derives its names from the numerous hot springs in and around the town. Within the Little Bitterroot Valley, artesian wells are common. Many of these wells were drilled in the early 20th century and are uncapped or have deteriorated to the point that they are unable to be controlled. The exact number of these wells is not presently known but they certainly number in the dozens. Many of these wells flow uncontrolled on a continual basis with flow rates between 1 and 50 gallons per minute. There have been numerous investigations studying the Lonepine Aquifer (located within the Little Bitterroot Valley). In 1916 when the first study was conducted, Meinzer noted that water conservation was needed in the Lonepine Reservoir, because pressure levels had gone down in numerous wells due to uncapped wells that were along the aquifer. The Long-term Hydrographs show that the Lonepine Aquifer is slowly declining. Finding solutions to capping or controlling these free-flowing wells presents a unique opportunity.

Wetlands

Wetlands are amongst the most important and beneficial ecosystems on the landscape. Montana's State Wildlife Action Plan identifies all streams, rivers, floodplain and riparian, and wetland community types across the state as "Community Types of Greatest Conservation Need". The plan defines this as meaning there is a clear obligation to use resources to implement conservation actions that provide direct benefit to these community types Area (Montana State Wildlife Action Plan, 2015). 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. Sanders County contains a diverse array of wetland types.

According to CSKT, the reservation alone contains approximately 22,000 acres of the above-mentioned wetlands and another 75,000 acres of lake open water. Together with the thousands of miles of tribal streams and riparian areas, these areas support most of the Reservation's fish and wildlife. CSKT values the importance of these resources and has active wetland and riparian restoration programs. The Tribe's goal is to "halt wetland and riparian losses on the Reservation and ultimately work to restore quantity and quality of these important aquatic resources" (CSKT Wetland Conservation Program).

Wildlife

Along with the diversity of ecosystems come a rich diversity of wildlife in Sanders County. As of 2019 Sanders County has 55 animal species and 50 plants species listed as species of concern (Montana Natural Heritage Program). The following species are listed as threatened by the USFWS; grizzly bear (*Ursus arctos horribilis*), Canada lynx (*Lynx canadensis*), bull trout (*Salvelinus confluentus*), Spalding's

campion (*Silene spaldingii*). There are is one proposed species, wolverine (*Gulo gulo*), and one candidate species, whitebark pine (*Pinus albicaulis).*

Grizzly Bear

The U.S. Fish and Wildlife Service (USFWS), in cooperation with Montana FWP, the U.S. Forest Service (USFS), National Parks Service (NPS), Bureau of Land Management (BLM), Blackfeet Tribe and Confederated Salish and Kootenai Tribes currently manages grizzly bears in Montana as 'threatened' under authority of the Endangered Species Act. This cooperative management is under the Interagency Grizzly Bear Committee (IGBC) within which all agencies and tribes are partners (FWP Grizzly Bear Management Plan for Western Montana). Sanders County falls within the Northern Continental Divide Ecosystem (NCDE) area which has a target goal of 500 or more grizzly bears (USFWS Grizzly Bear Recovery Plan, 2013). Sanders County is one of 17 Montana counties that currently or could in the near future contain populations of grizzly bears. Limiting human-bear conflicts is a critical component of grizzly bear recovery plans.

Table 10. Estimated grizzly bear densities in NCDE areas. (Courtesy Grizzly Bear Management Plan for Western Montana)

Area	Size (mi^2)	Density (mi^2/bear)	Number of Bears
Red Meadow	215	10-15	14-22
Whitefish	831	18-25	33-46
Glacier National Park	1,583	6-8	198-264
St. Mary	211	10-20	11-21
Badger-Two Medicine	323	27-38	9-12
South Fork Flathead River	1,624	10-13	125-162
East Front	1,119	25-31	36-45
Swan Front	780	20-30	26-39
Mission Mountains	1,044	25-45	23-42
Scapegoat	1,903	56-112	17-34
Total	**9,633**	**14-20**	**492-687**
Total excluding GNP	**8,050**	**19-27**	**294-423**

Bull Trout

Bull trout are listed as a 'threatened' species in Sanders County. Bull trout require specific habitat needs and are more vulnerable to environmental degradation than are other fish species. They require clean, cold, clear, complex and connected habitat (the five C's). Bull trout populations have declined due to habitat loss and degradation from a variety of human-caused factors. Collaborative efforts by many partners including USFWS, FWP, USFS, CSKT, DNRC and many others developed the Montana Bull Trout Restoration Plan. Both the Lower Clark Fork River (downstream from Thompson Falls Dam) and Middle Clark Fork River (Thompson Falls Dam to the old Milltown Dam) have been recognized as 2 of 12 different restoration/conservation areas (RCA's) in Montana. The three dams (Thompson Falls, Noxon Rapids and Cabinet Gorge) on the lower Clark Fork River have significantly reduced the amount of spawning and rearing habitat that is available to bull trout. These dams have also contributed to changes in water quality (temperature, nutrients and sediments) and water quantity. In addition, lake drawdowns, reduced shoreline food sources and direct losses of fish into water conveyances also contribute to declines. Silviculture has also been identified as a source of impairment for water quality within the lower Clark Fork River, often as a result of increased sediment loads. Unlike areas further upstream, such as the Flathead River drainage, agriculture and grazing do not appear to be a primary

causative agent of bull trout declines in the lower Clark Fork River (Montana Bull Trout Restoration Plan).

A plethora of high mountain lakes, irrigation reservoirs, lakes and streams support abundant fish populations. However, quality of habitat has been degraded by development activities. Water diversion structures block access to spawning grounds over much of the original ranges of bull trout and westslope cutthroat trout (*Oncorhynchus clarkii lewisi*). Many streams are dewatered each year due to irrigation uses. Numerous opportunities exist to improve water quality and overall aquatic habitat within Sanders County.

Figure 2. Current range of bull trout in Montana (Montana Field Guide)

Canada Lynx

Canada lynx are listed as a 'threatened' species in Sanders County. Canada lynx are limited to areas occupied by their main prey source, the snowshoe hare (*Lepus americanus*). Both the lynx and hares are typically found inhabiting moist, cool, boreal forests, typically above 4,000 feet in elevation. As hares make up approximately 90% of the lynx diet in winter, any degradation to snowshoe hare habitat that reduces hare populations has a direct commensurate negative impact on lynx populations as well.

Critical habitat has been designated for Canada lynx, although none is present in Sanders County (Figure 3).

Historic lynx population declines in Sanders County mimic those found in other occupied Montana counties and are largely a result of anthropogenic causes including timber harvest, infrastructure establishment, overharvest, and wildfire suppression. Currently, although exact populations levels are uncertain for the area, according to the USFWS's October 2017 Species Status Report for the Canada Lynx recent studies have indicated that both lynx reproduction and recruitment are occurring at healthy levels. To maintain these healthy numbers, conservation partners should seek to implement the Interagency Lynx Biology Team's conservation strategy including: managing vegetation for a mosaic of successional stages, reducing habitat fragmentation, minimizing winter related

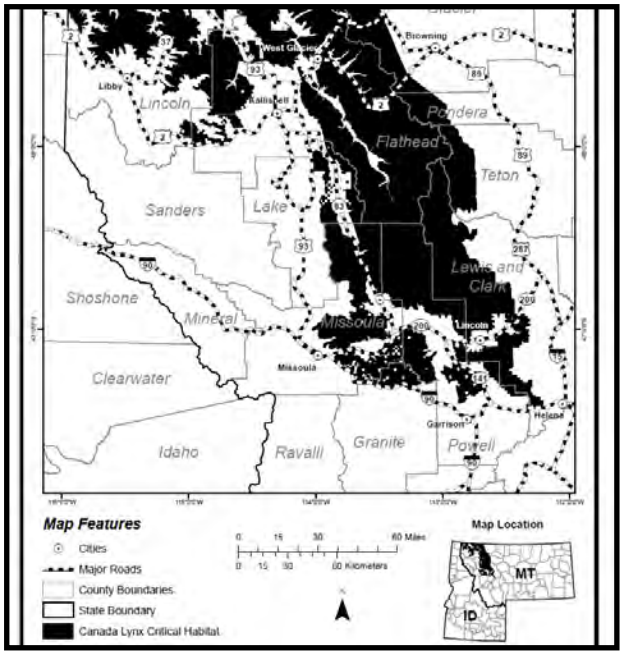

Figure 3: Canada lynx critical habitat in Western Montana.

recreational disturbances, avoiding backcountry road construction, and where possible maintaining fire as a key ecological process and disturbance mechanism.

Wolverine

The wolverine is listed as a 'proposed' species for Sanders County. Wolverines are limited to alpine tundra and primarily coniferous forests in western Montana. They are generally solitary and wide-ranging and are opportunistic omnivores. In the early 1990s wolverines were nearly extinct in Montana, however their numbers and range have been increasing ever since (Montana Field Guide. On October 18, 2016, the FWS published a Federal Register action reopening the comment period on their February 4, 2013 proposed rule to list the wolverine as threatened in the contiguous U.S. A final listing determination is expected in January 2020.

Spalding's Campion

The USFWS lists Spalding's campion as a 'threatened' plant species in Sanders County. Spalding's campion, also known as Spalding's catchfly, occupies open, mesic grasslands in valleys and foothills usually co-existing with rough fescue and Idaho fescue. It exists only in a few locations in the northwest corner of Montana including the Niarada area and on Wild Horse Island. Invasive weeds are the most pressing threat along with overgrazing, fire exclusion and lack of gene flow due to isolation of populations.

Whitebark Pine

Whitebark pine is listed as a 'candidate' species. Whitebark pine is a common component of subalpine forests occurring in all major mountain ranges of western and central Montana. Populations have been severely impacted by mountain pine beetle outbreaks and by the introduction of the white pine blister rust pathogen. Major declines in whitebark pine have been noted across its range.

Noxious and Invasive Species

Sanders County suffers from a litany of noxious and invasive species issues. Treatment and control of all invasive species in all areas is infeasible. However, identification and treatment of new and emerging threats should be prioritized. In addition, opportunities for integrated approaches to dealing with specific geographic areas and/or species should be sought. The Sanders County Weed Management Plan maintains an updated noxious weed list and prioritization.

Vegetative Weed Species

Sanders County is home to a wide diversity of both annual and perennial weed species. Weed species noted on Sanders County's Noxious Weed Management Plan include sulfur cinquefoil, tall buttercup, whitetop, yellow or common toadflax, houndstongue, field bindweed, leafy spurge, meadow and orange hawkweed, musk thistle, ox-eye daisy, purple loosestrife, Canada thistle, common tansy, dalmatian toadflax, diffuse knapweed, Russian knapweed, salt cedar, spotted knapweed, St. Johnswort and most recently ventenata (*Ventenata dubia).* The plan is continually updated with new species. The Sanders County Weed Management Plan calls for integrated weed management strategies and methods including treatment, control, prevention, education, mapping, and chemical control (Sanders County Weed Management Plan, 2018).

It is important to remain vigilant regarding new and invasive weeds. New weed species of concern include the annual grass Ventenata. Ventenata is known to take over native range, pastures, hay fields,

and right of ways. It is also found in Idaho where they have **seen a 50% decrease in production of land that this species has invaded (MSU Extension – Ventenata, 2018)**.

Aquatic Invasive Species

Aquatic invasive species (AIS) are also prevalent within Sanders County. Eurasian watermilfoil (*Myriophyllum spicatum*) is present in the lower Clark Fork River (Noxon and Cabinet Gorge Reservoirs) as is curly-leaf pondweed (*Potamogeton crispus*) and flowering rush (*Butomus umbellatus*). Of concern is the potential introduction of zebra and quagga mussels (*Dreissena polymorpha* and *Dreissena rostriformis*). Montana has recently had a positive detection for invasive mussels. Since this detection the state of Montana has set up check stations around the state, including multiple check stations in Sanders County to check for AIS including the quagga and zebra mussels.

Rangeland

Range and pastureland are two of the most common land uses in Sanders County and is most prevalent in the southern portions of the county in the Little Bitterroot and Camas Valleys. Cow/calf operations are the major type of livestock enterprise. Native rangeland is used primarily for grazing by domestic livestock; however, it also is used as wildlife habitat, recreational areas and has esthetic value. Rangelands consist mostly of forested or open areas where elevations range from twenty-five hundred to six thousand feet. Rangeland soils are frequently gravelly, rocky and shallow. Some native range plants of particular importance in Lake County include rough fescue (*Festuca scabrella*), Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Agropyron spicatum*), arrowleaf balsamroot (*Balsamorhiza sagittate*), camas (*Camassia quamash*), Columbia needlegrass (*Stipa Columbiana*), needle-and-thread (*Stipa comate*), prairie coneflower (*Ratibida columnaris*), prairie junegrass (*Koeleria pyramidata*) and western wheatgrass (*Agropyron smithii*).

