



RAVALLI COUNTY

Long Range Plan

**Long Range Plan
Ravalli County, Montana**

Section I. Introduction

Purpose

The Ravalli County Long Range Plan (LRP) was developed by the Hamilton Field Office for the Natural Resources Conservation Service (NRCS) with contributions from the Ravalli County Local Work Group (LWG). The LRP is a working document outlining the natural resource data, status and trends for Ravalli County. The LRP demonstrates a collaborative effort by the NRCS and partners to evaluate natural resource issues in Ravalli County and approach them strategically. The plan will be used to prioritize projects for NRCS technical assistance and financial incentive programs.

The LRP will be updated annually, as needed, and the goal of the document is to provide a tool that will be used to assess resource concerns of high priority and provide guidance on future planning of Targeted Implementation Plans (TIPs).

Multiple partners were consulted during the completion of this plan. 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 'reference' section.

Partners

Conservation Partnerships in Ravalli County include:

- Bitterroot Conservation District (BCD)
- Natural Resources Conservation Service (NRCS)
- Bitter Root Conservation and Development (RC&D)
- Farm Service Agency (FSA)
- US Forest Service, Bitterroot National Forest (USFS)
- Bitter Root Land Trust
- Bitter Root Water Forum
- US Fish and Wildlife Service (USFWS)
- Montana Fish, Wildlife & Parks (FWP)
- Teller Wildlife Refuge
- Montana State University Extension for Ravalli County
- Montana Dept. of Natural Resources and Conservation (DNRC)
- Trout Unlimited (TU)
- Ravalli County Weed District
- Montana Association of Conservation Districts (MACD)

Section II. County Profile and Natural Resource Inventory

Ravalli County is located in southwestern Montana, along the Bitterroot River between the Bitterroot Range and Sapphire Mountains. The county extends approximately 95 miles from Lost Trail Pass in Idaho, where it is narrow, to a point near the city of Missoula. To the west is the Bitterroot Range and its large Selway-Bitterroot Wilderness Area, and to the east is the smaller Sapphire Mountains and their

Anaconda-Pintler Wilderness Area. The Bitterroot Range has steep faces, deep canyons, is heavily forested, and is within the Bitterroot National Forest. The Sapphire Mountains are more rounded, drier, and much less forested. The southern end of the valley is split into the East and West Forks of the Bitterroot River, and the northern end has the confluence of the Bitterroot River with the Clark Fork River.

Communities within the county include: Florence, Stevensville, Victor, Corvallis, Hamilton, Darby, Conner, and Sula. Hamilton, the largest town and the county seat of Ravalli County, is located at 46°14.8'N and 114°09.6'W at an elevation of 3,570 ft with a population of 4,000.

County Overview

Ravalli County and the Bitterroot Valley has a rich history in both Native American culture and early settlers. The valley was the ancestral home of the Salish tribe of the Flathead nation. The Lewis and Clark Expedition crossed through the Bitterroot Valley in both 1805 and 1806. The first 'white' settlement in the valley was founded in 1841 at St. Mary's Mission, near present-day Stevensville, by Father DeSmet. Fort Owen was established nearby in 1850, and difficult relations occurred between the white settlers and the Salish until 1891, when the native tribes were relocated to the north. Agriculture has always been at the root of survival in the valley. In the early 1900's, the Bitterroot Valley had nearly a million apple trees, and was one of the world's largest producers of MacIntosh apples at that time. Irrigation was provided by about 80 miles of canals. Settlement has continued since that time with a significant increase in population in the last 30 years. The major industries are development and construction, ranching, agriculture, forestry, and tourism.

According to the most recent statistics available from the US Bureau of Census, the population of Ravalli County was estimated at 43,172 in 2018. The county is estimated to be 92.9% white, 3.6% Hispanic and 1.6% American Indian (US Census Bureau, 2018). Ravalli County covers 2,391 square miles and shares county borders with Granite County to the east, Missoula County to the north, Beaverhead County to the southeast and Idaho to the south and west. Ravalli County has federal, state, county and privately owned land. Ownership distribution is approximately 1,160,000 acres federal, 40,000 acres state and 370,000 acres private. US Forest Service and Wilderness occur to both the west and eastside of the valley (Figure 1).

Conservation Easements

Easements have become a very important tool for landowners within Ravalli County that seek to conserve certain attributes and values associated with their land. Montana leads the country with easements and Ravalli County is a significant contributor to that. An important factor in easement popularity in Ravalli County is the Open Lands Programs which came into effect in 2007. The Open Lands Bond Program has conserved about 6,610 acres in Ravalli County by helping to establish an impressive array of easements with an estimated value of \$17,083,800. The Open Lands Bond Program has contributed almost \$4.5 million to the placement of the easements with matching funds coming in from other sources totaling over \$4.2 million. Participating landowners have donated a total of about \$8.5 million. Figure 2 displays easements and grantees within Ravalli County.

Depending on the parameters contained in the deed language, easement land can be protected for decades or even perpetuity for the purposes of protecting plant or animal habitat, landscape features (e.g. wetlands) or land management activities like farming and ranching. Ravalli County contains a total of 37,984 acres (2%) under some form of conservation easement (Figure 2). Of these, 28,130 acres are

Ravalli County Long Range Plan: NRCS

associated with private easement holders (land trusts, animal conservation organizations, etc.). The remaining easements are federally owned (2,138 acres) and state or locally owned (7,716 acres). Of the federal acres, the United States Department of Agriculture currently holds 388 acres under easement within the county.

Ravalli County is located in the North American Bird Conservation Initiative's Bird Conservation Region 10 and contains two designated Important Bird Areas: Bitterroot River (27,868 acres total; 66% private ownership) and Blodgett (11,199 acres total; 0% private ownership).