Range condition varies, but large areas of rangeland have been degraded. Much of this degradation took place decades ago with the arrival of large quantities of livestock. Continuous, season-long grazing and over stocking has led to significant reductions in rangeland quality over the past 120 years. As bunchgrasses declined, they were replaced with less desirable grasses, shrubs and weeds. Exotic species such as timothy, smooth brome, orchard grass, tall fescue, crested wheatgrass and many others were planted for hay and pasture and these plants displaced native rangeland vegetation in some areas, mostly in valley bottoms. Knapweed, sulphur cinquefoil, whitetop, leafy spurge, goatweed, dalmatian toadflax, thistles and other noxious weeds are common within the rangelands of the county. These plants often out-competed many native grasses. Annual grasses are also outcompeting native species and include, cheatgrass, Japanese brome and most recently ventenata. The short-lived perennial grass bulbous bluegrass is also a common invader. Poor grazing management, invasive species, and changes in fire regime are responsible for rangelands moving away from climax plant communities. Rangelands in Sanders County can vary in production from 2 animal unit months (AUM's) per acre to 0.05 AUM's depending on range type and condition.

To protect existing range resources and riparian health, livestock grazing management is of key importance. Rotating livestock and altering grazing season usage are important tools managers can use to manage their livestock. For areas that are already heavily invaded by annual grasses and weeds, the best course of action is often to time grazing events to coincide with peak palatability of the non-desirable species while working to limit usage when desirable species are most susceptible to grazing pressures.

Forestland

The majority of Sanders County is forested. Forests types vary widely through the county, both east to west and from lower to higher elevations. The east half of the county is dominated by dry ponderosa pine/Douglas-fir forest types whereas the west third of the county supports highly productive whitepine, western red-cedar and western hemlock forest types. This is due to a warm, moist maritime climatic influence in the county north and west of Thompson Falls during late fall, winter, and spring.

Logging has played a major role in the western part of the county over the past 130 years. Extensive logging has occurred in most areas. Historically, logging provided timber for mines and smelting, a source of railroad ties for the railroads and shelter and income to homesteaders. Harvesting remained at a high-level during WWII and the postwar economy and provided the main economic driver for the western half of the county into the early 1990s.

Virtually all forested stands in the county have burned in the past. Historic fire return intervals vary from as short as six years on dry sites (more commonly 10 to 15 years) to moist sites that may have an interval of 250 years or more. Virtually all stands will experience fire within 400 to 500 years of stand initiation. Dry sites experience more frequent low intensity fires, while moist sites experience infrequent high intensity stand-replacement fires. Active fire suppression over the last 100 years has greatly changed forest species composition, fuel accumulations, and fire patterns from those of historic times.

Riparian forests and stream health are closely related in the county, as are recovery of native bull trout and west-slope cutthroat trout. Partners listed within this document have been actively addressing issues on multiple fronts for over 10 years, coordinated through the Lower Clark Fork Watershed Group.

Western Sanders County is well known among regional forest pathologists as a root disease epicenter along with sites on the Idaho Panhandle National Forest.

Sanders County government has offered fire hazard reduction grants since the early 2000s to encourage landowners to improve defensible space around structures, usually only several acres in size. MSU Forest Extension holds a Forest Stewardship class in the county most years. There remain extensive opportunities to work with private landowners on forest-related issues including pre-commercial thinning, forest health and fuels reduction.

Unique Features

Microclimate and Maritime Climate

Sanders County features a unique climate zone in comparison to the rest of Montana. Along the banks of the Clark Fork throughout Sanders County, much of the Plant hardiness zone is listed as 6A according to the USDA. This warmer climate allows for a wider diversity of cropping options for agricultural producers and gardeners. Several peach orchards are present near the town of Paradise. The west end of Sanders County north and west of Thompson Falls has a warm, moist maritime climatic influence. This creates some of the best coniferous growing sites in the state, supporting forest species more representative of western Washington and Oregon than the rest on Montana.

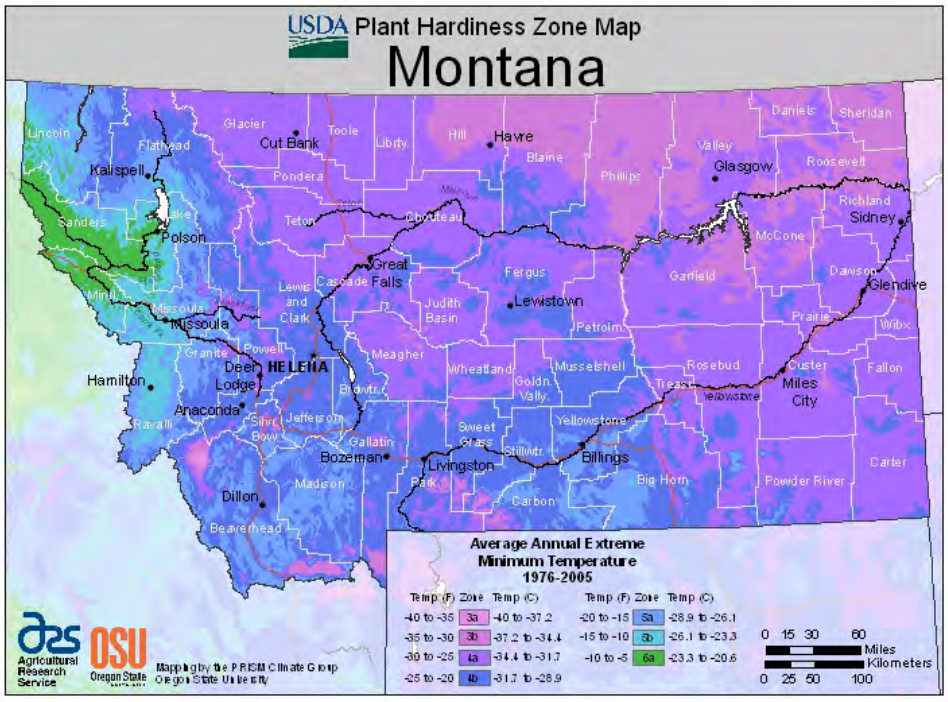

Figure 4. Plant hardiness zone map of Montana.

Private Land Conservation on the Bull River and the Lower Clark Fork

In the north end of Sanders County, near the Idaho border lies vast expanses of US National Forests. These public lands allow for exceptional recreational opportunities, wildlife habitat and aesthetic values. Private land ownership in this area is minimal and limited to narrows bands along the Bull and Clark Fork Rivers. Many of these properties harbor diverse and critically important wetland and riparian habitats. Many organizations have actively pursued expanding protection of these private lands in order to limit their development and subdivision. Land trusts such as Montana Land Reliance, Kaniksu Land Trust, The Nature Conservancy and the NRCS hold many easements in this area ensuring permanent protection of this unique location. Appendix Map 8 details the private land holdings and conservation easements in northwest Sanders County.

Figure 5: Critically important wetlands such as this one along the Bull River have been largely protected on private lands thanks to a conservation easement. Photo by Troy Hidy.

The Shire of Montana

Montana not only has unique and rugged landscape, but it is also home to a rare hobbit community located near Trout Creek in northern Sanders County. Although uncommon, some visitors claim to have chanced glimpses of hairy-footed, short-statured hobbits scurrying beneath the towering evergreen overstory.

Figure 6: The Shire in Trout Creek.

Ross Creek Cedars

Across the Sanders County line and less than two miles into Lincoln County, Ross Creek Cedars is part of the Kootenai National Forest. It was introduced as a scenic area when loggers discovered the enormous size of the trees. Some of the trees that are in this forest were alive before Columbus sailed to America in 1492. These trees provide a glimpse of what was once more common on many of the creek bottoms in the western part of Sanders County.

Figure 7 and 8: Ross Creek Cedars

Hydroelectric Dams

The lower Clark Fork River in Sanders County has three hydroelectric dams within 50 miles of each other. The dams greatly effect the Lower Clark Fork watershed. The dams are: 1) Thompson Falls operating since 1915, 110 feet high, operated by Northwestern Energy, 2) Noxon Rapids operating since 1959, 260 feet high, operated by Avista Energy and 3) Cabinet Gorge operating since 1952, 208 feet high, operated by Avista Energy.

Glacial Lake and Catastrophic Floods

Continental glaciers dammed up the Clark Fork River at the Montana/Idaho border repeatedly during the last Ice Age. The ice dams failed and re-formed many times. During the failure events the resulting flood water re-shaped the landscape. Flood water scoured many areas including Lake Pend Oreille in Idaho and the scab lands in eastern Washington. Sanders County soils and landforms are representative of this throughout the county. The famous 30-foot-high ripples on the Camas Prairie and the high cliffs that were scoured on the Lower Clark Fork Valley walls are remnants of these forces of nature.

Section III. Conservation Activity Analysis

Recent NRCS Works

The NRCS office in Sanders County is located in Plains. The Pablo Field Office, located in the CSKT Tribal Complex in Pablo also serves Sanders County, focusing mainly on working directly with the tribe and tribal producers. The Plains Field Office works with both tribal and non-tribal producers.

NRCS work in Sanders County has historically focused on meeting the needs of the Local Working Group's priority. This priority has shifted between grazing, forestry and irrigation over the past 15 years. During this time 137 forestry improvement projects totaling 2,085 acres have been completed. There remains a strong need and desire in Sanders County to prioritize forestry-related projects. Additionally, 27 irrigation projects, totally 2,478 acres have been installed. High tunnels have also been a commonly contracted practice with 10 installed over the past 10 years. Other common practices include grazing-related practices such as weed control (17,634 acres), watering facilities (29 total) and fencing (73,089 ft). Multiple other practices have been contracted to lesser extents.

Table 11. NRCS EQIP implementation of commonly applied practices from 2004 to 2019.

Practice Name	Unit Type	Applied Amount	Number of Practices
Herbaceous Weed Treatment	Ac	17,634.00	124
Critical Area Planting	Ac	1238.6	18
Fence	Ft	73,089.80	26
Irrigation Pipeline	Ft	29,085.00	22
Irrigation System, Micro irrigation	Ac	2.5	5
Sprinkler System	Ac	2478.1	27
Irrigation Water Management	Ac	2153	32
Forage and Biomass Planting	Ac	771.4	15
Watering Facility	No	45	29
Water Well	No	12	12
Livestock Pipeline	Ft	19,318.00	16
Prescribed Grazing	Ac	8689.6	51
Pumping Plant	No	22	22
Spring Development	No	14	11
Structure for Water Control	No	10	12
Tree/Shrub Establishment	Ac	204.8	13
Forest Stand Improvement	Ac	2085.9	137
Woody Residue Treatment	No	1294.5	93
Seasonal High Tunnel	SqFt	17,168.00	10

NRCS in Sanders County has seven permanent Wetland Reserve Program easements in the county totaling 777 acres, and one 30-year easement totaling 20 acres. These easements are wetland-dependent wildlife habitat focused. Inventory and management of the easements is an on-going process. Recent habitat improvement projects have occurred on two Bull River easements: Lynch Creek near Plains, and Beaver Creek between Thompson Falls and Trout Creek.

Confederated Salish Kootenai Tribe – Natural Resource Management

The Confederated Salish Kootenai Tribe (CSKT) has developed a comprehensive resource plan to guide natural resource management and development on the Flathead Indian Reservation. The Tribe has identified goals for each natural resource and outlined a series of alternatives for management. While

the plan focuses on lands and resources it also incorporates social service and human concerns. The plan also serves to define policies and processes that will guide future resource management on the Reservation.

CSKT has a long history of effective resource management. They have enacted a great many Ordinances that serve to guide the preservation, restoration and protection of their cherished resources. CSKT is very mindful of 'zones of influences' that affect Reservation resources. Zones of influence are policies and practices of off-reservation entities and individuals that affect the Reservation and its resources. For example, management of off-Reservation resources such as water quality and fish and wildlife habitat can have profound effects on the Reservation's own resources. The concept of an ecological zone of influence is important to the Tribe because a single major development activity off-Reservation can affect the Tribes' resource base forever. CSKT places great value on communication and coordination of environmental and economic policies between itself and other entities.