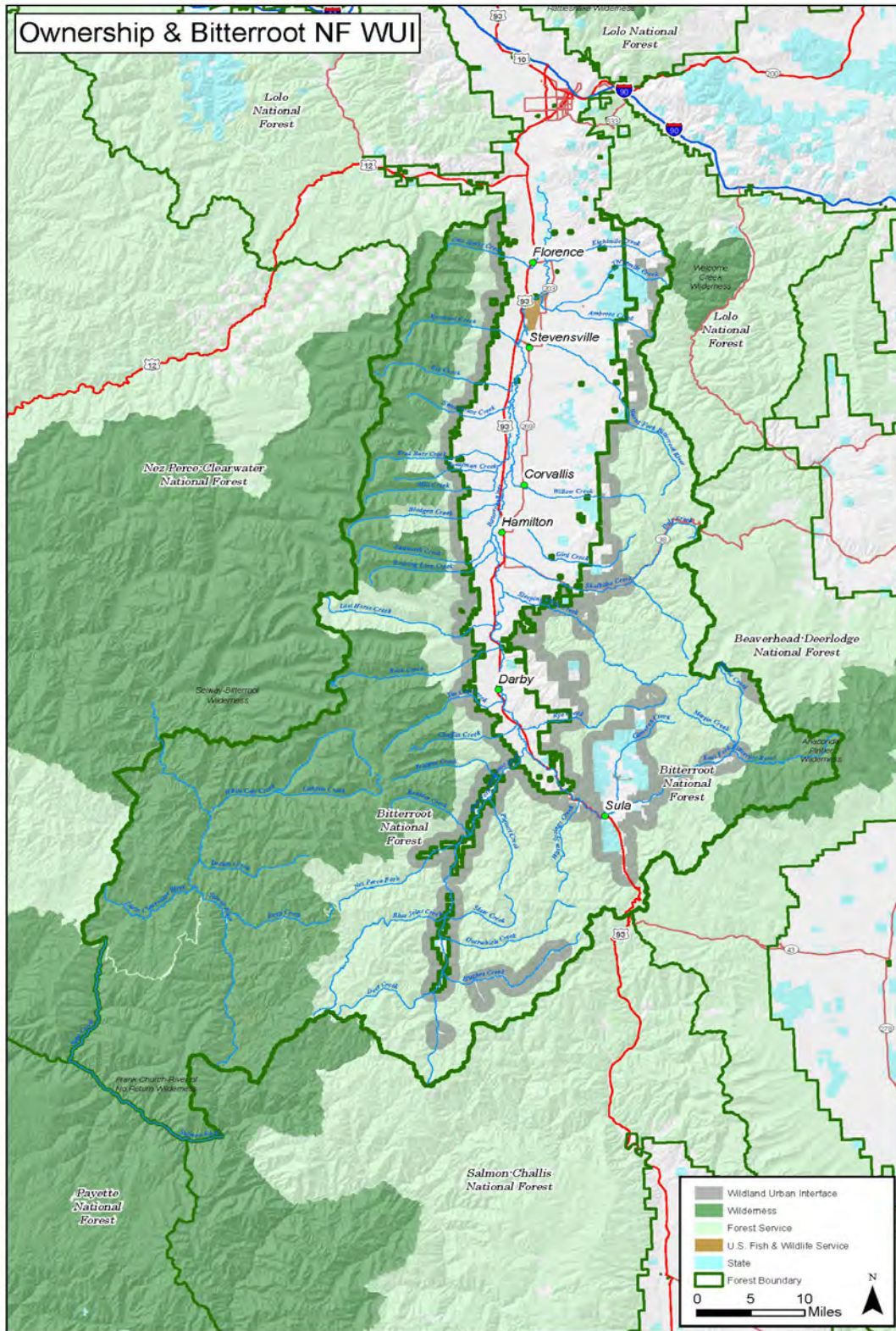


Figure 1. Ownership within Ravalli County

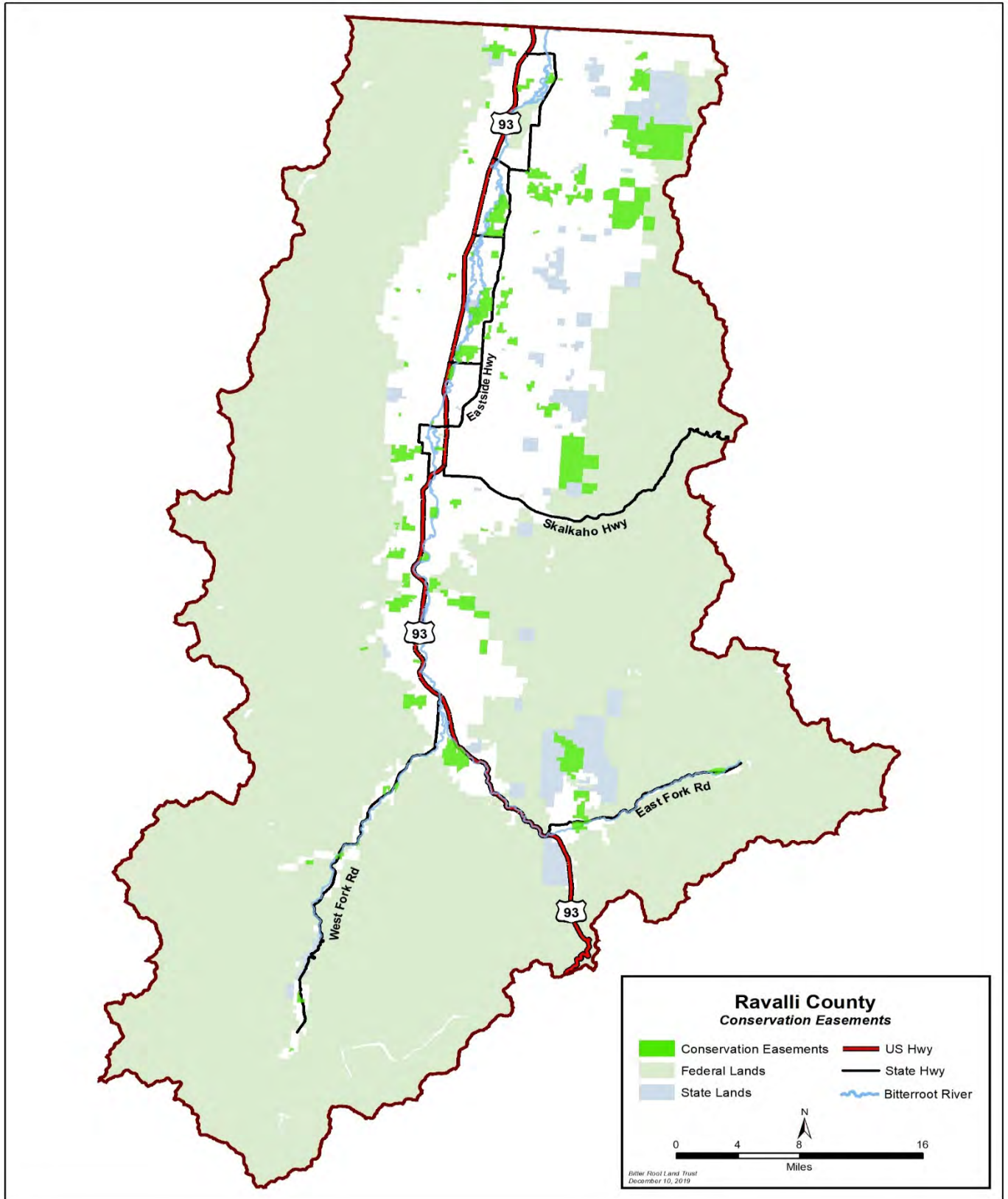


Figure 2. Ravalli County Conservation Easements

Agriculture

Agriculture has always been a critical industry to the economy of Ravalli County. The Montana Agricultural Statistics (USDA 2018) identifies significant agricultural commodities in Ravalli County to be logging and timber, cattle, apples, sugar beets, potatoes, wheat, and dairy. In 2012, there were 1,438 agriculture operations recorded in Ravalli County with an average size of 163 acres (USDA 2018).

Table 1: Agricultural Statistics for Ravalli County in 2017: Average Production (USDA 2018)

Alfalfa Hay	4.5 ton/ac
Other Hay	2 ton/ac
Cattle and Calves	31,000
Sheep and Lambs	2,400
Swine	300

In addition to these traditional agricultural commodities, smaller ‘truck farms’ have grown in popularity in recent years and provide a variety of vegetables and fruit to the local communities. As the population in Ravalli County grows many farms and ranches have become subdivided. New residents frequently purchase tracts of 5 to 80 acres and establish small farms or ranches. This subdivision of existing properties has fractured some of the farmland and created a large base of additional

smaller-scale agricultural producers. Often these smaller-scale landowners have different viewpoints and goals than those within the traditional agricultural community. The subdivision of existing farms creates additional logistical challenges when working to make resource improvements. Conservation projects completed on smaller, fractured land parcels often require participation of more landowners and neighbors and an increase in coordination between all parties in order to provide more value.

Geology and Soils

The field work for the Bitterroot Valley Soil Survey (Soil Survey Area MT645) was completed from 1947-1951 and published in 1959. This survey was remapped and major revisions were made in the 2000s and released via Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>) in 2009. The Bitterroot National Forest Soil Survey Area (MT647) makes up the remainder of Ravalli county. The soil survey field work was done in the late 1990s and early 2000s and released via Web Soil Survey in 2005.

General Nature of the Area

The county contains portions of the Sapphire and Bitterroot mountain ranges. The Sapphire Range to the east; the Bitterroot Range to the west and south. The Bitterroot River runs from the south to the north down the middle of the valley. A small area of the Anaconda Range is in the extreme southeast part of the county.

The county includes about 1,536,899 acres and about 82 percent is forest land, 14 percent range and pasture, 3 percent irrigated land, 1 percent fallow and dry hayland.

The county lies within two Major Land Resource Areas including 44A – Northern Rocky Mountain Valleys and 43B – Central Rocky Mountains.

Parent Material

During the Pleistocene Epoch, approximately 13,000 to 15,000 years ago, 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,

Flathead, and Bitterroot Valleys. This body of water has been named Glacial Lake Missoula. The lake extended into many of the valleys in western Montana and reached a maximum elevation of about 4,200 feet above sea level, or about 1,000 feet above the present elevation of the city of Missoula. Deposits from the lakebed consist principally of silty material and fine sand but deposits of this material are uncommon in the Bitterroot Valley.

Though the valley was filled many times during the Pleistocene with the waters of Glacial Lake Missoula, most of the evidence of those flooding events have been wiped away by more recent alluvium. Few scattered glacial erratics, boulders that were captured in an “iceberg” and floated across the valley where it ran aground can be found at the flood waters highest elevations. The major portion of the valley is filled with fluvial sediments in the riparian areas, alluvial fans and outwash deposits reaching back towards the mountain ranges.

The Precambrian rocks are among the oldest exposed sedimentary rocks in the world. They are represented by the Ravalli, Piegan, and Missoula Groups, which are collectively referred to as the Belt Supergroup. Most of the soils found in the Sapphire Range areas are underlain by sediment from the “Belt rocks”. These east side soils are medium to fine grained in texture and relatively productive.

The soil of west side of the valley are coarser grained because the source of the parent material is from the Idaho Batholith. This is rock type is primarily granite and gneiss that has been transported in colluvium and glacial till and outwash into the valley. Many of these soils are also very rocky within and on the surface.

Important Farmland

Farmland of Local Importance - These are widely scattered in areas where hay and forage are grown and occur mainly on elevated fans and terraces on both sides of the Bitterroot River.

Farmland of Statewide Importance - These soils occur mainly on the east side of the Bitterroot River on broad alluvial fans and terraces.

Prime if Irrigated – These areas are mainly on low lying alluvial terraces on the southern end of the valley on the east side of the Bitterroot River (refer to Figure 4).