For the purposes of facilitating resource planning efforts, CSKT has divided the Reservation into 6 smaller planning units called Study Areas. Each Study Area was developed to organize and prioritize resource information at a manageable scale. Study Areas include: Flathead Lake-River, Polson-Elmo, Camas-Hot Springs, Mission Valley, Perma-Dixon and Jocko Valley. Refer to the CSKT Comprehensive Resource Plan, Volume 1, Chapter 6 for information specific to each Study Area. The incorporation of the major resource and planning issues outlined within each Study Area is critical to NRCS planning efforts.

Conservation Districts

Sanders County is divided between two conservation districts: 1) Eastern Sanders Conservation District (ESCD) and 2) Green Mountain Conservation District (GMCD). ESCD's boundary encompasses the southern half of the county up to Thompson Falls. GMCD's jurisdiction extends from Thompson Falls to the Idaho border. Appendix Map 9 details the jurisdictional boundaries of the conservation districts in Sanders County.

Section IV. Natural Resource Issues to be Addressed

Throughout 2019, the Plains Field Office has met with partners and evaluated opportunities to expand partnerships for the betterment of conservation. Listed below are some of the most pressing resource issues identified by NRCS and our partners.

Forestry

The opportunity exists within Sanders County to improve forest lands. NRCS and the DNRC Service Forester are the only known resident personnel providing technical forestry advice in the county. Forest site potential is not being realized in most areas due to management practices over the last 100 years. The most pressing forestry concerns in the county are as follows:

- Decline of the proportion of white pine in stands and of white pine forest typesWhite pine blister rust introduced from Europe on both coasts in 1910 has decimated this species along with inappropriate silvicultural practices and fire suppression. The proportion of white pine regeneration (planted and natural) in eastern Washington, northern Idaho, and western Montana decreased from 44% in 1941 to 5% in 1979 (USFS Silvics guide). White pine could be used as a key species in the western third of the county to improve site productivity and mitigate the effects of root disease and climate change.

- Decline of healthy riparian forests. Riparian areas were the first to be logged and have roads constructed during the homestead era. Due to the lack of large rock and bedrock in most area streams, large diameter wood and tree roots are a key component to stream and flood plain stability. Historically this created high quality fishery habitat for native fish species by maintaining complex stream structures with deep, cool pools. These areas also provided quality habitat for terrestrial wildlife species (see large diameter forest bullet in references section).
- Root disease. A fungal disease, root disease is a native forest pathogen that lives in the soil. Douglas-fir and the true firs are the most susceptible, and as the amount of these species has greatly increased in stands over the last 100 years so has the effect of root disease in Sanders County forests. Fire historically played a major role in subduing these species and promoting root disease resistant species. As fire has been removed, firs have begun to dominate stands thereby increase susceptibility of the stand to root diseases.
- Lack of large diameter, old forests. These forests have greatly declined in the last 100 years and often occurred in riparian areas that burned less frequently and have higher moisture. These forests provide a habitat component lacking in younger, smaller diameter forests. Cavity dependent species utilize these forests heavily, and other wildlife use them sporadically such as ungulates utilizing them during deep snow periods. Heart rots increase as trees get older. This allows primary cavity excavators to hollow out trees that creates habitat for secondary cavity users (pine marten, fisher, bats, owls, etc.).
- Poor or lack of forest management. Lack of forest management has resulted in overstocked forests, increasing the densities of shade-tolerant species. As forests become over-stocked root disease, fire and other challenges become more common. Additionally, poor management often causes the 'high-grading' of stands whereby the best trees and removed during harvest thereby removing their genetics from the stand and reducing the quality of genetics within future stands.
- Fire-wise home and property practices. Like most of the west, Sanders County has seen an increase in home construction and subdivision in recent years. Many landowners have not taken necessary precautions to protect their property and/or structures from wildfire. Working with landowners to manage vegetation near structures and add resiliency to their properties is an important resource issue.

Irrigation

As stated in the "Irrigation" section, the CSKT Montana Compact was ratified by the state of Montana in 2015 and currently awaits approval by United States Congress. The Compact outlines water usage for irrigation and instream flows on the CKST reservation and beyond while also protecting historical irrigation uses. One of the key goals of the Compact is to improve irrigation efficiencies within the target area.

Irrigation is fundamental to agriculture in Sanders County. Most of the irrigated lands in Sanders County are in the Little Bitterroot Valley. The Flathead Indian Irrigation Project (FIIP) operates the irrigation delivery system in the Little Bitterroot Valley. This system is antiquated and in need of vast infrastructure improvements. Areas need of improvement include updating water delivery conveyances to gravity pressure, converting from open ditch to pipeline to reduce system losses, improving water measurement abilities, and reducing waste and runoff within the system. Improving on-farm irrigation efficiencies by improving infrastructure is also needed. In addition, reducing off-season delivery demands within the irrigation system for stockwater could leave more water in streams for fish and wildlife if alternative stockwater options are provided to landowners. Working with partners to address

multiple resource benefits is a key goal of the Plains NRCS field office.

Weeds

Weeds are a constant natural resource issue in Sanders County. The type of weeds and density of each within the county is more information than will be discussed in this document, however, focusing on emerging threats should be a priority. Aggressively targeting new threats should be a cornerstone of any active weed management plan and should be a high priority for focusing resources whenever possible.

Habitat

Wildlife habitat is a priority for many natural resource partners in Sanders County. Native fisheries of bull trout and westslope cutthroat trout have been a primary focus for Avista and Northwest Energy mitigation, FWP, Lower Clark Fork Watershed Group, and the Forest Service. NRCS easements on the Bull River include habitat for these species, and efforts to improve woody vegetation adjacent to the stream with partners has been on-going over the past 15 years. Other potential habitat improvement projects are located on Lynch and Swamp Creek NRCS easements near Plains and a Beaver Creek NRCS easement between Thompson Falls and Trout Creek. Addressing issues such as forest and rangeland health and riparian areas will result in overall improvement to wildlife habitat.

Pasture and Range Improvements

Many of the tame pastures (dry and irrigated) in Sanders County are in fair to poor condition. The conditions are a result of both grazing management and species selection and diversity. Targeting improvements to both grazing and/or species selection could provide significant resource benefits. The Ronan NRCS and Lake County Conservation District have completed numerous pasture-related field trials in Lake County including legume inter-seeding studies and a recently-completed 40-acre dryland forage study in 2017. The results of these studies are promising and are currently being monitored and analyzed; and results could prove beneficial in planning future treatments for pastures within Sanders County.

Rangeland conditions in Sanders County vary but significant amounts of rangeland are in fair to poor condition. Grazing management, noxious weeds and climactic issues all affect rangelands. Improving grazing rotations should be strongly encouraged and when necessary providing infrastructure to facilitate rotational grazing such as fences and stockwater systems should be analyzed.

Little Bitterroot Valley Artesian Wells:

As noted under the groundwater section, artesian wells in the Little Bitterroot Valley have been an unaddressed resource issue for decades. Most of these wells were drilled between 1900 and the 1930s and flow at rates between 5 and 50 gallons per minute. Over time the infrastructure to manage these wells has decayed and many of them are impossible to regulate causing them to flow continuously even when the water is not used for beneficial purposes. The exact number of wells and extent of water loss is not currently known but this issue is deserving of more research and analysis to determine if solutions are available.

Riparian Zones:

Riparian zones play a critical role in our watersheds. From flood control to habitat to aesthetics and recreation these areas are some of the most important within the landscape. Many of our partners

have taken a leading role in preserving and restoring riparian zones. Most of the NRCS WRP easements in Sanders County contain riparian areas. There exists significant interest and opportunity to continue to focus efforts on protecting and restoring riparian habitat and doing so provides NRCS the opportunity to strengthen and expand partnerships.

Section V. Prioritization of Natural Resource Problems and Desired Outcomes

The Sanders County Local Working Group met on October 22, 2019 in Thompson Falls to identify and prioritize resource concerns within Sanders County. Representatives were present from the farming and ranching community, Green Mountain CD, Eastern Sanders CD, DNRC, a County Commissioner's Office and MSU Extension. The group prioritized water quality and water quantity (identified as similar resource concerns), plant health and vigor (to include the interrelated resource concerns of weeds, grassland habitats and forage-issues) and forest health as the main resource concerns in Lake County. Animal-human interactions were also a noted concern. There was much discussion regarding a TIP for forestry in the NW area of the county and the group supported this proposal. There was also discussion regarding ventenata and developing a project to control this annual grass. No formal conclusion was drawn with some present suggesting more study was necessary while others wanted to start treating ventenata with chemical as soon as possible. There was support for NRCS working more closely on riparian improvements in the NW area of the county as well.

Prioritized Resource Concerns (no order of priorities provided):

- ***Water Quality and Water Quantity***: Identified as similar resource concerns, often addressed via irrigation-related improvements. There exists support within the county and within the LWG to address water quality and water quantity issues. Largely this support relates to irrigation improvements in the Little Bitterroot Valley. There is a moderate demand for irrigation improvement from producers in the Little Bitterroot, however, many of the more basic on-farm flood to sprinkler improvements have already been addressed after years of work in the area by NRCS. There may still be opportunities for on-farm improvements. An area in need of more work is to improve the delivery system to producers to improve efficiency of both water movement and management. Working on delivery-related issues would require complex communication and planning with FIIP and at present NRCS does not have the staff or expertise available to complete these works.
- ***Artesian Well Capping Project***: The Hot Springs area in the Little Bitterroot Valley artesian wells are common. Most were drilled in the early 20th century. Many of these wells have deteriorated and can no longer be controlled. Because many landowners are unable to manage the wells, they often flow constantly all year, even though the water is not used for a beneficial purpose. With many dozens of wells flowing, often at 20-50 gallons per minute the waste of water is high. Additionally, often the wasted water flows overland, causing erosion before emptying back into a stream or ditch. Capping these wells or providing a means of control would save significant water resources and treat erosion issues also. More research needs to be done on this potential project.
- ***Forest Health***: Sanders County is primarily tree-covered. Supporting healthy forests and fire resiliency. Fire mitigation is a popular topic locally and many partners are actively seeking opportunities to collaborate on projects. The County has an active forestry program to treat fuels within 200' of homes. DNRC is active in the county and often provides expertise and funding for forest management practices. The NRCS is looking for opportunities to collaborate with partners to develop forest-related projects.

- ***Weed Control***: Like most counties in Montana, Sanders County is plagued by numerous noxious weeds. There is strong support for weed control-related projects. Much discussion at the LWG revolved around weed control. More research and planning need to be done on potential projects and partnerships.

Section VI. Targeted Implementation Plans

Lower Clark Fork Forest Restoration Project

The Plains Field Office along with partners including the Sanders County Local Working Group (SCLWG), Montana Department of Natural Resources and Conservation (DNRC), Lower Clark Fork Watershed Group (LCFWG), and the Green Mountain Conservation District (GMCD), have identified the western Sanders County area as a priority for forest health. The prioritized area lies within Sanders County and extends from the confluence of the Vermillion River with the Clark Fork River to the Idaho border. This area has been identified as a high priority because it encompasses the best site-indexes for trees on private land in the county, as well as in the state (*Forest Habitat Types of Montana*, USDA Forest Service General Technical Report INT-34, appendix E-3) and has the greatest potential for forestland improvement in the county.

This TIP proposal encompasses over 360,000 acres, the vast majority of which is publicly owned and is primarily Forest Service. Private ownership is limited primarily to the valley floors and totals 56,789 acres. This area of the county also has the greatest concentration private land with conservation easements totaling over 3,000 acres. Land trusts holding the easements support land management improvements but lack the expertise and personnel to work with landowners to implement. The Lower Clark Fork Watershed Group and Green Mountain Conservation District have been active in stream restoration projects since the early 2000s, and this proposal has the potential to complement this work on adjacent forest land.

The goals of the project are to Improve forest health, resiliency, and over-all productivity of privately held forest lands in Northwest Sanders County and work with partners to increase landowner education and awareness of forest health and associated ecological components to provide long-term management consistency and attain maximum conservation benefit.

This project would extend for five years with a goal of treating 2,000 acres over that time period.