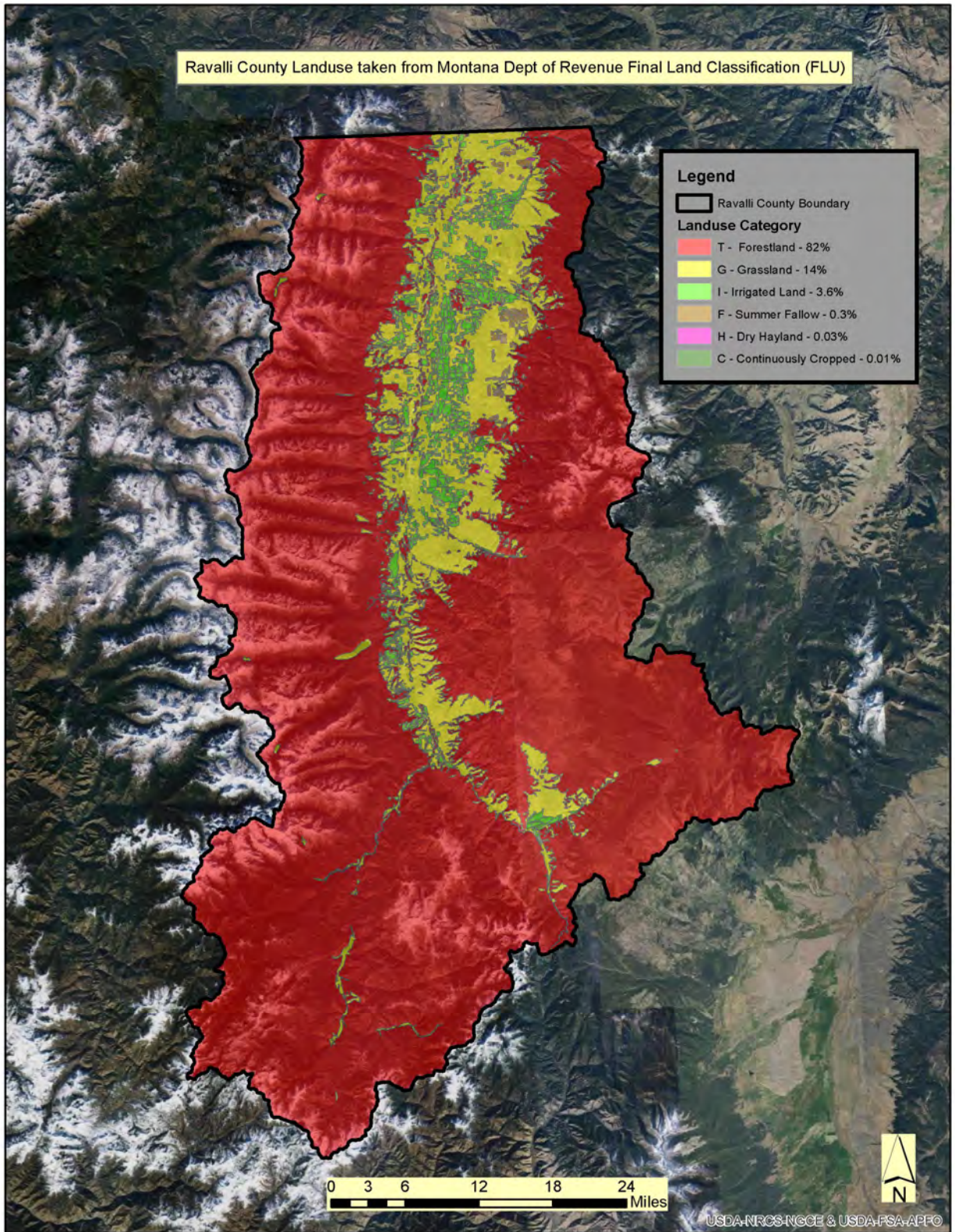


Figure 3: Ravalli County Land Use

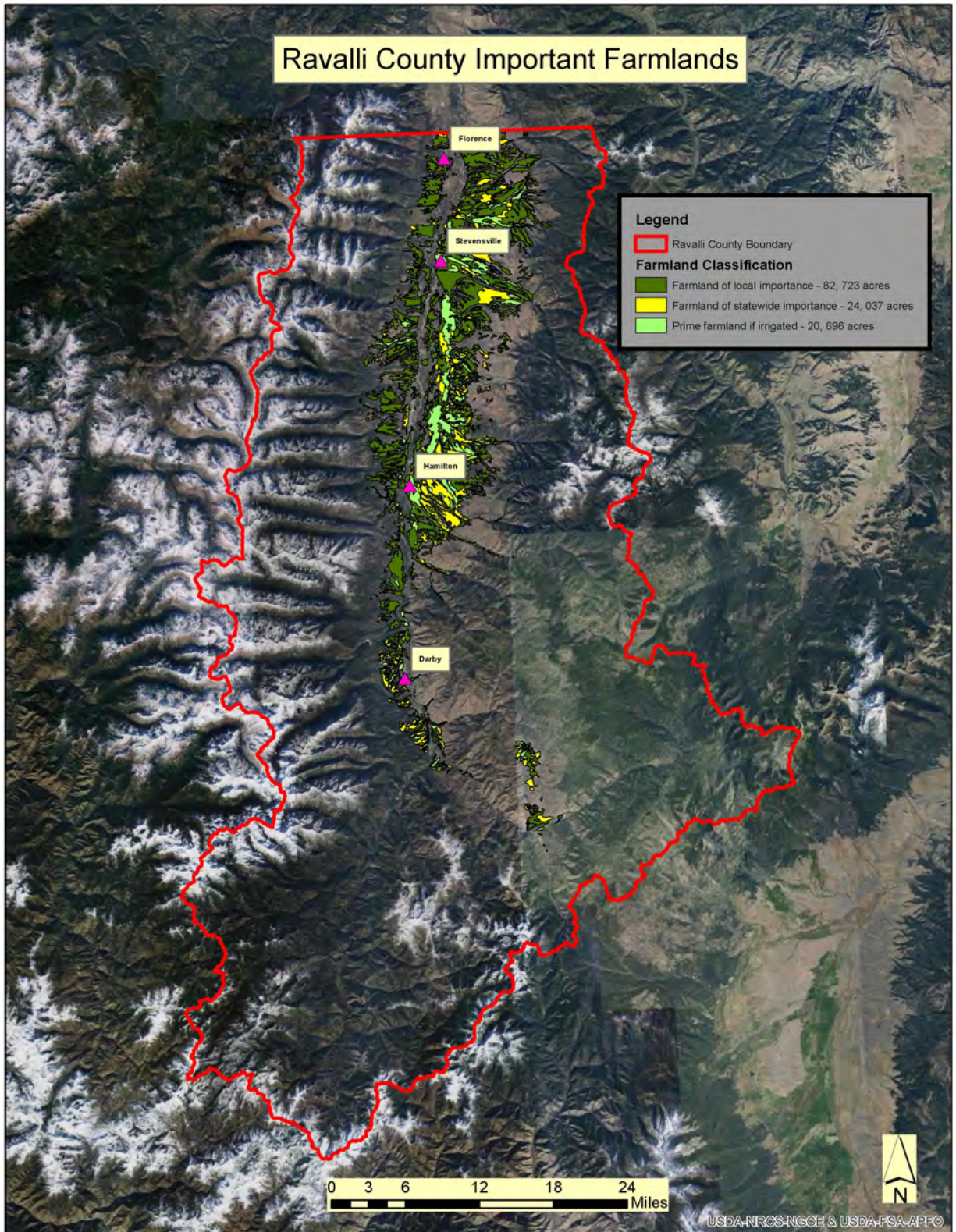


Figure 4: Ravalli County Important Farmlands

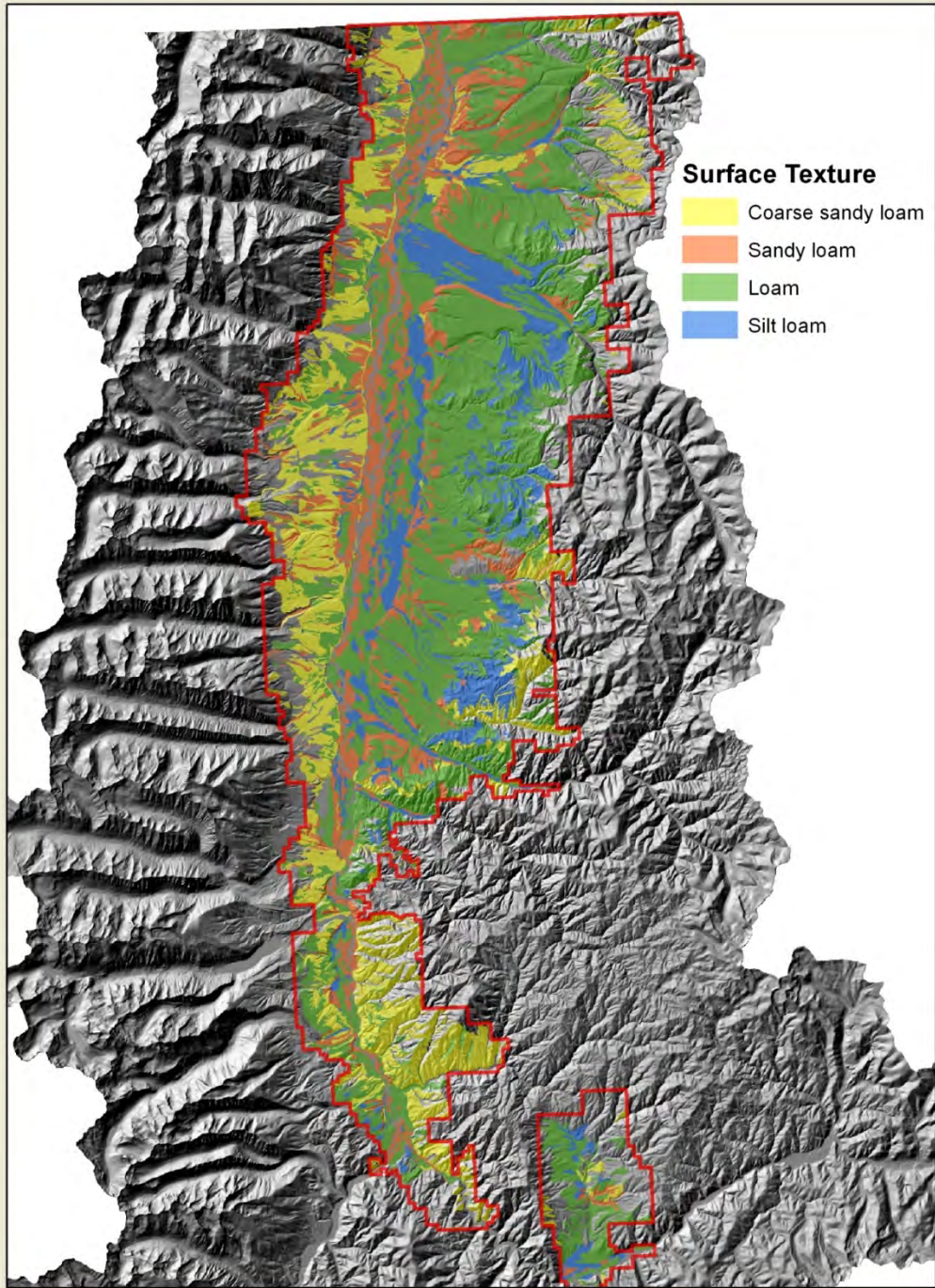


Figure 5: Soil Textures within Ravalli County

Water

Precipitation

Precipitation in Ravalli County ranges from approximately 12 inches in the valleys to over 50 inches on top of some of the highest peaks (NWS 2019). Generally, precipitation is lower in the valleys and increases as elevations rise.

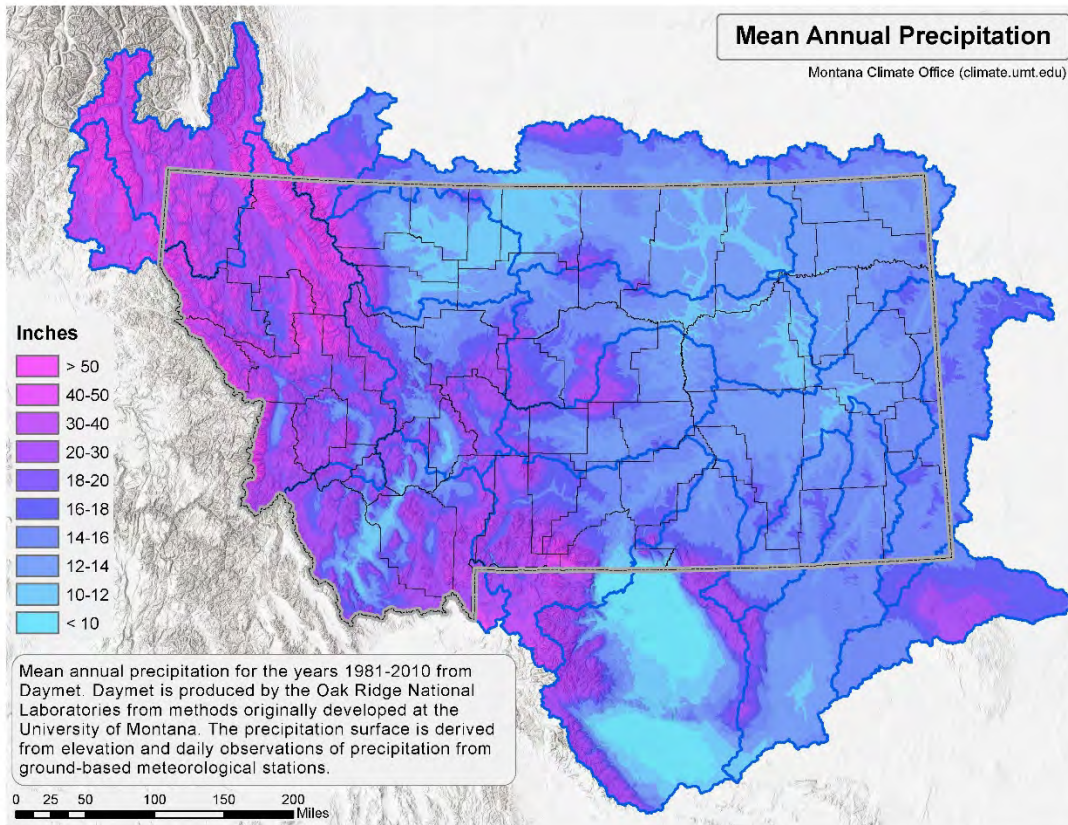


Figure 6: Average Precipitation in Montana

Watershed and Streams

The Bitterroot River is a northward flowing river running through the Bitterroot Valley, from the confluence of its West and East forks near Conner in southern Ravalli County to its confluence with the Clark Fork River near Missoula in Missoula County (approximately 84 miles). The Clark Fork River is tributary to the Columbia River and ultimately, the Pacific Ocean. The Bitterroot River is a Blue-Ribbon trout fishery with a healthy population of native westslope cutthroat trout and bull trout. It is the third most fly-fished river in Montana behind the Madison and Big Horn Rivers (BCC 2019).

The Bitterroot River watershed drains 2,889 square miles in Ravalli and Missoula counties (Ravalli WRS 1958). The Bitterroot Valley averages 7–10 miles wide and is uniquely low gradient for western Montana streams. The river mainstem begins at the confluence of the East Fork Bitterroot River and the West Fork Bitterroot River. From there the mainstem receives numerous tributaries from the Bitterroot Mountains

to the west and the Sapphire Mountains to the east. The watershed is a snowmelt dominated system with large interannual variations in streamflow and peak flows from mid-May to mid-June. The variation is compounded by extensive irrigation withdrawals and upstream reservoir storage at Painted Rocks Reservoir on the West Fork Bitterroot River with the most severely dewatered reaches along 12 miles of the river located between Woodside Crossing near Corvallis and Bell Crossing near Stevensville (Ravalli WRS 1958). The target minimum flow of about 400 cfs at Bell Crossing is met during wet years, but not during very dry years, when streamflows can drop to below 200 cfs (MFWP 2019). In the early 1990's the dam at Lake Como was raised 3 feet and the extra stored water is released into the Bitterroot River after Labor Day each year. Major tributaries include Skalkaho Creek, and Lolo Creek. The Skalkaho Creek drainage sub watershed originates in the Sapphire Mountains and drains 132 square miles and flows 28 miles west-northwest to its confluence with the Bitterroot River. Lolo Creek is the primary tributary in the northern portion of the Bitterroot watershed. Lolo Creek is often completely dewatered in late summer in its lower 2 miles due to withdrawals for irrigation and rural water use.

The Montana Water Quality Report and List of Impaired Waters (known as the Integrated Report) combines reporting information for the Clean Water Act Section 305(b) assessment of water bodies and the Section 303(d) list of water bodies that do not meet water quality standards (DEQ 2016). Water bodies not meeting standards need pollution reduction studies, called Total Maximum Daily Loads (TMDLs). TMDLs also include plans to improve water quality to eventually meet standards. Table 2 lists the stream segments within Ravalli County that have been identified by the DEQ not to meet water quality standards.