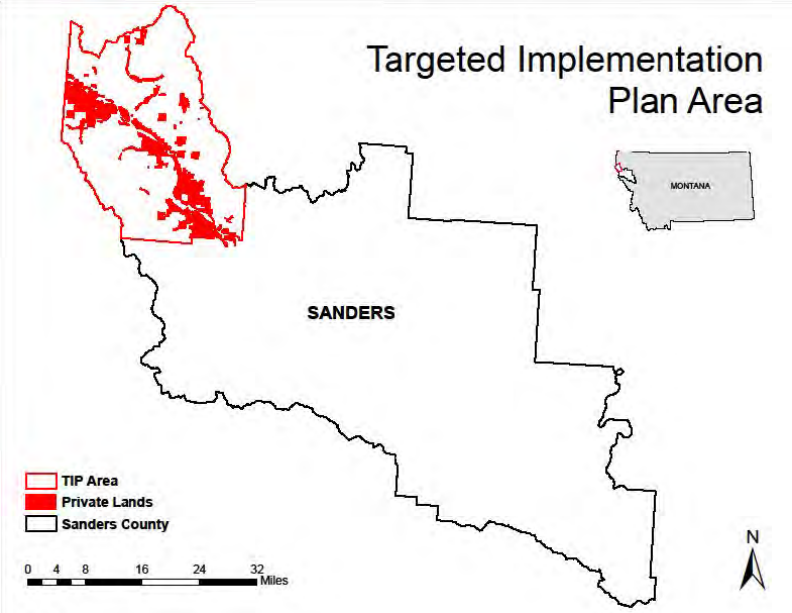

Figure 7: Map of the proposed Lower Clark Fork Forest Restoration Project

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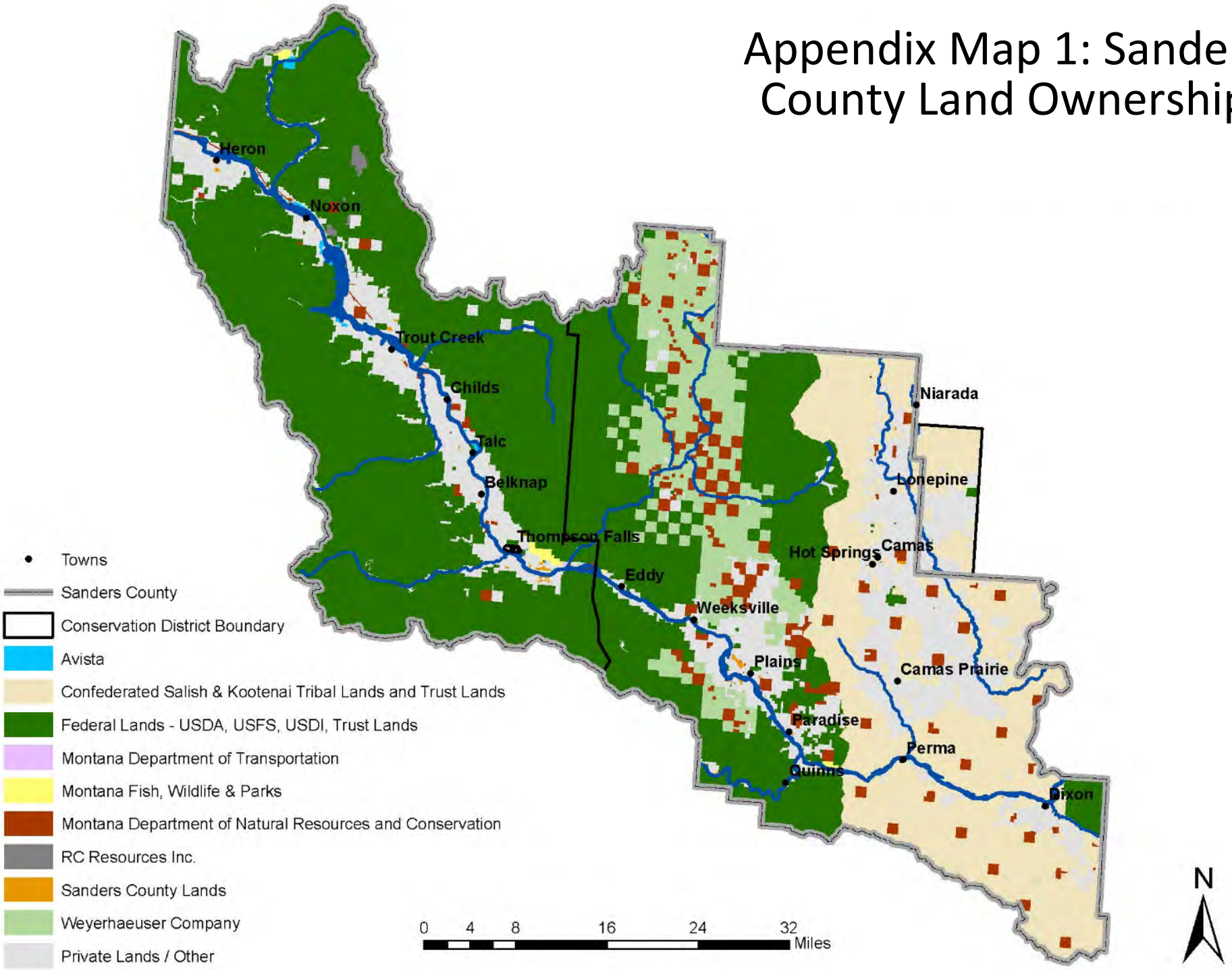
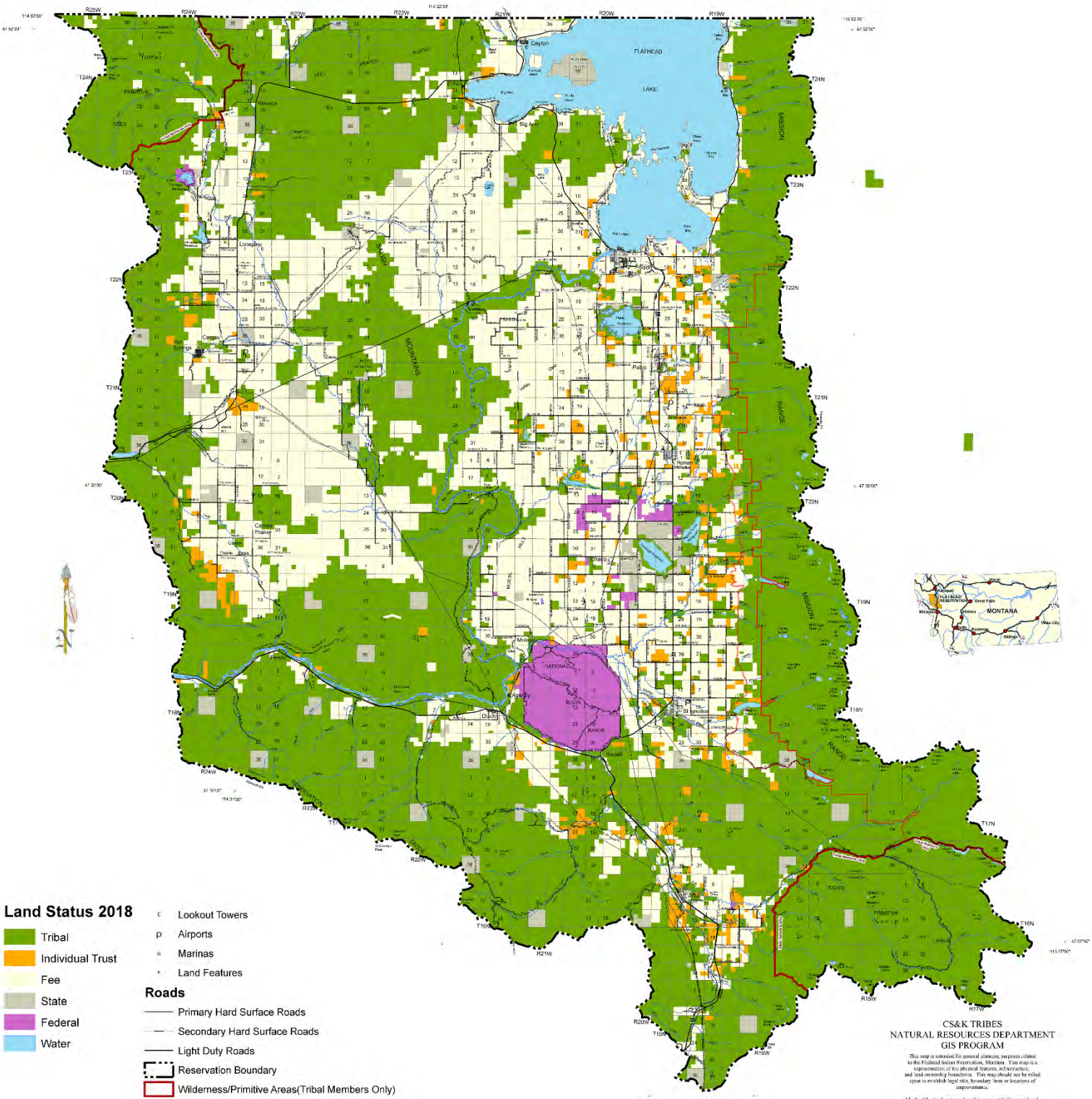
Montana Fish, Wildlife and Parks. Montana Action Plan for Implementation of Department of the Interior Secretarial Order 3362: "Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors." October 2019. https://www.nfwf.org/rockymountains/Documents/Montana2020ActionPlan.pdf

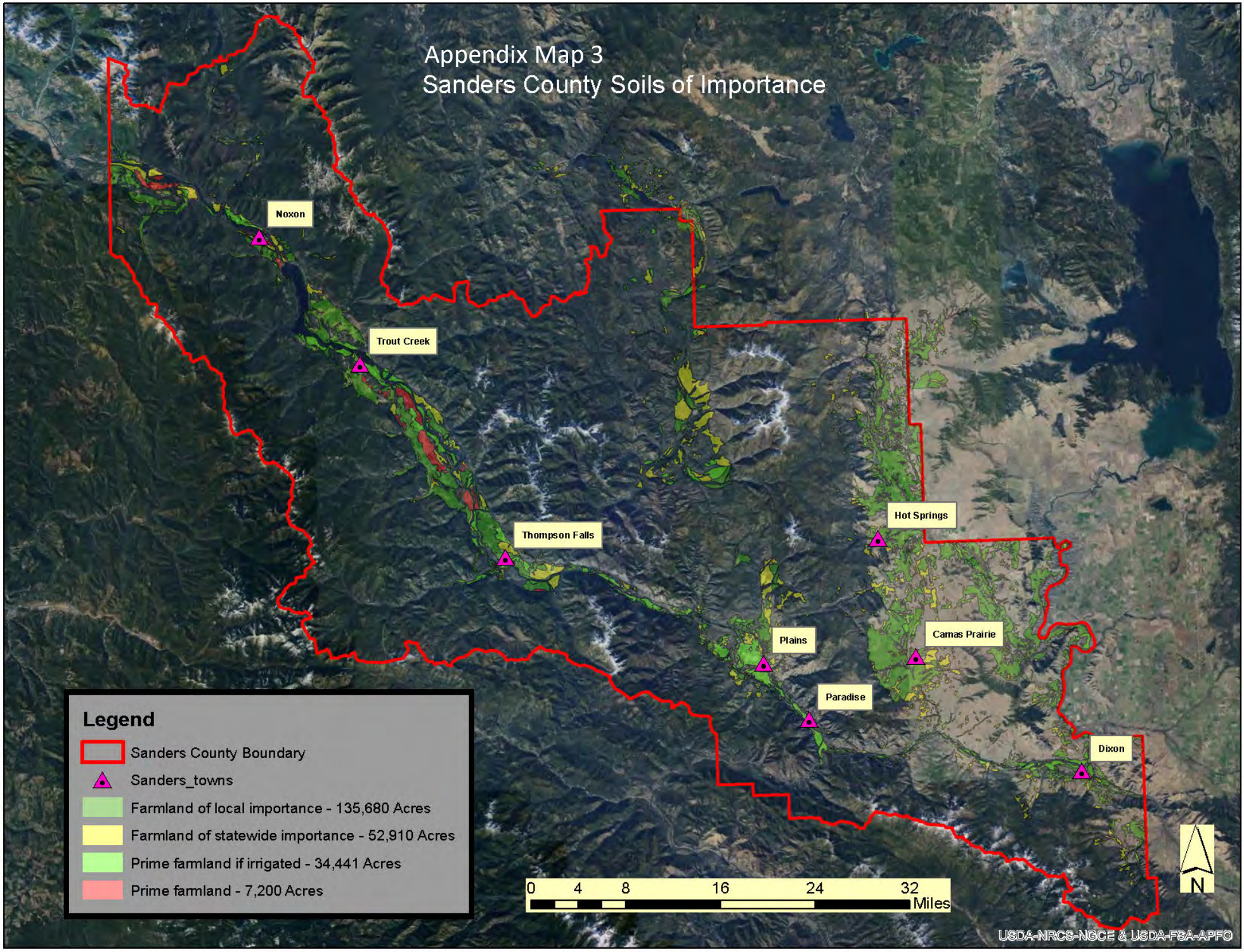
Appendix Map 1: Sanders County Land Ownership