Table 2: Stream Segments in Ravalli County on 303d List

<i>Stream segment list on 303d list</i>	<i>Water Quality Standard</i>	<i>Length</i>
BITTERROOT RIVER, Skalkaho Creek to Eightmile Creek	Sedimentation/Siltation	34
BITTERROOT RIVER, Eightmile Creek to mouth (Clark Fork River)	Lead	24
BITTERROOT RIVER, Eightmile Creek to mouth (Clark Fork River)	Sedimentation/Siltation	24
BASS CREEK, Selway-Bitterroot Wilderness boundary to mouth (un-named channel of Bitterroot River), T9N R20W S3	Nitrogen (Total)	5
BASS CREEK, Selway-Bitterroot Wilderness boundary to mouth (un-named channel of Bitterroot River), T9N R20W S3	Phosphorus (Total)	5
MILL CREEK, Selway-Bitterroot Wilderness boundary to the mouth (Fred Burr Creek), T7N R20W S19	Temperature, water	9
AMBROSE CREEK, headwaters to mouth (Threemile Creek)	Nitrogen (Total)	12
AMBROSE CREEK, headwaters to mouth (Threemile Creek)	Phosphorus (Total)	12
MILLER CREEK, headwaters to mouth (Bitterroot River)	Nitrate/Nitrite (Nitrite + Nitrate as N)	18
MILLER CREEK, headwaters to mouth (Bitterroot River)	Nitrogen (Total)	18
MILLER CREEK, headwaters to mouth (Bitterroot River)	Phosphorus (Total)	18

Ravalli County Long Range Plan: NRCS

THREEMILE CREEK, headwaters to mouth (Bitterroot River)	Nitrate/Nitrite (Nitrite + Nitrate as N)	18
THREEMILE CREEK, headwaters to mouth (Bitterroot River)	Nitrogen (Total)	18
THREEMILE CREEK, headwaters to mouth (Bitterroot River)	Phosphorus (Total)	18
NORTH FORK RYE CREEK, headwaters to mouth (Rye Creek-Bitterroot River, South of Darby)	Nitrogen (Total)	7
NORTH FORK RYE CREEK, headwaters to mouth (Rye Creek-Bitterroot River, South of Darby)	Phosphorus (Total)	7
LICK CREEK, headwaters to mouth (Bitterroot River)	Aluminum	6
LICK CREEK, headwaters to mouth (Bitterroot River)	Phosphorus (Total)	6
MUDDY SPRING CREEK, headwaters to mouth (Gold Creek) T7N R19W S2	Nitrate/Nitrite (Nitrite + Nitrate as N)	2
RYE CREEK, North Fork to mouth (Bitterroot River)	Nitrogen (Total)	6
RYE CREEK, North Fork to mouth (Bitterroot River)	Phosphorus (Total)	6
NORTH BURNT FORK CREEK, confluence with South Burnt Fork Creek to Mouth (Bitterroot River)	Nitrogen (Total)	11
NORTH BURNT FORK CREEK, confluence with South Burnt Fork Creek to Mouth (Bitterroot River)	Phosphorus (Total)	11
SWEATHOUSE CREEK, headwaters to mouth (Bitterroot River)	Phosphorus (Total)	12

Bitterroot Watershed TMDL Project Area



Figure 7: TMDL Watersheds in Ravalli County

Irrigation

There is an estimated 55,000 acres of land in agricultural production in Ravalli County (USDA 2018). In support of this production, there is an extensive system of stream diversions ditches that has been developed throughout the county to reroute water to provide irrigation. While some of the water is delivered in pipes, much of the water is delivered through open ditches. Table 3 lists those irrigation districts organized and presented in the Ravalli County Water Resource Survey (1958).

Table 3: Irrigation Districts within Ravalli County

Bass Lake Reservoir
Big Creek Lakes Reservoir Association
Bitter Root Irrigation District (BRID)
Blodgett Creek Irrigation District
C&C Ditch Users Association
Canyon Creek Irrigation District
Carlton Creek Irrigation District
Charlos Irrigation District
The Corvallis Canal
Daly Ditch
Etna Ditch
Fred Burr Creek Water Users' Association
Lomo Irrigation District
Mill Creek Irrigation District
Rock Creek Water Company
Sunset Irrigation District
Supply Ditch Association
Tin Cup Water Company
Union Ditch Company
Ward Irrigation District
Webfoot Ditch Company
West Fork Water Users Association
Woodside Irrigation Company

The Montana Department of Natural Resources and Conservation (DNRC 2014) evaluated demand trends for irrigation in western Montana. General trends in irrigated agriculture over the last twenty years in the western Montana basins can be surmised by utilizing data from the Montana Department of Revenue Final Lands Unit (FLU), National Agricultural Statistics Service (NASS), Agricultural Census and permits granted by DNRC for irrigation (DNRC 2014). These resources indicate that irrigated acres have been static or on the decline in the Clark Fork Basin for the last twenty years. A review of irrigation water use permits granted by DNRC over the last twenty years indicates that very limited development has occurred (DNRC 2014). Agricultural demand of water over the next 20 years in the Clark Fork basin is expected to remain near current levels. Trends in agriculture and water rights permitting suggest that expansion of irrigated agriculture is not likely. Climate modeling indicates the potential for minor increases in evapotranspiration in the basin. Water resources for new agricultural development in the Clark Fork basin are limited by senior irrigation rights, hydropower water rights, instream flow rights and basin closures.

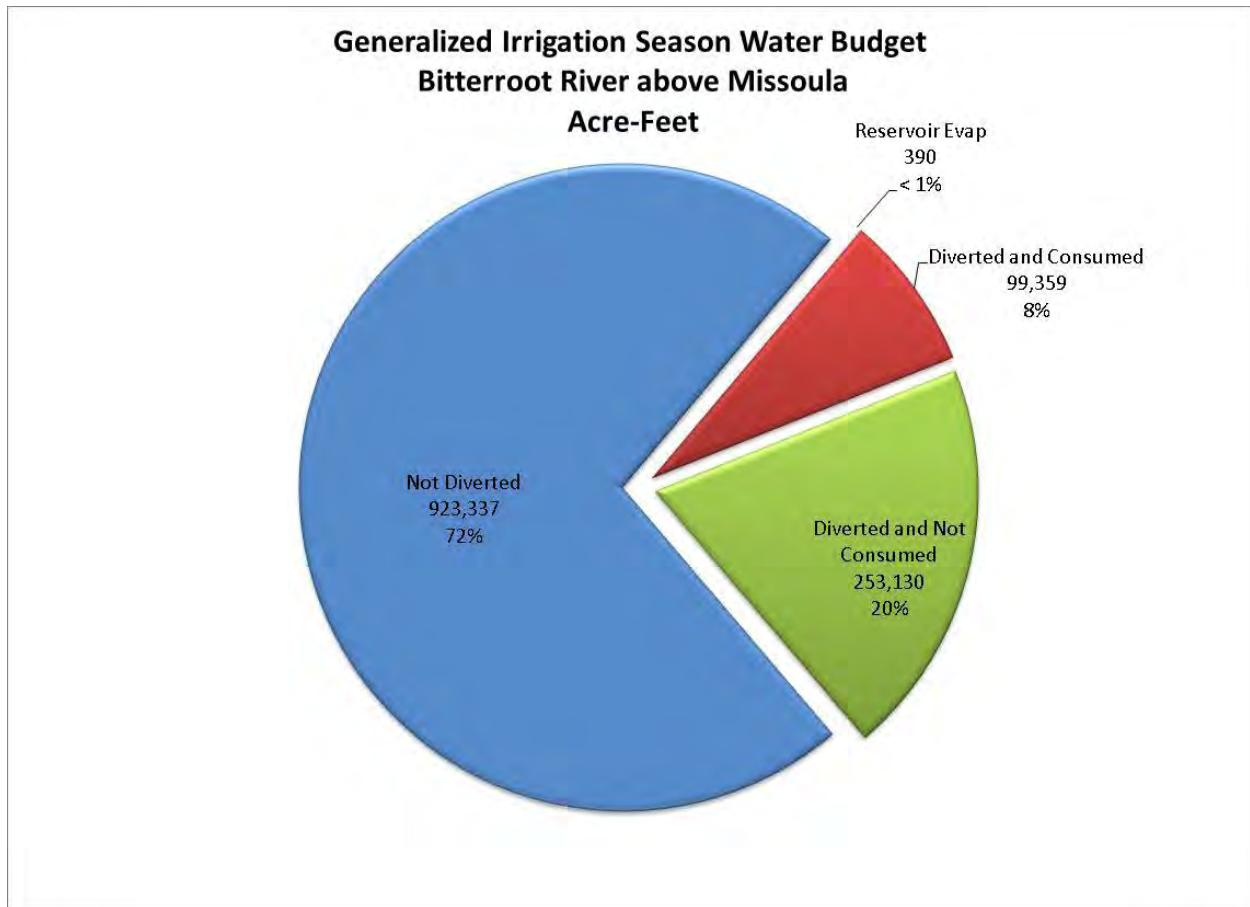


Figure 8: Generalized Irrigation Season Water Budget (DNRC 2014)

Groundwater

Groundwater in Ravalli County has been studied through groundwater assessments and modeling completed by the Montana Bureau of Mines and Geology (MBMG 2013). The MBMG found that the annual groundwater-level fluctuation patterns vary across the Lolo-Bitterroot area. Groundwater-level changes are related to seasonal streamflow and climate variability, re-charge from irrigation practices, long-term (yearly to decadal) climate variations, and groundwater pumping (usage). Some hydrographs display influences from multiple factors, such as high-frequency seasonal water-level fluctuations superimposed on slowly changing multi-year climate patterns. Common patterns of water-level change that occur in the Lolo-Bitterroot Area include:

- (a) The “runoff/stream recharge” response where water levels rise and fall in concert with streamflow and snowmelt runoff.
- (b) The “irrigation” response is where groundwater levels abruptly rise in late spring or early summer, stay elevated throughout the summer when irrigation is occurring, and then decline through the winter and into early spring. The irrigation response is the most common water-level pattern in the Lolo-Bitterroot area, occurring throughout the Bitterroot and Missoula valleys and in many other areas where irrigation water is diverted to canals and delivered to fields. Annual water-level change in irrigation-responsive groundwater systems ranges from a few to tens of feet.

(c) The “pumpage” response occurs where groundwater levels are affected by pumping; the response is characterized by sharply downward groundwater-level changes during summer months, usually in response to irrigation withdrawals. Regional pumpage response may be followed by long recovery periods after pumping ceases. Pumpage responses may be as little as a few feet in non-pumped wells that provide groundwater data documenting widespread groundwater use across an area, to many feet if the groundwater withdrawals are near or in the measured well.

Wetlands

Wetlands are amongst the most important and beneficial ecosystems on the landscape. Wetlands provide critical biological, ecological, and economic benefits including flood attenuation, water filtration, carbon sequestration, and drought resiliency. Further, wetlands are home to 31% of all U.S. plant species, half of all North American bird species use wetlands as some point in their lifecycle, and nearly half of all threatened or endangered species in the US are also associated with wetlands. Ravalli County contains a diverse array of wetland types. A total of 46,641 acres of wetlands can be found within the county borders. Of these, 14,052 acres are palustrine (lacking flowing water), 2,997 are lacustrine (lake associated) in nature, 5,132 acres are riverine (river associated), and 24,460 acres are located within riparian zones.

Typical wetlands within Ravalli County are riparian wetlands located within the valley floor. Kudray (2008) evaluated wetlands within the Bitterroot Valley and confirmed that wetlands and wetland associated ecological functions are concentrated in the valley bottom and along riparian areas. Common activities within the valley that impact wetlands are armoring banks with rip-rap which may limit the ability of the river to maintain the same number of wetlands on the floodplain because high flow events are essential in creating and renewing wetlands (Kudray 2008). Beavers have also been a significant factor in creating and maintaining wetlands within Ravalli County. Beavers are a keystone species with a disproportionate effect on ecological functions compared to their numbers. Beaver activity improves water quality through sediment retention, influences on nutrient cycling and decomposition, and hydrologic modifications. Beavers create wetlands that would otherwise be rare in mountainous terrain, thus providing important habitat for many other wetland-dependent species (Kudray 2008).

Air and Energy

Air Quality

Ravalli County is occasionally in non-compliance with Environmental Protection Agency air quality standards. The main reason for non-compliance is particulate matter associated with forest fires, woodstoves/fireplaces and open burning. Ravalli County does not have its own Air Quality District and Montana law prevents local regulation and enforcement of without such a district.

Utilities

The two distributors of electricity in Ravalli County are Northwestern Energy and Ravalli Electric Co-op. Solar power and other energy efficient approaches are increasing in popularity, however, cost of installation is often the limiting factor. Credit and grant programs are available to assist in off-setting cost of solar conversion, but funding is often inconsistent. Distribution of natural gas is administered by Northwestern Energy. Propane is a common source of energy and there a variety of commercial and residential distributors.

Wildlife

Ravalli County is home to a wide variety of fish and wildlife species. Many species of ducks and waterfowl are common along with osprey (*Pandion haliaetus*), bald eagles (*Haliaeetus leucocephalus*) and great blue herons (*Ardea herodias*). Elk (*Cervus canadensis*), moose (*Alces alces*), and both white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) frequent the Bitterroot River and other riparian areas for water and to graze. Montana Fish, Wildlife and Parks has identified priority areas for big game winter range and migration corridors for pronghorn, elk, and mule deer. The Anaconda Range to Big Hole, Bitterroot, and Upper Clark Fork Watershed Priority Area occurs in Ravalli County (MFWP 2019). Common predator species include: black bears (*Ursus americanus*), mountain lions (*Puma concolor*), wolves (*Canis lupus*), coyotes (*Canis latrans*) and red foxes (*Vulpes vulpes*). The most notable wildlife viewing locale along the Bitterroot River is the famous US Fish and Wildlife Service (USFWS) Lee Metcalf National Wildlife Refuge, named for U.S. Senator Lee Metcalf, a pioneer of the conservation movement.

A renowned fly fishing stream, the Bitterroot River mainstem and many of its tributaries are important migratory corridors and spawning habitat for native westslope cutthroat trout (*Oncorhynchus clarki lewisi*) and bull trout (*Salvelinus confluentus*). Other native fish include mountain whitefish (*Prosopium williamsoni*), longnose sucker (*Catostomus catostomus*), slimy sculpin (*Cottus cognatus*), and longnose dace (*Rhinichthys cataractae*).

The Bitterroot River is managed as a wild trout fishery, emphasizing natural reproduction. The basin is also a focus area for native fish recovery efforts (MFWP 2019). The Bitterroot River is home to 10 native fish species including bull trout, westslope cutthroat trout, mountain whitefish, northern pike minnow, longnose dace, redbelt shiner, peamouth, longnose and largescale sucker, and Columbia slimy sculpin.

Rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) are popular game fish but are not native to the Bitterroot River watershed and pose significant threats to native trout. In Montana, rainbow trout are only native to the upper Kootenai River in the state's extreme northwest corner. Non-native rainbow trout pose one of the greatest threats to cutthroat trout by hybridization, producing "cutbows". In addition, non-native brook trout (*Salvelinus fontinalis*) often displace native cutthroat trout and bull trout in small streams.

Federally Listed Species

The USFWS's Ecological Services Division lists the following threatened species as present within areas of Ravalli County: bull trout (*Salvelinus confluentus*), Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horribilis*), and yellow-billed cuckoo (*Coccyzus americanus*) (Appendix A). One candidate species (wolverine, *Gulo gulo luscus*) and one proposed species (whitebark Pine, *Pinus albicaulis*) are also considered present. None of Montana's federally endangered species are known to reside within the county.

Bull trout require specific habitat needs and are more vulnerable to environmental degradation than are other fish species. They require clean, cold, complex and connected habitat (the four C's). Bull trout populations have declined due to habitat loss and degradation from a variety of human-caused factors. Bull trout are rare in the mainstem of the Bitterroot River (MFWP 2019). Fluvial (river dwelling) forms exist in the East and West Forks but are uncommon. Adfluvial (lake dwelling) lifeforms exist primarily in Painted Rocks Reservoir. Resident lifeforms exist in many smaller tributaries throughout the drainage (MFWP 2019). 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 cutthroat trout. Many streams are dewatered each year due to overpreparation and irrigation uses.



Figure 9: Current range of bull trout in Montana (Montana Field Guide)

State Animal Species of Concern

According to the Montana Natural Heritage Program, Ravalli County contains 51 state listed animal Species of Concern (Refer to Appendix A for complete list). These species consist of 9 mammal species, 26 bird species, 2 reptile species, 1 amphibian specie, 1fish species, 2 insect species, 3 amphipod species, and 8 mollusk species. Habitats generally associated with these species are diverse including both terrestrial and aquatic types and comprise mountain streams, rivers, lakes, grasslands, riparian forests, conifer forests, wetlands, and sagebrush. More specialized species on the list can be found only in association with Ravalli County's waterfalls, rocky side slopes, alpine, and forested habitat caves.

Vegetation Communities

Ravalli County is fortunate to have a variety of vegetation communities and land uses. The county is located within plant hardiness zone 5b, which is relatively mild for Montana (Figure 10). Common land uses within Ravalli County include: pastureland, cropland, rangeland, forestland and riparian.

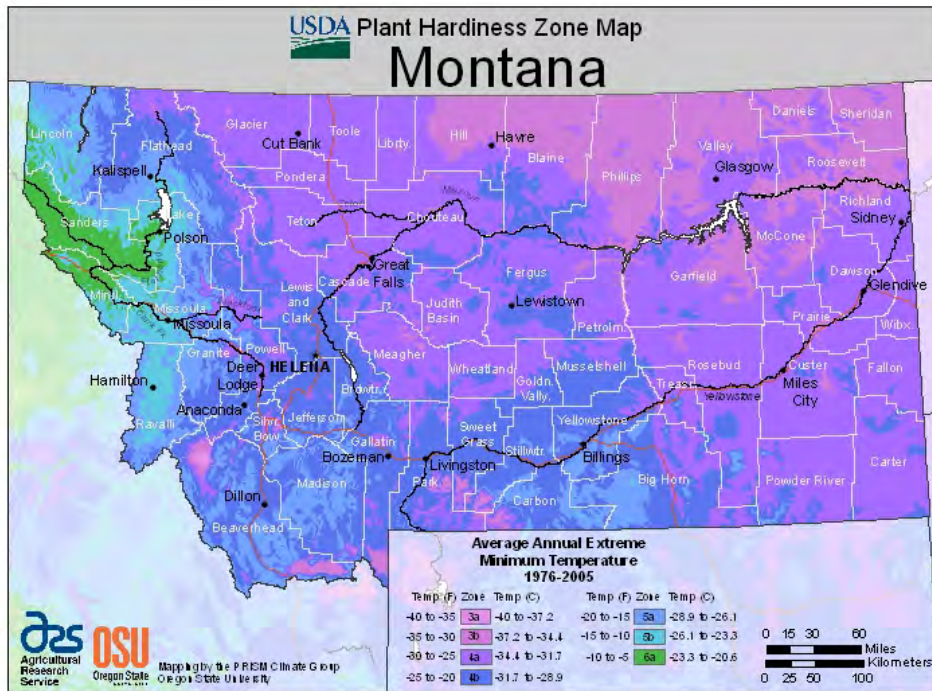


Figure 10: USDA Plant Hardiness Zone for Montana

Pastureland

Pastureland is some of the county’s most valued agricultural land. Many of the tame pastures (dry and irrigated) in Ravalli County are in fair to poor condition. The conditions are a result of both grazing management and species selection and diversity. The county is comprised of approximately 3.6 percent irrigated pasture.

Cropland

Most cropland in Ravalli County is hayland and covers approximately four percent of the land use. Alfalfa-small grain is the most common crop rotation. Grass hay is also a common use for irrigated cropland. Since the common rotation is five years in alfalfa with two-years of a small grain, soil health is typically relatively good. The use of cover crops has increased on cropland within the last ten-years. In addition to these traditional agricultural commodities, smaller ‘truck farms’ have grown in popularity in recent years and provide a variety of vegetables and fruit to the local communities

Rangeland

Rangeland accounts for about 14 percent of land use in Ravalli County. Rangelands often receive less emphasis than pasture or cropland since production is typically lower. Rangeland in Ravalli County is often used as summer pasture or left unutilized for wildlife. 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,

orchardgrass, 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.

Forestland

Ravalli County falls within the West-Central Montana Forest Region, characterized by larch and ponderosa pine with grand-fir locally dominant as well as warm, dry Douglas-fir forest habitat types. As elevations rise, forest types include lodgepole pine, on up to subalpine fir. Ravalli County is 82% forested. Sixty-nine percent of forest acres held in federal and state ownership, leaving about 82,357 acres in private ownership. Ravalli has 395,941 acres in the wildland urban interface, 262,239 of which are FS.

The lowland ponderosa pine forest natural fire regime would be frequent, low intensity fires with fire free intervals of 5 to 25 years. In the Douglas-fir forests, the natural, uninhibited fire regime would be fire free intervals of about 45 years, with low to moderate intensity fires that maintained forests in a state where the tree species present, spacing between trees, and understory vegetation are well adapted to fire in healthy state. Lodgepole pine forests experience a longer duration fire interval from 100 to 500 years and are stand replacing. A century of fire suppression and manipulation of the natural disturbance mechanisms leave many forests, both public and private, in a state that fires quickly surpass the historic norm and become high severity, stand replacement fires. The wildfire threat and trend toward more catastrophic fire to the urban interface is common knowledge. The county has a Community Wildfire Protection Plan that discusses this topic in detail, so it is not repeated here (http://dnrc.mt.gov/divisions/forestry/docs/fire-and-aviation/wui/ravalli_cwpp).

Forest insect and disease issues are ever-present and in a constant state of flux. The current culprits in Ravalli County include: bark beetles, spruce budworm, alarming mistletoe infestations, and root rot. The manipulation of disturbance mechanisms has increased the number of trees per acre far beyond the natural system sustainability and skewed the forest tree species composition toward those more susceptible to insects, disease, and wildfire. This situation complicates and limits forest management options.

The RCLWG that helps guide NRCS priorities recognizes the current state of forests as being far from historical state of resilience and have prioritized forest degradation as a resource concern. The BCD, RC&D, DNRC and USFS stand ready to collaborate with the NRCS in identifying and delivering focused conservation efforts.