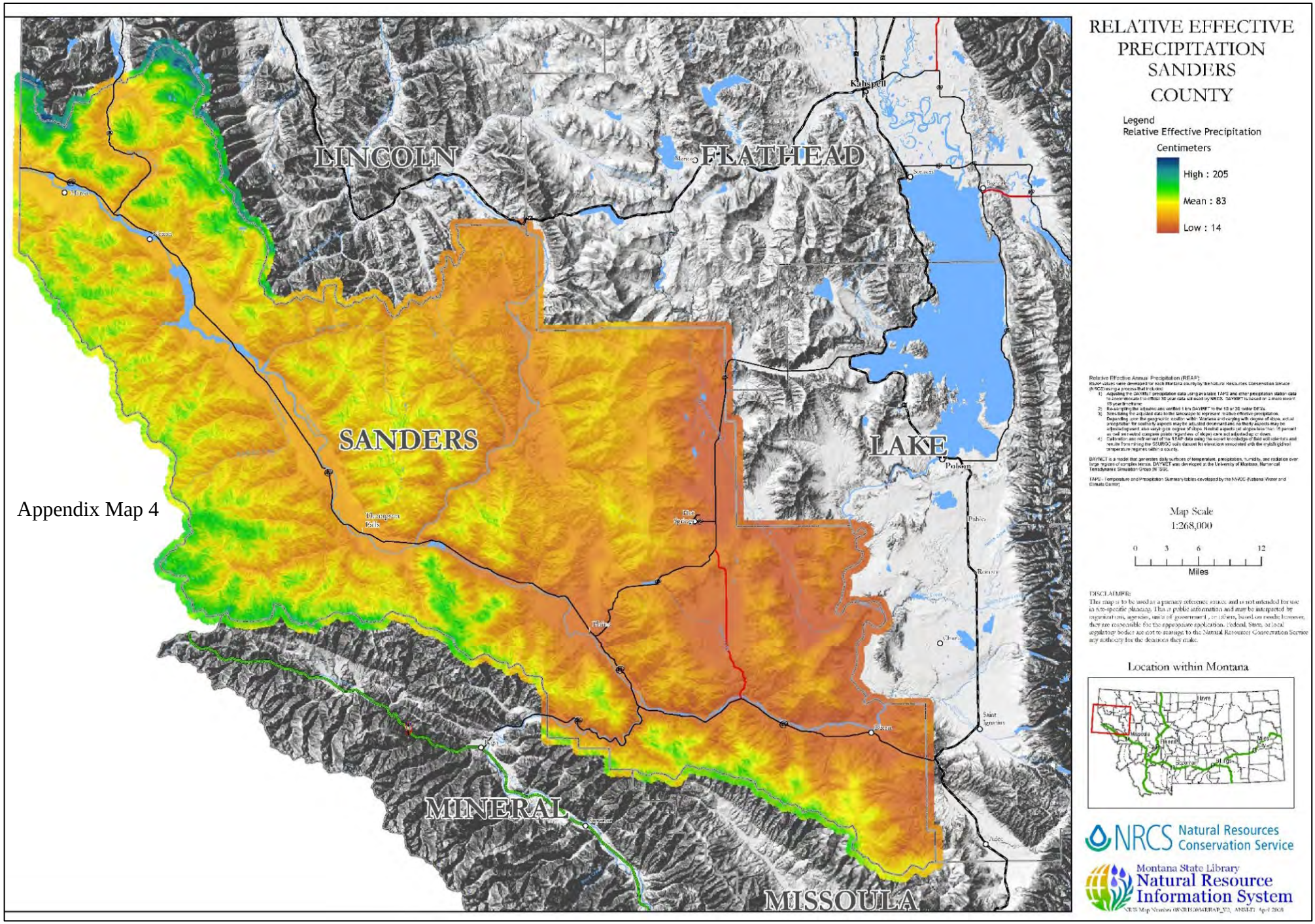


Appendix Map 2

THE CONFEDERATED SALISH AND KOOTENAI TRIBES OF THE FLATHEAD NATION



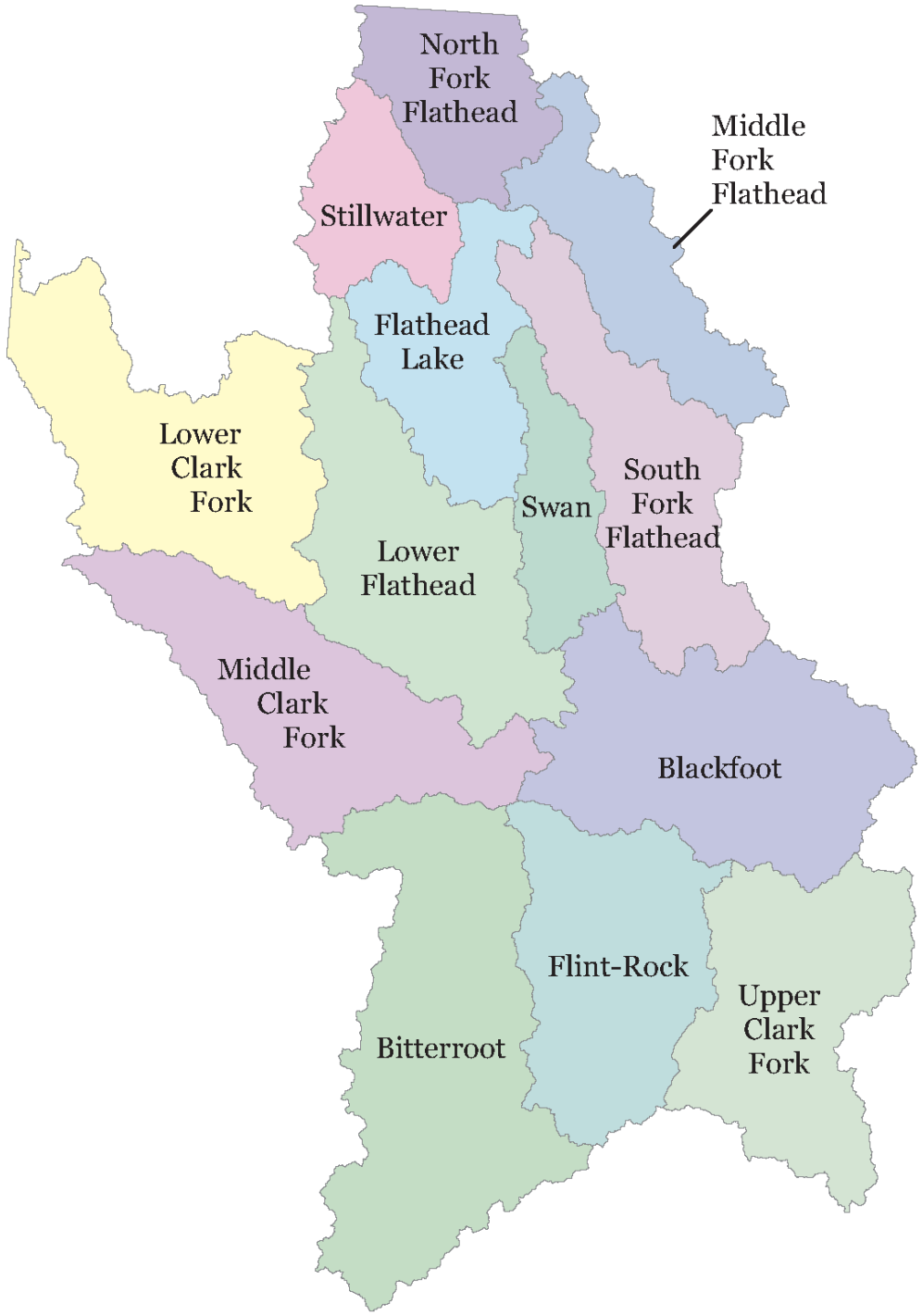

Appendix Map 3
Sanders County Soils of Importance
Noxon
Trout Creek
Thompson Falls
Hot Springs
Plains
Camas Prairie
Paradise
Dixon
Legend
Sanders County Boundary
Sanders_towns
Farmland of local importance - 135,680 Acres
Farmland of statewide importance - 52,910 Acres
Prime farmland if irrigated - 34,441 Acres
Prime farmland - 7,200 Acres
0 4 8 16 24 32
Miles
N
USDA-NRCS-NGCE & USDA-FSA-APFO



Appendix Map 4

Appendix A: Impaired Waters

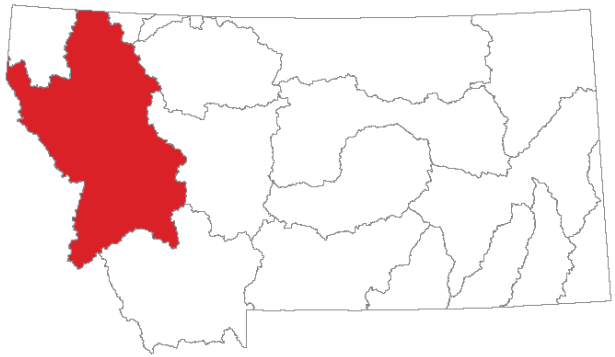
ST WTRSHD	HUC	HUC NAME
Upper South Saskatchewan River	09040001	St. Marys
	09040002	Belly
Missouri Headwaters	10020001	Red Rock
	10020002	Beaverhead
	10020003	Ruby
	10020004	Big Hole
	10020005	Jefferson
	10020006	Boulder
	10020007	Madison
	10020008	Gallatin
Upper Missouri	10030101	Upper Missouri
	10030102	Upper Missouri-Dearborn
	10030103	Smith
	10030104	Sun
	10030105	Belt
Marias	10030201	Two Medicine
	10030202	Cut Bank
	10030203	Marias
	10030204	Willow
	10030205	Teton
Fort Peck Lake	10040101	Bullwhacker-Dog
	10040102	Arrow
	10040103	Judith
	10040104	Fort Peck Reservoir
	10040105	Big Dry
	10040106	Little Dry
Musselshell	10040201	Upper Musselshell
	10040202	Middle Musselshell
	10040203	Flat Willow
	10040204	Box Elder
	10040205	Lower Musselshell
Milk	10050001	Milk Headwaters
	10050002	Upper Milk
	10050003	Wild Horse Lake
	10050004	Middle Milk
	10050005	Big Sandy
	10050006	Sage
	10050007	Lodge
	10050008	Battle
	10050009	Peoples
	10050010	Cottonwood
	10050011	Whitewater
	10050012	Lower Milk
	10050013	Frenchman
	10050014	Beaver
	10050015	Rock
	10050016	Porcupine
Missouri-Poplar	10060001	Prairie Elk -Wolf
	10060002	Redwater
	10060003	Poplar
Missouri-Poplar	10060004	West Fork Poplar
	10060005	Charlie-Little Muddy
	10060006	Big Muddy
	10060007	Brush Lake Closed Basin
Upper Yellowstone	10070001	Yellowstone Headwaters
	10070002	Upper Yellowstone
	10070003	Shields
	10070004	Upper Yellowstone-Lake Basin
	10070005	Stillwater
	10070006	Clarks Fork Yellowstone
	10070007	Upper Yellowstone-Pompeys Pillar
	10070008	Pryor
Big Horn	10080010	Big Horn Lake
	10080014	Shoshone
	10080015	Lower Bighorn
	10080016	Little Bighorn
Tongue	10090101	Upper Tongue
	10090102	Lower Tongue
Powder	10090207	Middle Powder
	10090208	Little Powder
	10090209	Lower Powder
	10090210	Mizpah
Lower Yellowstone	10100001	Lower Yellowstone-Sunday
	10100002	Big Porcupine
	10100003	Rosebud
	10100004	Lower Yellowstone
	10100005	O'Fallon
Little Missouri/ Belle Fourche	10110201	Upper Little Missouri
	10110202	Boxelder
	10110203	Middle Little Missouri
	10110204	Beaver
	10120202	Lower Belle Fourche
Kootenai	17010101	Middle Kootenai
	17010102	Fisher
	17010103	Yaak
	17010104	Lower Kootenai
	17010105	Moyie
	17010106	Elk
Pend Oreille	17010201	Upper Clark Fork
	17010202	Flint-Rock
	17010203	Blackfoot
	17010204	Middle Clark Fork
	17010205	Bitterroot
	17010206	North Fork Flathead
	17010207	Middle Fork Flathead
	17010208	Flathead Lake
	17010209	South Fork Flathead
	17010210	Stillwater
	17010211	Swan
	17010212	Lower Flathead
	17010213	Lower Clark Fork