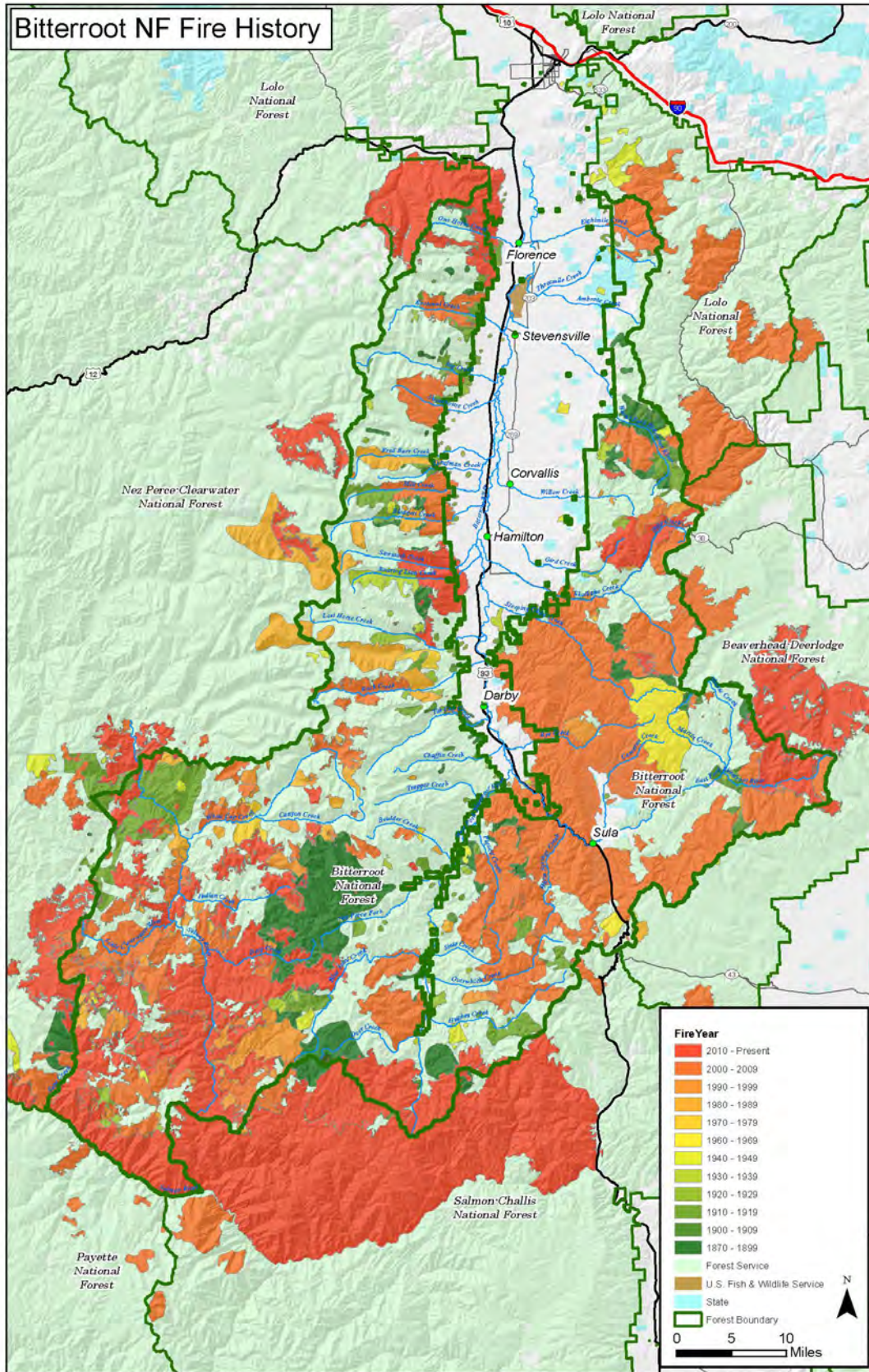


Figure 11: Fire History in Ravalli County

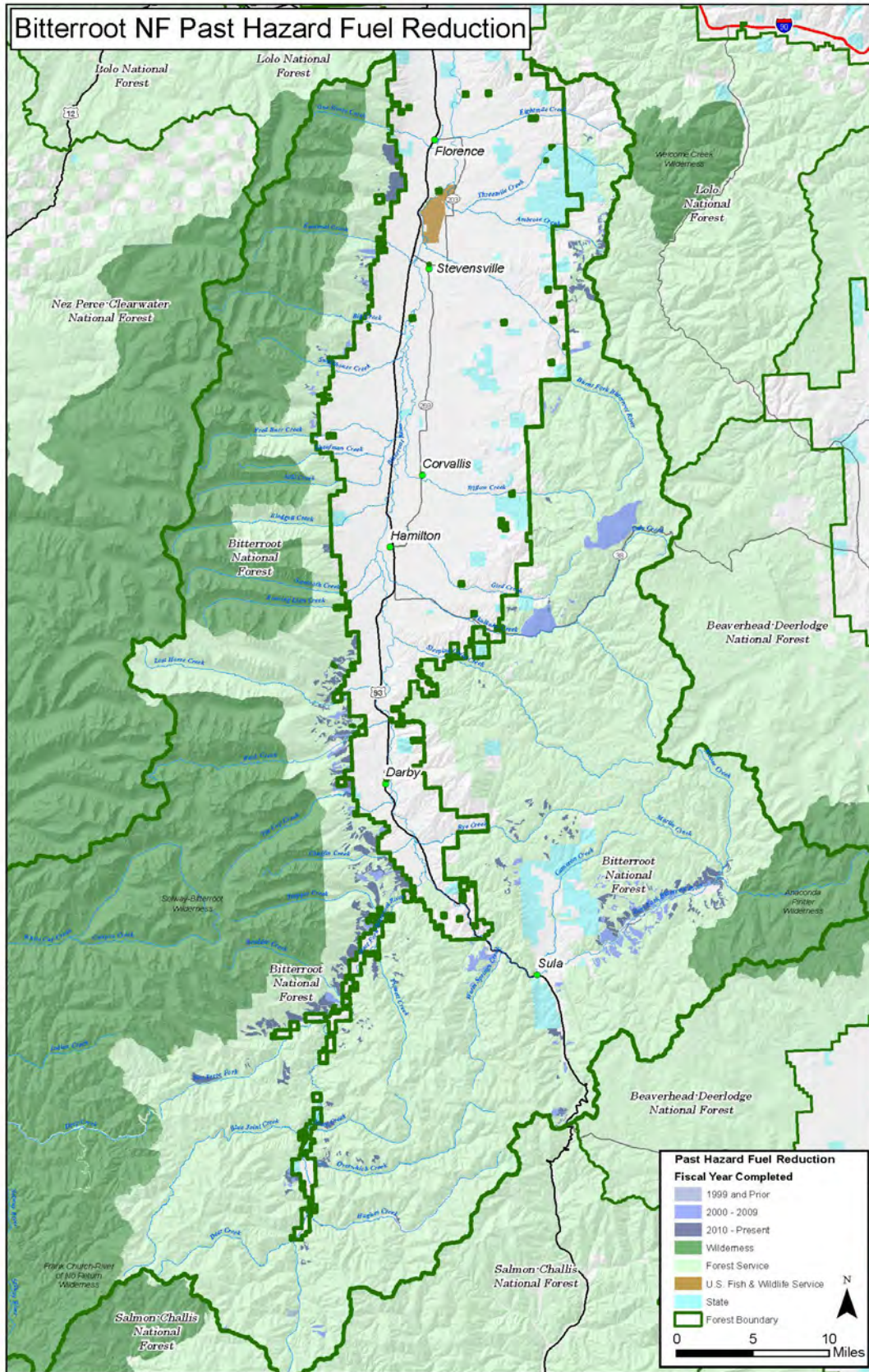


Figure 12: Past Hazard Fuels Reduction Projects

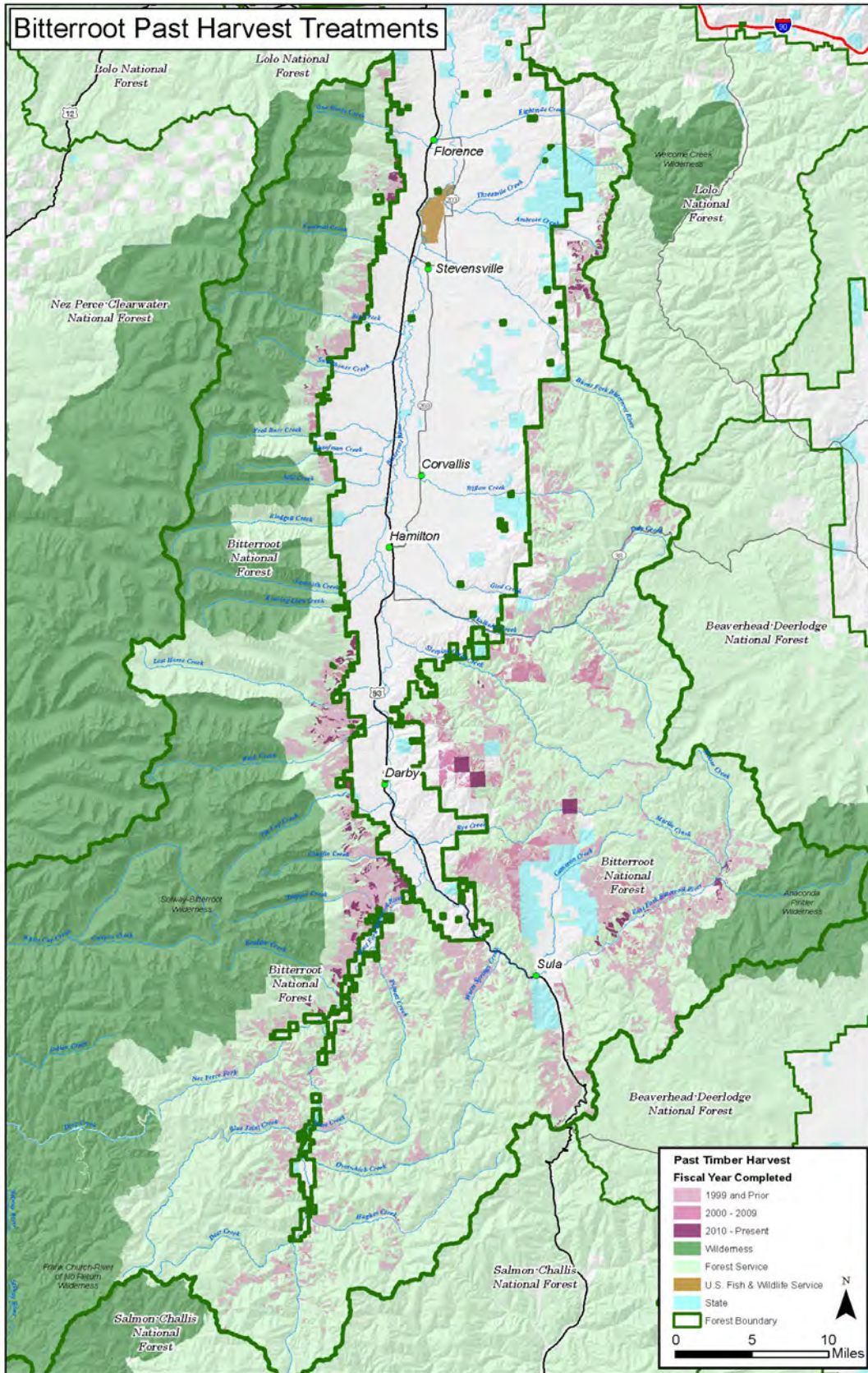


Figure 13: Past Timber Harvest Projects

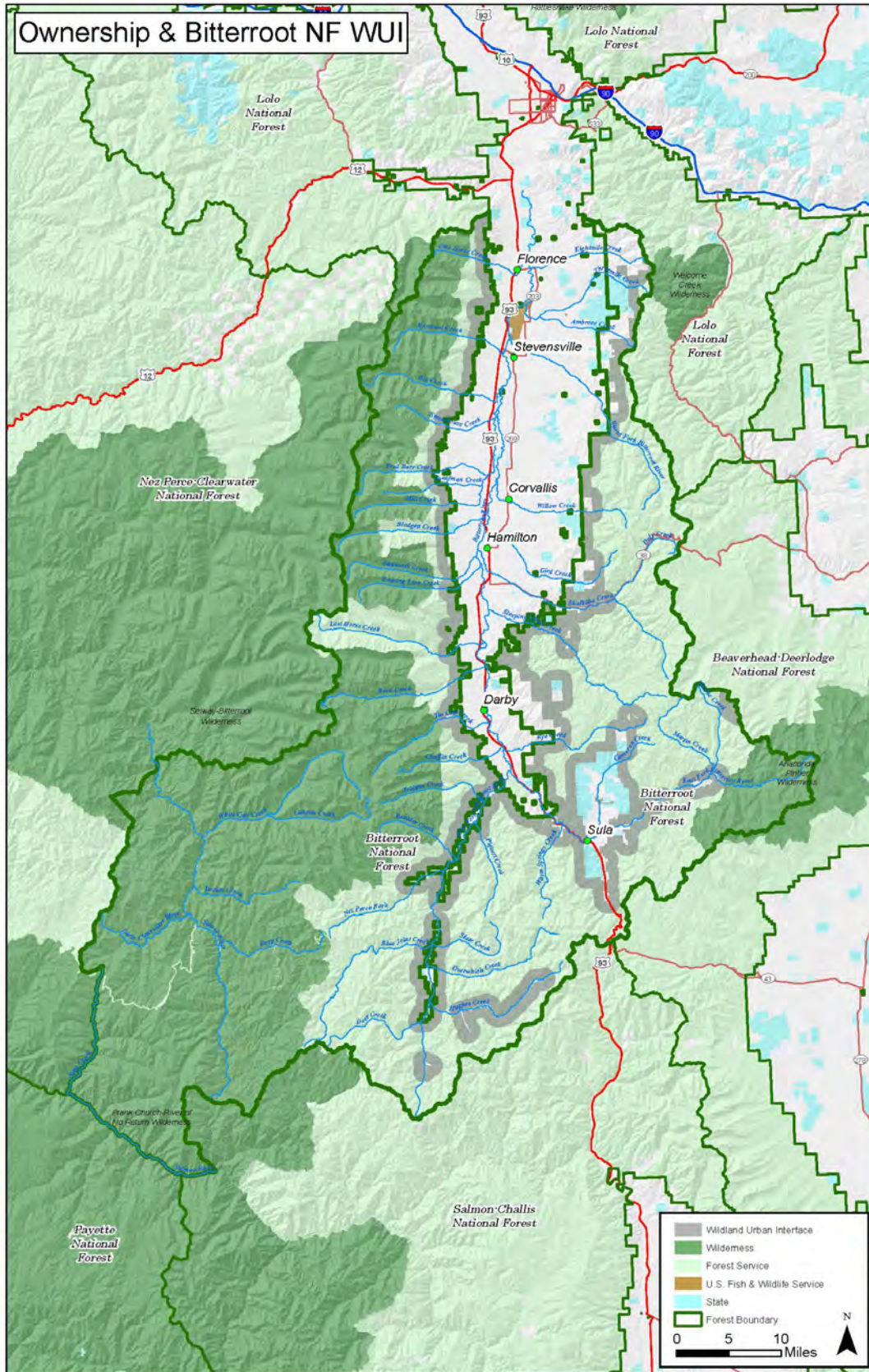


Figure 14: Wildland Urban Interface in Ravalli County

Riparian

Riparian zones play a critical role in our watersheds. From flood control to habitat 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.

Riparian vegetation and wetlands can be extremely effective at buffering streams, rivers, and lakes from nonpoint sources of pollutants. Often, poor water quality is associated with areas of low riparian vegetation cover and low wetland abundance. Many nonpoint sources of pollutants are derived from land use activities that can negatively influence the riparian areas and wetlands. While some sources of nonpoint source pollution can be sub-surface or difficult to observe on the ground, it is possible to use publicly-available imagery to account for varying riparian vegetation cover and certain types of land use activities that may negatively impact riparian vegetation and wetlands.

Montana Department of Environmental Quality recently completed an assessment and evaluation of riparian areas in Bitterroot (MDEQ 2019). Figure 16 and the list below highlights their findings:

Streams with <25% low riparian cover:

- Willow
- Miller
- McClain
- Lick
- Ambrose
- West Fork Lolo
- Granite

Streams with >75% high riparian cover:

- Tin Cup
- Rye Creek Watershed
- Lost Horse
- Kootenai
- Blodgett
- Bear
- Overwhich

Others important notes:

- North Burnt Fork (~40% low riparian cover)
- Most unevaluated reaches are in USFS property, where fine scale source assessment work is routinely done

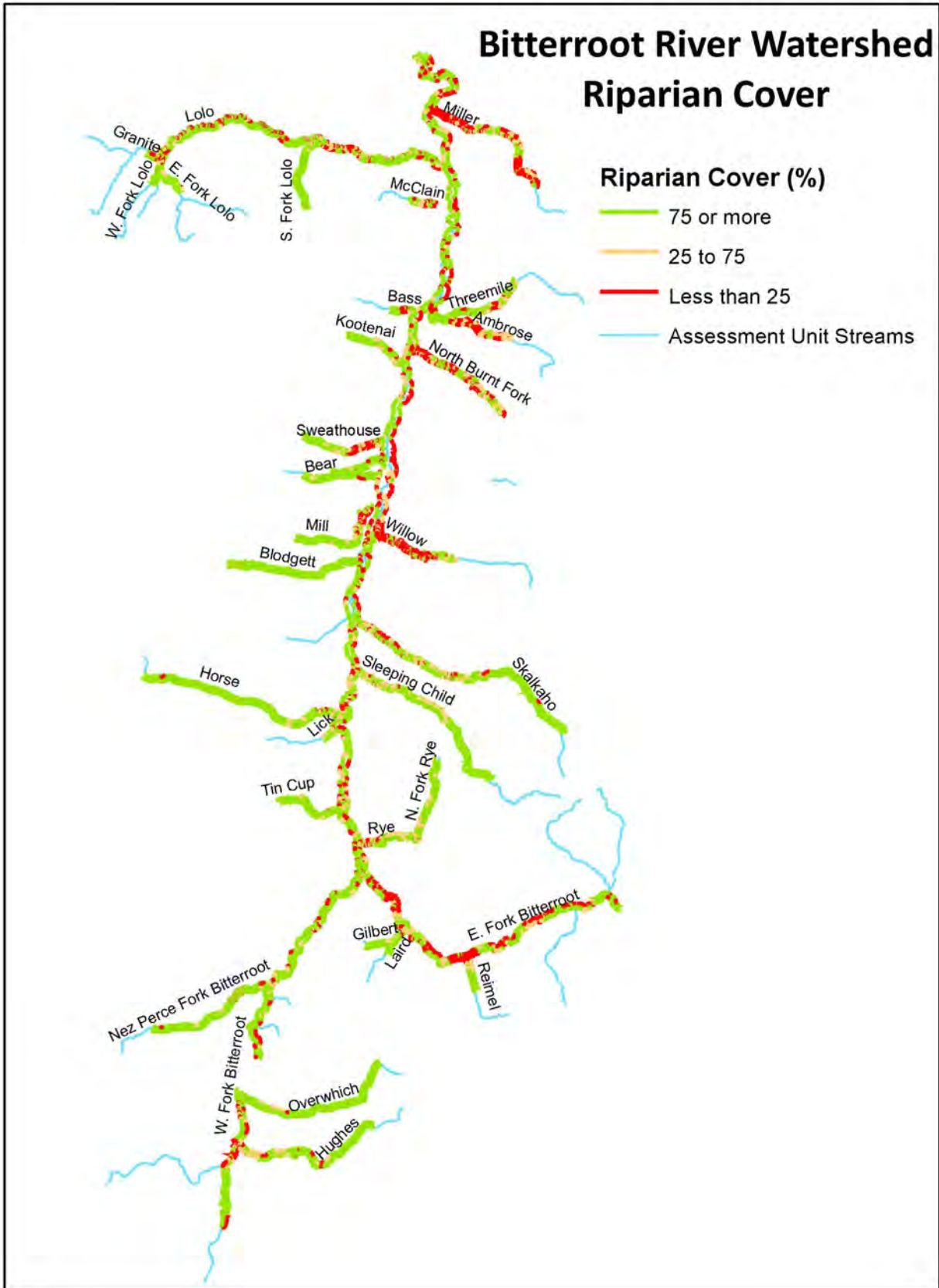


Figure 15: Riparian Cover in Ravalli County

Noxious Weeds

Like many counties in western Montana, Ravalli County has a wide variety of state listed noxious weeds. However, identification and treatment of new and emerging threats should be prioritized. Priority 1 species identified in Ravalli County: knotweed complex, purple loosestrife, rush skeletonweed, and blueweed. There are a number of Priority 2 and 2 species common in Ravalli County. Refer to Appendix B for a list of noxious weeds that occur within Ravalli County. Ravalli County weed management plan calls for integrated weed management strategies and methods including treatment, control, prevention, education, mapping, and chemical control.

State Plant Species of Concern