Pend Oreille Sub-Major Basin

Columbia River Basin

USGS HUC	HUC NAME
17010201	Upper Clark Fork
17010202	Flint-Rock
17010203	Blackfoot
17010204	Middle Clark Fork
17010205	Bitterroot
17010207	Middle Fork Flathead
17010208	Flathead Lake
17010209	South Fork Flathead
17010210	Stillwater
17010211	Swan
17010212	Lower Flathead
17010201	North Fork Flathead
17010201	Lower Clark Fork



Montana Department of Environmental Quality

Appendix A: Impaired Waters

HUC: 17010204 Middle Clark Fork **Watershed:** Pend Orielle

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Middle Clark Fork Tributaries	MT76M002_090	PETTY CREEK, headwaters to mouth (Clark Fork River)	4A	12.2	MILES	B-1	N	X	X	F	Alteration in stream-side or littoral vegetative covers Low flow alterations Sedimentation/Siltation Temperature, water	Agriculture Highways, Roads, Bridges, Infrastructure (New construction)
Middle Clark Fork Tributaries	MT76M002_100	WEST FORK PETTY CREEK, headwaters to mouth (Petty Creek)	4A	7.64	MILES	B-1	N	F	F	N	Chlorophyll-a Phosphorus (Total) Sedimentation/Siltation	Forest Roads (Road Construction and Use) Silviculture Harvesting
Middle Clark Fork Tributaries	MT76M002_120	RATTLESNAKE CREEK, headwaters to mouth (Clark Fork River)	4C	23.56	MILES	A-CLOSED	N	F	F	X	Other flow regime alterations	Dam Construction (Other than Upstream Flood Control Projects Flow Alterations from Water Diversions
Middle Clark Fork Tributaries	MT76M002_130	GRANT CREEK, headwaters to mouth (Clark Fork River)	4A	18.86	MILES	B-1	N	F	F	N	Alteration in stream-side or littoral vegetative covers Excess Algae Growth Low flow alterations Nitrate/Nitrite (Nitrite + Nitrate as N) Nitrogen (Total) Sedimentation/Siltation Temperature, water	Flow Alterations from Water Diversions Irrigated Crop Production Loss of Riparian Habitat Site Clearance (Land Development or Redevelopment) Streambank Modifications/destabilization
Middle Clark Fork Tributaries	MT76M002_140	MILL CREEK, headwaters to mouth (Clark Fork River near Frenchtown)	4C	13.67	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers	Agriculture Golf Courses Grazing in Riparian or Shoreline Zones
Middle Clark Fork Tributaries	MT76M002_150	SIXMILE CREEK, headwaters to mouth (Clark Fork River)	4C	10.36	MILES	B-1	N	X	X	X	Alteration in stream-side or littoral vegetative covers	Rangeland Grazing Silviculture Activities
Middle Clark Fork Tributaries	MT76M002_160	NEMOTE CREEK, headwaters to mouth (confluence Clark Fork River)	4A	10.38	MILES	B-1	N	F	F	N	Chlorophyll-a Low flow alterations Nitrogen (Total) Phosphorus (Total) Temperature, water	Dredge Mining Flow Alterations from Water Diversions Source Unknown

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
* The impairment cause and source names in this appendix are listed alphabetically. There is no implied relationship between the listed causes and sources. See individual assessment reports for details.

Appendix A: Impaired Waters

HUC: 17010204 Middle Clark Fork **Watershed:** Pend Orielle

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Middle Clark Fork Tributaries	MT76M002_170	DRY CREEK, headwaters to mouth (Clark Fork River)	4A	15.86	MILES	B-1	N	F	F	N	Alteration in stream-side or littoral vegetative covers Low flow alterations Nitrogen (Total)	Flow Alterations from Water Diversions Grazing in Riparian or Shoreline Zones Natural Sources Source Unknown
Middle Clark Fork Tributaries	MT76M002_180	FLAT CREEK, headwaters to mouth (Clark Fork)	4A	8.02	MILES	B-1	N	X	N	X	Antimony Arsenic Cadmium Lead Mercury Physical substrate habitat alterations Sedimentation/Siltation Zinc	Impacts from Abandoned Mine Lands (Inactive) Unspecified Unpaved Road or Trail
Middle Clark Fork Tributaries	MT76M002_200	HALL GULCH, headwaters to mouth (Flat Creek)	4A	2	MILES	B-1	N	X	N	X	Antimony Arsenic Iron Lead Zinc	Impacts from Abandoned Mine Lands (Inactive)
St. Regis	MT76M003_010	ST. REGIS RIVER, headwaters to mouth (Clark Fork River)	4A	40.3	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers Other flow regime alterations Sedimentation/Siltation Temperature, water	Channelization Highway/Road/Bridge Runoff (Non-construction Related) Highways, Roads, Bridges, Infrastructure (New Construction Loss of Riparian Habitat Streambank Modifications/destabilization
ST. Regis	MT76M003_020	TWELVE MILE CREEK, headwaters to mouth (St. Regis River)	4A	13.96	MILES	B-1	N	F	F	F	Physical substrate habitat alterations Sedimentation/Siltation Temperature, water	Channelization Forest Roads (Road Construction and Use) Highway/Road/Bridge Runoff (Non-construction Related) Highways, Roads, Bridges, Infrastructure (New Construction) Loss of Riparian Habitat

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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Appendix A: Impaired Waters

HUC: 17010204 Middle Clark Fork **Watershed:** Pend Orielle

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
St. Regis	MT76M003_020	TWELVE MILE CREEK, headwaters to mouth (St. Regis River)	4A	13.98	MILES	B-1	N	F	F	F		Silviculture Activities
St. Regis	MT76M003_030	SILVER CREEK, headwaters to mouth (St. Regis River)	4C	4.96	MILES	A-1	N	F	F	F	Other flow regime alterations	Highways, Roads, Bridges, Infrastructure (New Construction) Impacts from Hydrostructure Flow Regulation/modification
St. Regis	MT76M003_040	BIG CREEK, the East and Middle Forks to mouth (St. Regis River)	4A	2.77	MILES	B-1	N	F	F	F	Sedimentation/Siltation Temperature, water	Channelization Loss of Riparian Habitat Streambank Modifications/destabilization
St. Regis	MT76M003_070	LITTLE JOE CREEK, North Fork to mouth (St. Regis River)	4A	2.6	MILES	B-1	N	F	F	F	Sedimentation/Siltation	Highways, Roads, Bridges, Infrastructure (New Construction) Streambank Modifications/destabilization
ST. Regis	MT76M003_080	NORTH FORK LITTLE JOE CREEK, headwaters to mouth (Little Joe Creek)	4A	10.82	MILES	B-1	N	F	F	F	Physical substrate habitat alterations Sedimentation/Siltation Temperature, water	Channelization Forest Roads (Road Construction and Use) Highway/Road/Bridge Runoff (Non-construction Related) Highways, Roads, Bridges, Infrastructure (New Construction) Loss of Riparian Habitat
Ninemile	MT76M004_010	NINEMILE CREEK, headwaters to mouth (Clark Fork River)	4A	26.85	MILES	B-1	N	F	X	F	Low flow alterations Sedimentation/Siltation	Flow Alterations from Water Diversions Impacts from Abandoned Mine Lands (Inactive) Streambank Modifications/destabilization
Ninemile	MT76M004_020	STONY CREEK, headwaters to mouth (Ninemile Creek)	4A	7.07	MILES	B-1	N	F	F	N	Phosphorus (Total) Sedimentation/Siltation	Agriculture Irrigated Crop Production
Ninemile	MT76M004_031	McCORMICK CREEK, Little McCormick Creek to mouth (Ninemile Creek)	4C	2.01	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers	Placer Mining
Ninemile	MT76M004_040	JOSEPHINE CREEK, headwaters to mouth (Ninemile Creek)	4A	5.99	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers Low flow alterations Sedimentation/Siltation	Forest Roads (Road Construction and Use) Impacts from Hydrostructure Flow Regulation/modification Placer Mining
Ninemile	MT76M004_060	CEDAR CREEK, headwaters to mouth (Ninemile Creek)	4A	4.52	MILES	B-1	N	F	F	N	Alteration in stream-side or littoral vegetative covers Low flow alterations Sedimentation/Siltation	Agriculture Flow Alterations from Water Diversions Forest Roads (Road Construction and Use) Natural Sources

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
* The impairment cause and source names in this appendix are listed alphabetically. There is no implied relationship between the listed causes and sources. See individual assessment reports for details.

Appendix A: Impaired Waters

HUC: 17010204 Middle Clark Fork **Watershed:** Pend Orielle

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Ninemile	MT76M004_070	KENNEDY CREEK, headwaters to mouth (Ninemile Creek)	4A	5.64	MILES	B-1	N	N	N	N	Alteration in stream-side or littoral vegetative covers Lead Low flow alterations Mercury Sedimentation/Siltation Zinc	Irrigated Crop Production Mine Tailings Placer Mining Subsurface (Hardrock) Mining Surface Mining
Ninemile	MT76M004_080	LITTLE MCCORMICK CREEK, headwaters to mouth (McCormick Creek)	4A	3.54	MILES	B-1	N	I	F	I	Fish-Passage Barrier Low flow alterations Physical substrate habitat alterations Sedimentation/Siltation	Placer Mining

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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Appendix A: Impaired Waters

HUC: 17010208 Flathead Lake **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Flathead - Stillwater	MT76O002_010	ASHLEY CREEK, Ashley Lake to Smith Lake	4A	15.64	MILES	B-1	N	F	X	N	Alteration in stream-side or littoral vegetative covers Chlorophyll-a Nitrogen (Total) Oxygen, Dissolved Sedimentation/Siltation Temperature, water	Channelization Crop Production (Crop Land or Dry Land) Grazing in Riparian or Shoreline Zones Loss of Riparian Habitat Source Unknown
Flathead - Stillwater	MT76O002_020	ASHLEY CREEK, Smith Lake to Kalispell Airport Road	4A	14.17	MILES	B-2	N	F	X	N	Low flow alterations Nitrogen (Total) Phosphorus (Total) Sedimentation/Siltation Temperature, water	Agriculture Crop Production (Crop Land or Dry Land) Grazing in Riparian or Shoreline Zones Loss of Riparian Habitat
Flathead - Stillwater	MT76O002_030	ASHLEY CREEK, Kalispell airport road to mouth (Flathead River)	4A	13.17	MILES	C-2	N	F	-	N	Alteration in stream-side or littoral vegetative covers Chlorophyll-a Nitrate/Nitrite (Nitrite + Nitrate as N) Nitrogen (Total) Oxygen, Dissolved Phosphorus (Total) Sedimentation/Siltation Temperature, water	Channelization Discharges from Municipal Separate Storm Sewer Systems (MS4) Irrigated Crop Production Loss of Riparian Habitat Municipal Point Source Discharges Upstream Source
Flathead - Stillwater	MT76O002_040	SPRING CREEK, headwaters to mouth (Ashley Creek)	5	4.8	MILES	B-1	N	F	N	N	Alteration in stream-side or littoral vegetative covers Arsenic Nitrate/Nitrite (Nitrite + Nitrate as N) Nitrogen (Total) Other flow regime alterations Oxygen, Dissolved Phosphorus (Total) Physical substrate habitat alterations	Agriculture Baseflow Depletion from Groundwater Withdrawals Channelization Flow Alterations from Water Diversions Loss of Riparian Habitat Source Unknown

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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Appendix A: Impaired Waters

HUC: 17010208 Flathead Lake **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Flathead Lake	MT76O003_010	FLATHEAD LAKE	5	57305	ACRES	A-1	N	F	F	F	Mercury	Atmospheric Deposition - Nitroge
											Nitrogen (Total)	Impacts from Hydrostructure Flow Regulation/modification
											Phosphorus (Total)	Municipal Point Source Discharges
											Polychlorinated biphenyls	Silviculture Harvesting
												Source Unknown
												Unspecified Urban Stormwater
												Upstream Impoundments (e.g., Pl-566 NRCS Structures)
Flathead Lake	MT76O004_020	LAKE MARY RONAN	4C	1517.2	ACRES	A-1	T	F	X	F	Chlorophyll-a	Agriculture
												Grazing in Riparian or Shoreline Zones
												Silviculture Activities

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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Appendix A: Impaired Waters

HUC: 17010211 Swan **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Swan	MT76K002_010	SWAN LAKE	4A	3273.6	ACRES	A-1	T	F	F	F	BOD, sediment load (Sediment Oxygen Demand)	Forest Roads (Road Construction and Use)
											Nitrogen (Total)	Highways, Roads, Bridges, Infrastructure (New Construction)
											Phosphorus (Total)	
											Sedimentation/Siltation	
Swan	MT76K003_010	JIM CREEK, headwaters to mouth (Swan River), T21 R18W S8	4A	12.11	MILES	B-1	N	F	X	F	Sedimentation/Siltation	Silviculture Harvesting
Swan	MT76K003_031	GOAT CREEK, headwaters to Squeezer Creek	4A	9.71	MILES	B-1	N	F	X	F	Total Suspended Solids (TSS)	Highways, Roads, Bridges, Infrastructure (New Construction)
												Silviculture Harvesting

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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Appendix A: Impaired Waters

HUC: 17010212 Lower Flathead **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Lower Flathead	MT76L001_010	FLATHEAD RIVER, Flathead Reservation boundary to mouth (Clark Fork River)	5	4.24	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers Nitrate/Nitrite (Nitrite + Nitrate as N) Nitrogen (Total) Other flow regime alterations Phosphorus (Total) Sedimentation/Siltation Temperature, water	Dam or Impoundment Impacts from Hydrostructure Flow Regulation/modification Irrigated Crop Production Natural Sources
Lower Flathead	MT76L002_060	LITTLE BITTERROOT RIVER, Hubbart Reservoir to Flathead Reservation Boundary	4A	5.2	MILES	B-2	N	X	X	N	Chlorophyll-a Nitrate/Nitrite (Nitrite + Nitrate as N) Nitrogen (Total) Other flow regime alterations Phosphorus (Total) Sedimentation/Siltation	Upstream Impoundments (e.g., PI-566 NRCS Structures) Upstream Source
Lower Flathead	MT76L002_070	SULLIVAN CREEK, headwaters to Flathead Indian Reservation	4A	3.9	MILES	B-1	N	X	N	N	Alteration in stream-side or littoral vegetative covers Aluminum Cadmium Copper Phosphorus (Total) Sedimentation/Siltation Zinc pH	Grazing in Riparian or Shoreline Zones Impacts from Abandoned Mine Lands (Inactive) Mine Tailings

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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Appendix A: Impaired Waters

HUC: 17010213 Lower Clark Fork **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Clark Fork River	MT76N001_010	CLARK FORK RIVER, Flathead River to Thompson Falls Reservoir	5	36.3	MILES	B-1	N	F	F	F	Dissolved Gas Supersaturation Fish-Passage Barrier	Dam or Impoundment Hydrostructure Impacts on Fish Passage
Clark Fork River	MT76N001_020	CLARK FORK RIVER, Noxon Dam to Noxon Bridge	5	2.85	MILES	B-1	N	F	F	F	Dissolved Gas Supersaturation Fish-Passage Barrier Other flow regime alterations Temperature, water	Dam or Impoundment Hydrostructure Impacts on Fish Passage
Middle Clark Fork Tributaries	MT76N003_010	LYNCH CREEK, headwaters to mouth (Clark Fork River)	4A	13.33	MILES	B-1	N	X	X	N	Alteration in stream-side or littoral vegetative covers Low flow alterations Nitrogen (Total) Phosphorus (Total) Sedimentation/Siltation Temperature, water	Channelization Forest Roads (Road Construction and Use) Grazing in Riparian or Shoreline Zones Irrigated Crop Production
Prospect Creek	MT76N003_020	PROSPECT CREEK, headwaters to mouth (Clark Fork River)	4A	19.07	MILES	B-1	N	F	N	F	Alteration in stream-side or littoral vegetative covers Antimony Lead Sedimentation/Siltation Zinc	Grazing in Riparian or Shoreline Zones Mine Tailings Silviculture Activities
Prospect Creek	MT76N003_021	ANTIMONY CREEK, headwaters to mouth (Prospect Creek)	4A	1.25	MILES	B-1	N	X	N	X	Antimony Arsenic Lead	Mill Tailings Natural Sources
Prospect Creek	MT76N003_022	COX GULCH, headwaters to mouth (Prospect Creek)	4A	3.61	MILES	B-1	N	X	N	X	Antimony Lead	Mine Tailings
Lower Clark Fork Tributaries	MT76N003_030	BEAVER CREEK, headwaters to mouth (Confluence with Clark Fork River)	4C	25.41	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers	Forest Roads (Road Construction and Use) Grazing in Riparian or Shoreline Zones Natural Sources
Lower Clark Fork Tributaries	MT76N003_040	BULL RIVER, the North Fork to mouth (Cabinet Gorge Reservoir)	4A	25.18	MILES	B-1	N	F	X	F	Physical substrate habitat alterations	Silviculture Activities

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
* The impairment cause and source names in this appendix are listed alphabetically. There is no implied relationship between the listed causes and sources. See individual assessment reports for details.

Appendix A: Impaired Waters

HUC: 17010213 Lower Clark Fork **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Lower Clark Fork Tributaries	MT76N003_040	BULL RIVER, the North Fork to mouth (Cabinet Gorge Reservoir)	4A	25.18	MILES	B-1	N	F	X	F	Sedimentation/Siltation	Streambank Modifications/destabilization
Prospect Creek	MT76N003_050	CLEAR CREEK, headwaters to mouth (Prospect Creek)	4A	12.09	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers Sedimentation/Siltation	Forest Roads (Road Construction and Use) Streambank Modifications/destabilization
Elk Creek	MT76N003_060	ELK CREEK, headwaters to mouth (Cabinet Gorge Reservoir)	4A	8.04	MILES	B-1	N	F	F	F	Sedimentation/Siltation	Grazing in Riparian or Shoreline Zones Habitat Modification - other than Hydromodification Hardrock Mining Discharges (Permitted)
Prospect Creek	MT76N003_070	DRY CREEK, headwaters (confluence of East and West Forks) to mouth (Prospect Creek)	4A	4.23	MILES	B-1	N	F	F	N	Alteration in stream-side or littoral vegetative covers Chlorophyll-a Sedimentation/Siltation	Highways, Roads, Bridges, Infrastructure (New Construction) Rangeland Grazing
Lower Clark Fork Tributaries	MT76N003_080	GRAVES CREEK, headwaters to mouth (Clark Fork River)	4C	10.52	MILES	B-1	N	F	X	X	Alteration in stream-side or littoral vegetative covers	Grazing in Riparian or Shoreline Zones Highway/Road/Bridge Runoff (Non-construction Related)
Lower Clark Fork Tributaries	MT76N003_090	MARTEN CREEK, headwaters to mouth (Noxon Reservoir)	4A	6.78	MILES	B-1	N	F	X	X	Physical substrate habitat alterations Sedimentation/Siltation	Forest Roads (Road Construction and Use) Silviculture Activities Streambank Modifications/destabilization
Lower Clark Fork Tributaries	MT76N003_100	PILGRIM CREEK, headwaters to mouth (Clark Fork River)	4C	7.15	MILES	A-1	N	F	X	F	Physical substrate habitat alterations	Channelization Grazing in Riparian or Shoreline Zones Streambank Modifications/destabilization
Lower Clark Fork Tributaries	MT76N003_120	WHITE PINE CREEK, headwaters to mouth (Beaver Creek)	4A	12.37	MILES	B-1	N	F	F	F	Alteration in stream-side or littoral vegetative covers Sedimentation/Siltation Temperature, water	Forest Roads (Road Construction and Use) Grazing in Riparian or Shoreline Zones Natural Sources Silviculture Harvesting Streambank Modifications/destabilization Watershed Runoff following Forest Fire
Lower Clark Fork Tributaries	MT76N003_130	VERMILION RIVER, headwaters to mouth (Noxon Reservoir)	4C	22.84	MILES	B-1	N	F	X	X	Alteration in stream-side or littoral vegetative covers	Placer Mining Silviculture Activities

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Appendix A: Impaired Waters

HUC: 17010213 Lower Clark Fork **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Lower Clark Fork Tributaries	MT76N003_130	VERMILION RIVER, headwaters to mouth (Noxon Reservoir)	4C	22.84	MILES	B-1	N	F	X	X		Streambank Modifications/destabilization
Lower Clark Fork Tributaries	MT76N003_140	SWAMP CREEK, Cabinet Mountains Wilderness boundary to mouth (Noxon Reservoir)	4A	9.75	MILES	A-1	N	X	X	X	Sedimentation/Siltation	Loss of Riparian Habitat
Middle Clark Fork Tributaries	MT76N003_160	SWAMP CREEK, West Fork Swamp Creek to mouth (Clark Fork River), T20N R27W S3	4A	4.76	MILES	B-1	N	X	X	N	Alteration in stream-side or littoral vegetative covers Nitrate/Nitrite (Nitrite + Nitrate as N) Nitrogen (Total) Phosphorus (Total) Sedimentation/Siltation	Channelization Forest Roads (Road Construction and Use) Grazing in Riparian or Shoreline Zones Silviculture Harvesting
Middle Clark Fork Tributaries	MT76N003_170	HENRY CREEK, headwaters to mouth (Clark Fork River), T19N R26W S1	4A	7.1	MILES	B-1	N	X	X	F	Alteration in stream-side or littoral vegetative covers Low flow alterations Sedimentation/Siltation	Channelization Flow Alterations from Water Diversions Forest Roads (Road Construction and Use) Grazing in Riparian or Shoreline Zones Source Unknown
Lower Clark Fork Tributaries	MT76N003_180	DRY CREEK, headwaters to mouth (Bull River), T28N R33W S32	4A	4.1	MILES	B-1	N	F	F	F	Sedimentation/Siltation	Forest Roads (Road Construction and Use)
Lower Clark Fork Tributaries	MT76N003_190	ROCK CREEK, headwaters to mouth below the Noxon Dam	4C	11.1	MILES	B-1	N	F	F	F	Other anthropogenic substrate alterations	Silviculture Activities
Thompson	MT76N005_030	McGREGOR CREEK, McGregor Lake to mouth (Thompson River)	4A	6.82	MILES	B-1	N	X	X	F	Other flow regime alterations Sedimentation/Siltation Temperature, water	Channelization Highway/Road/Bridge Runoff (Non-construction Related) Hydrostructure Impacts on Fish Passage Impacts from Hydrostructure Flow Regulation/modification Irrigated Crop Production
Thompson	MT76N005_040	LITTLE THOMPSON RIVER, headwaters to mouth (Thompson River), T22N R25W S8	4A	19.92	MILES	B-1	N	X	X	N	Alteration in stream-side or littoral vegetative covers Nitrogen (Total) Phosphorus (Total) Sedimentation/Siltation	Forest Roads (Road Construction and Use) Grazing in Riparian or Shoreline Zones Silviculture Harvesting
Thompson	MT76N005_060	LAZIER CREEK, headwaters to mouth (Thompson River)	4A	7.79	MILES	B-1	N	X	X	N	Alteration in stream-side or littoral vegetative covers	Grazing in Riparian or Shoreline Zones

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F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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Appendix A: Impaired Waters

HUC: 17010213 Lower Clark Fork **Watershed:** Pend Oreille

TMDL Planning Area	ID305B	Waterbody Name/Location	Category	Size	Units	Use Class	Beneficial Use				Cause Name*	Source Name*
							AqL	Ag	DW	Rec		
Thompson	MT76N005_060	LAZIER CREEK, headwaters to mouth (Thompson River)	4A	7.79	MILES	B-1	N	X	X	F	Nitrate/Nitrite (Nitrite + Nitrate as N)	Livestock (Grazing or Feeding Operations)
											Nitrogen (Total)	Silviculture Activities
											Phosphorus (Total)	
											Sedimentation/Siltation	
Thompson	MT76N005_070	MCGINNIS CREEK, headwaters to mouth (Little Thompson River)	4A	5.12	MILES	B-1	N	X	X	F	Fish-Passage Barrier	Forest Roads (Road Construction and Use)
											Sedimentation/Siltation	Grazing in Riparian or Shoreline Zones
												Habitat Modification - other than Hydromodification
												Silviculture Harvesting
												Source Unknown