A total of 87 state listed plant Species of Concern can be found within Ravalli County. They are generally comprised of 7 fern species, 1 conifer, 47 dicot species, 13 monocot species, 12 bryophytes, and 7 lichens. Most of these species subsist in Ravalli’s general habitat types (grasslands, riparian, forests) but a few specialized species can only be found in more limited habitats including rock crevices, alpine, and fens.

Section III. Conservation Activity Analysis

NRCS work in Ravalli County has historically focused on meeting the needs of the RCLWG’s priority. This priority has generally focused on irrigation over the past two decades. A summary of common practices that have been installed in Ravalli County between 2004 and 2018 can be seen in Table 4. Over the past 15 years (2004 thru 2019), the NRCS in Ravalli County has focused heavily on irrigation-related practices. During this time, 59 irrigation projects have been installed. High tunnels have also been a commonly contracted practice with 23 installed during the most recent 15-year period. Other common practices include grazing-related practices such as weed control and fencing. Cover crop and nutrient management have been common practices associated to cropland with 23 and 53 projects completed, respectively. Forest stand improvements have also been a popular conservation practice with 59 completed in the last 15 years. Multiple other practices have been contracted to lesser extents.

Table 4. NRCS Hamilton Field Office EQIP implementation of commonly applied practices from 2004 to 2019.

Practice Name	Unit Type	Applied Amount	Number of Projects
Herbaceous Weed Treatment	Ac	1,667	114
High Tunnel System	SqFt	40,830	23
Cover Crop	Ac	11.7	23
Diversion	Ft	2446	4
Fence	Mi	6.1	22
Fuel Break	Ac	22.4	7
Woody Residue Treatment	Ac	206.2	16
Irrigation Pipeline	Mi	7.5	35
Irrigation System, Microirrigation	Ac	14.1	17
Sprinkler System	Ac	1542.1	42

Practice Name	Unit Type	Applied Amount	Number of Projects
Irrigation Water Management	Ac	949.3	41
Forage and Biomass Planting	Ac	392.3	8
Livestock Pipeline	Ft	3568	9
Prescribed Grazing	Ac	165.8	5
Pumping Plant	No	42	29
Spring Development	No	4	4
Structure for Water Control	No	40	36
Nutrient Management	Ac	288.6	53
Tree/Shrub Establishment	Ac	119.3	19
Watering Facility	No	13	9
Forest Stand Improvement	Ac	766.1	59

Section IV. Natural Resource Issues to be Addressed

Throughout 2019 the Hamilton 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. The RCLWG has been meeting regularly since the implementation of Montana Focused Conservation and discussing resource concerns and focus for future efforts.