AqL=Aquatic Life; **Ag**=Agriculture; **DW**=Drinking Water; **Rec**=Primary Contact Recreation
F=Fully Supporting; T=Threatened; N=Not Fully Supporting; I=Insufficient Information; X=Not Assessed; - = Beneficial Use Not Assigned
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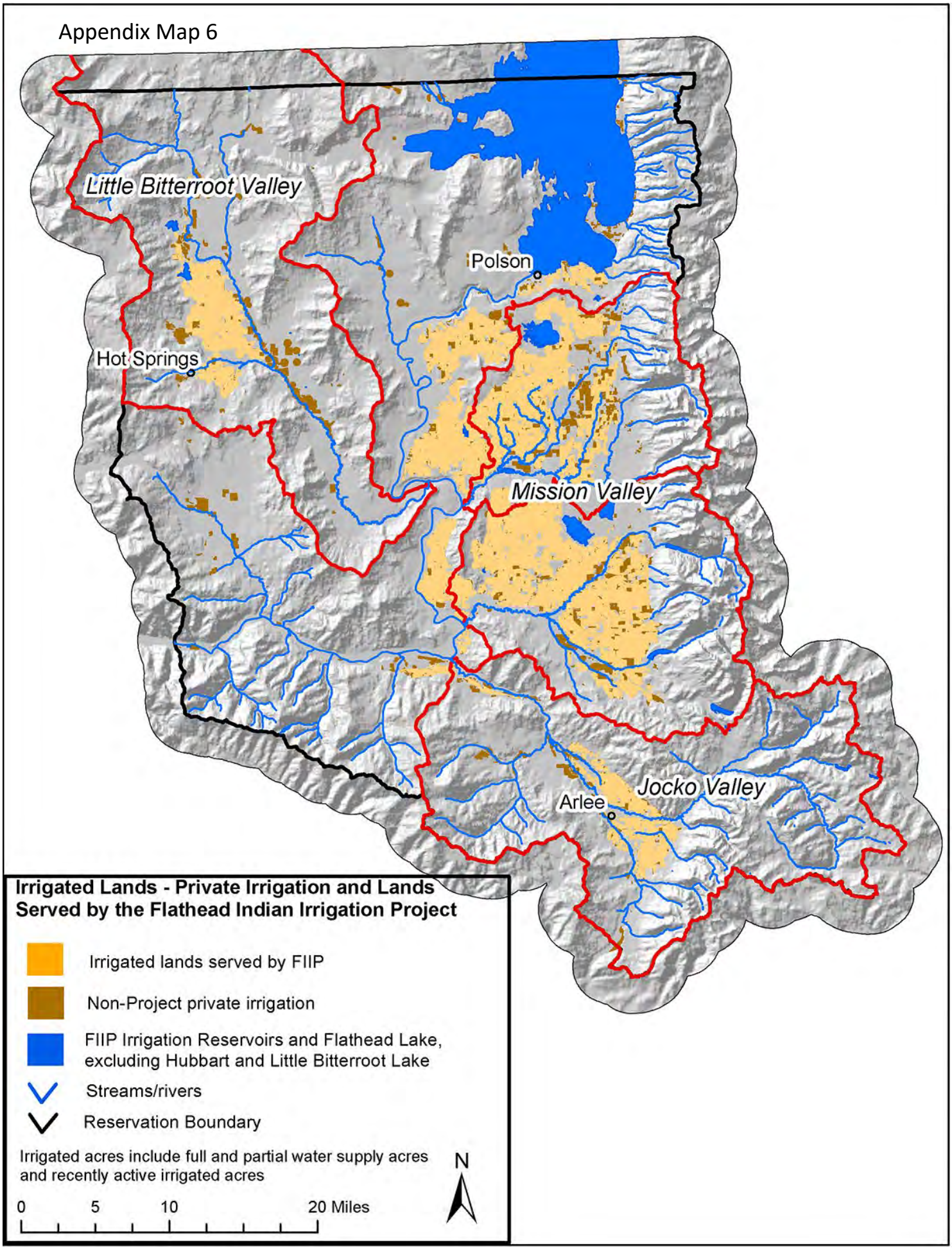
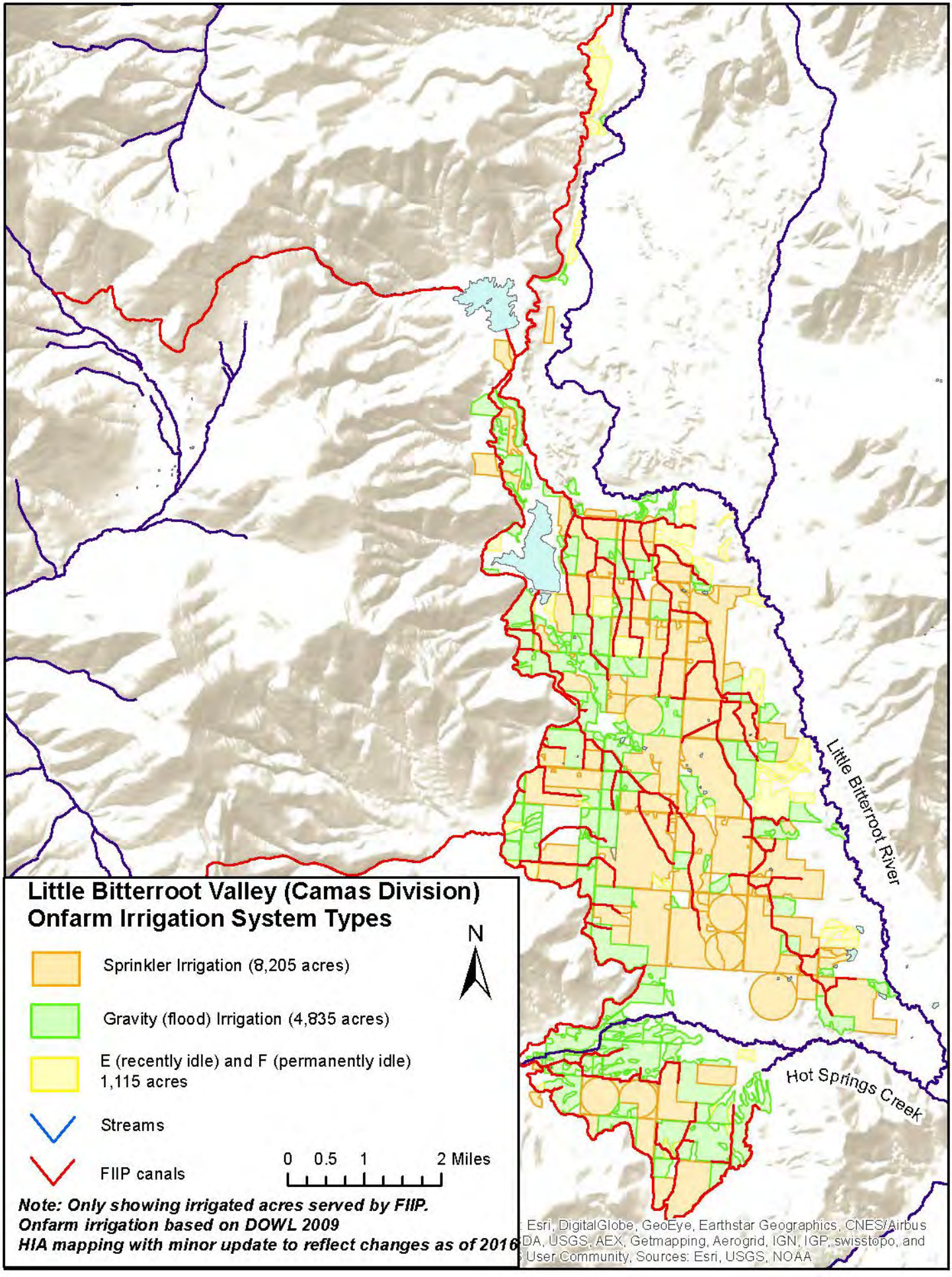
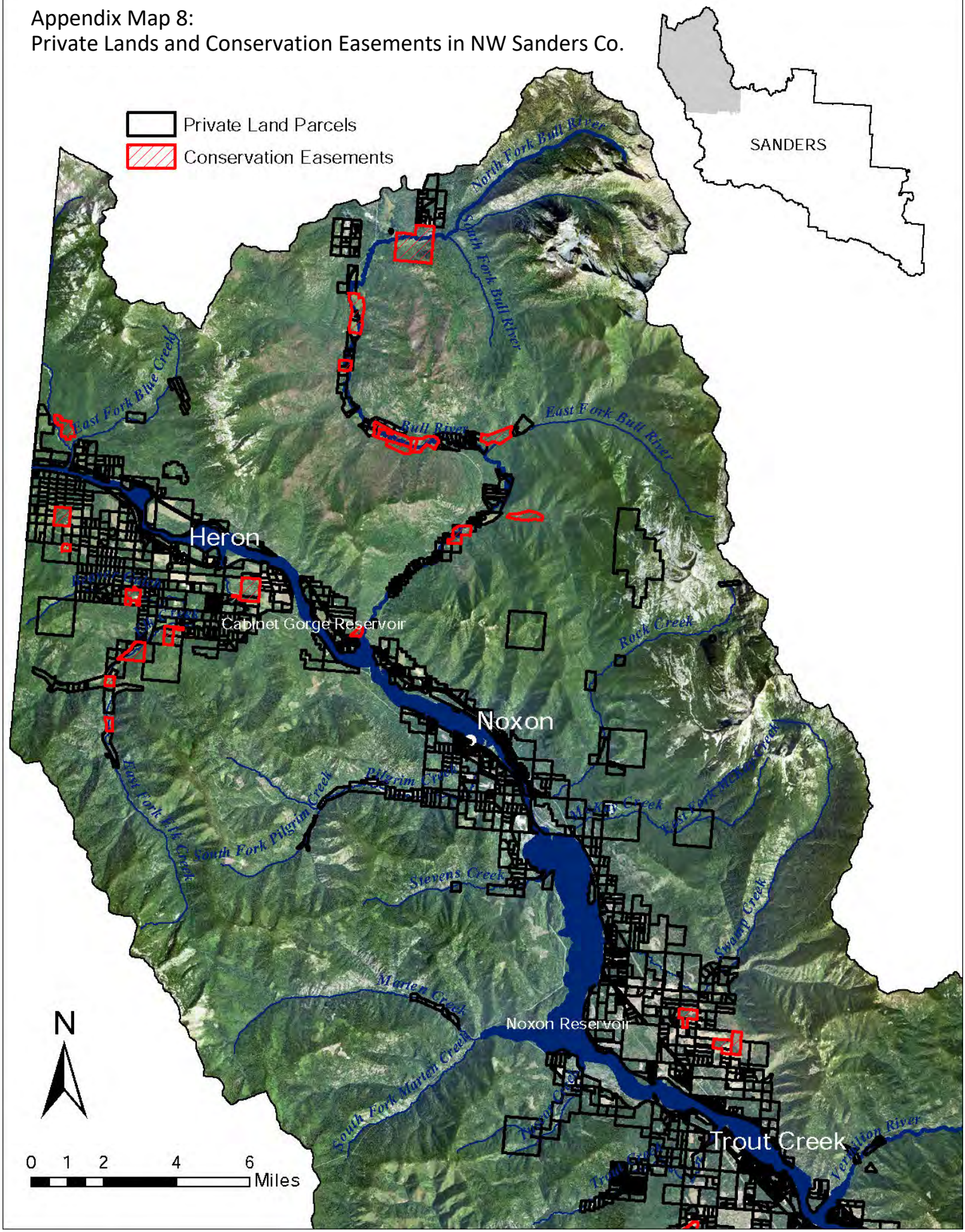
Appendix Map 6



Appendix Map 7



Appendix Map 8:
Private Lands and Conservation Easements in NW Sanders Co.



Appendix Map 9
Conservation Districts in Sanders County, Montana