Forestry

Forest health and fire risk is a growing concern in the Bitterroot Valley on both private and public lands. The 2016 Roaring Lion fire was a wake-up call to residents in Ravalli County and since that time, there has been increased collaboration between natural resource management agencies to work together and improve the health of the forest on both sides of the fence. Forest site potential is not being realized in most areas due to fire suppression and a lack of management over the last 100 years. Implementation of management practices are needed to improve forest health and resilience to insects, diseases and fire as well as improve wildlife habitat. Forest Stand Improvement practices should be promoted within the Wildland Urban Interface (WUI) within the Bitterroot Valley. Conservation practices would also help address the goals and objectives in the National Cohesive Wildland Fire Management Strategy, Bitterroot Community Wildfire Protection Plan, and the Joint Chief’s Landscape Restoration Partnership.

The most pressing forestry concerns in the county are as follows:

- Reducing stand density within over-stocked stands. Decades of fire exclusion has allowed stem densities of shade-tolerant species to greatly increase. The high number of trees per acre has resulted in competitive stress through competition for growing space, water, nutrients, and sunlight. Tree stress is further exacerbated by moderate to severe western spruce budworm defoliation and Douglas-fir dwarf mistletoe. Competitive stress and poor tree vigor provide opportunities for insects and disease to establish and spread such as Douglas-fir beetle and mountain pine beetle.
- 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. Fire historically played a major role in subduing fir 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 growth forests. These forests have greatly declined in the last 100 or more 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, 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.).
- Fire-wise home and property practices. Like most of the west, Ravalli 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.

Water Quality and Water Quantity

Irrigation is fundamental to agriculture in Ravalli County. Water quality and quantity are often overlapping resource concerns. In Ravalli County, water quality issues are created as a result of irrigation and agricultural-related use. Irrigation runoff is a major concern affecting both the quality of water in rivers, streams and waterbodies as well as the quantity of water available for irrigation. Areas in particular need of improvement include updating water delivery conveyances to gravity pressure where possible, converting from open ditch to pipeline to reduce system losses, improving water measurement abilities, reducing system waste including stemming the significant tailwater return flows and providing alternative stockwater options to reduce off-season delivery through canals solely for livestock water. On-farm improvements are also needed throughout the system. Currently there remains significant wild-flood irrigation on steep slopes which could benefit from flood-to-sprinkler conversion. Improving irrigation efficiency by upgrading irrigation type may also be worthwhile in many cases. Improvements should focus on maximizing efficiency while eliminating off-site movement of water, nutrients and sediments. Working with partners to address multiple resource benefits is a key goal of the Hamilton NRCS Field Office.

Weeds

Weeds are a constant natural resource issue in Ravalli County. Controlling and reducing the spread of noxious weeds is a priority for partners in Ravalli County, however, focus has been put on emerging threats and new invaders. 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 Ravalli County. Native fisheries of bull trout and westslope cutthroat trout have been a primary focus for partners such as the Bitter Root Water Forum and Trout Unlimited. Addressing issues such as forestry and rangeland health, improving riparian areas, and reducing dewatering will result in overall improvement to wildlife habitat.

Soil Health

Soil health remains an area of interest in Ravalli County. Many producers are interested in improving their soil health and increasing the sustainability of their agricultural operations. Farmers have started utilizing cover crops, but adoption is still low. Encouraging more landowners to adopt soil building practices should be prioritized. Producers using cover crops have reduced input costs and created additional forage opportunities. Expanding the use and adoption of cover crops, and other soil health practices could prove beneficial within the county.

Pasture and Range Improvements

Many of the grasslands in Ravalli County, which include pastures (dry and irrigated), rangeland and grassland habitat areas are in poor condition. The conditions are a result of both poor grazing management, weed encroachment and a general lack of species diversity. Targeting improvements related to weed control, species selection and grazing management could provide significant resource benefits. Improving grazing management should be strongly encouraged and when necessary providing infrastructure to facilitate rotational grazing such as fences and stockwater systems.

Riparian Zones:

Riparian vegetation and wetlands can be extremely effective at buffering streams, rivers, and lakes from nonpoint sources of pollutants. Often, poor water quality is associated with areas of low riparian vegetation cover and low wetland abundance. Many nonpoint sources of pollutants are derived from land use activities that can negatively influence the riparian areas and wetlands. While some sources of nonpoint source pollution can be sub-surface or difficult to observe on the ground, it is possible to use publicly-available imagery to account for varying riparian vegetation cover and certain types of land use activities that may negatively impact riparian vegetation and wetlands. Improving and protecting riparian vegetation is a priority, especially along those streams with less than 25 percent of cover (Willow, Miller, McClain, Lick, Ambrose, West Fork Lolo, and Granite). Riparian revegetation plantings and the installation of livestock exclusion fence would be effective practices for improving the condition of these areas.

Conservation Easements

Conservation easements will continue to be encouraged as a tool for landowners within Ravalli County that seek to conserve certain attributes and values associated with their land. The Hamilton NRCS Field Office will continue to work with partners and landowners to assist with the easement process.

Section V. Prioritization of Natural Resource Problems and Desired Outcomes

The RCLWG has been meeting regularly since the introduction of Montana Focused Conservation in order to prioritize resource concerns, identify focus areas, and discuss opportunities for partnerships. The RCLWG represents a commitment and partnership from: BCD, NRCS, USFS, Bitter Root Land Trust, Bitter Root Water Forum, MSU Extension, MTFWP, Teller Wildlife Refuge, DNRC, TU, and the Ravalli County Weed District. The group has 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 Ravalli County. There was much discussion regarding a TIP for forestry in the eastern portion of the county and the group supported this proposal. There was also discussion regarding water quality and quantity within specific drainages in the northeast portion of the county. Ventenata was also identified as a new invader and the group discussed developing a project to control this annual grass. No formal conclusion was drawn with some present suggesting more study was necessary.

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 RCLWG to address water quality and water quantity issues. The goal would be to address non-point water pollution while complementing partner efforts and collaboration. This TIP proposal is still in development.
- **Forest Health:** Ravalli County is 82% forested and supporting healthy forests and fire resiliency is a priority to the RCLWG. Extensive efforts and collaboration have been put forward by partners and the Hamilton NRCS Field Office to develop a forest health TIP that would address forest health concerns along the Sapphire front.
- **Weed Control:** Like most counties in Montana, Ravalli County is plagued by numerous noxious weeds. There is strong support for weed control-related projects. Much discussion at the RCLWG revolved around weed control. More research and planning need to be done on potential projects and partnerships.
- **Riparian Protection and Restoration:** Riparian protection and restoration is a strong priority for the RCLWG. The group is committed to utilizing the recent DEQ evaluation and assessment to collaborate and prioritize riparian restoration within those drainages with less than 25 percent cover. This TIP is in current development.
- **Conservation Easement:** The local Bitter Root Land Trust has submitted a RCPP proposal for ALE easements within Ravalli County. Through planning and collaboration, the RCLWG is committed to developing a TIP to support conservation efforts identified within the RCPP proposal. The TIP would focus on resource concerns identified within cropland.

Section VI. Targeted Implementation Plans

Sapphire Front Forest Health Targeted Implementation Plan

Forest health and fire risk is a growing concern in the Bitterroot Valley on both private and public lands. The 2016 Roaring Lion fire was a wake-up call to residents in Ravalli County and since that time, there has been increased collaboration between natural resource management agencies to work together and improve the health of the forest on both sides of the fence. The Sapphire Front Forest Health Targeted Implementation Plan (SFFH TIP) is a product of those collaborative efforts. The overall goal of the SFFH TIP is to improve forest health and resilience to insects, diseases and fire as well as improve wildlife habitat. The Focus Area was identified and delineated in cooperation with partners with the objective of complementing on-going or planned forest health partner projects along the Sapphire Front. The Focus Area overlaps with the Wildland Urban Interface (WUI) along the eastside of the Bitterroot Valley. Conservation practices would also help address the goals and objectives in the National Cohesive Wildland Fire Management Strategy, Bitterroot Community Wildfire Protection Plan, Joint Chief's

Landscape Restoration Partnership, and the NRCS Long Range Plan for Ravalli County. Partners include Ravalli County Local Work Group (RCLWG), Bitterroot Conservation District (BCD), Bitter Root Resource Conservation and Development (RC&D), Montana State University Extension for Ravalli County (MSU Extension), US Forest Service, the Bitter Root Land Trust (BRLT), Department of Natural Resource and Conservation (DNRC), and the Natural Resources Conservation Service (NRCS).

Wildfires and declining health of forestlands within the Bitterroot Valley are a growing concern amongst citizens of Ravalli County. Most of the Sapphire Front Forest Health Focus Area would have historically experienced frequent, low intensity wildfires characterized by low stem densities of shade-intolerant species such as ponderosa pine. Decades of fire exclusion has allowed stem densities of shade-tolerant species to greatly increase. The high number of trees per acre has resulted in competitive stress through competition for growing space, water, nutrients, and sunlight. Tree stress is further exacerbated by moderate to severe western spruce budworm defoliation and Douglas-fir dwarf mistletoe. Competitive stress and poor tree vigor provide opportunities for insects and disease to establish and spread such as Douglas-fir beetle and mountain pine beetle. This disease and insect caused mortality adds to the fuel load and makes fire suppression activities more difficult. In addition, the prevalence of noxious weeds within some forest stands can limit the growth of desirable understory plants, negatively affecting key wildlife species. Intermediate silvicultural treatments reduces competitive stress and creates forest stands that are more resilient to disturbance, such as root rot, insects or low severity fire. Supportive practices such as weed control and critical area planting can assist and reducing the spread of noxious weeds.

The specific objectives of SFFH TIP are to:

- Increase the knowledge of forest landowners within Ravalli County regarding forest health and how implementation of conservation practices can improve the health and resiliency of their forested land;
- Promote participation in the forest stewardship workshop hosted by MSU Extension on an annual basis;
- Improvement of forest health, resiliency to insects, disease and fire, and over-all productivity:
 - Develop management plans for each program participant with consideration for stand diversity, multiple age class retention, optimal stand densities, and overall health;
 - Through implementation of conservation practices, stem density would be decreased within over-stocked stand and insect and disease issues would be addressed;
 - Through implementation of appropriate supporting practices, resource concerns would be addressed resulting in a reduction in noxious weeds and soil erosion.

References

Bitterroot Chamber of Commerce (BCC). 2019. <http://www.bitterrootchamber.com/>

Kudray, Gregory M. 2008. Wetlands of the Bitterroot: change and ecological functions. Montana Natural Heritage Program, Helena, MT.

Montana Bull Trout Restoration Team. *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin Montana*. June, 2000.

Montana Climate Office. University of Montana. <http://climate.umn.edu/atlas/precipitation/default.php>

Montana Bureau of Mines and Geology (MBMG 2013). 2013. Montana Ground Water Assessment: Groundwater resources of the Lolo-Bitterroot Area. Montana Bureau of Mines and Geology: Butte, MT

Montana Field Guide. <http://fieldguide.mt.gov>

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>

Helena, MT: Montana Department of Environmental Quality.

Montana Department of Environmental Quality (DEQ). 2016. Final Integrated Water Quality Report. Prepared by: Water Quality Planning Bureau: Information management and technical services section.

Montana Department of Environmental Quality, Planning, Prevention and Assistance Division, Water Quality Planning Bureau. 2016. Montana Final 2016 Water Quality Integrated Report – Appendix A. H SNOFLO. 2019. <https://snoflo.org/report/flow/montana/flathead-river-near-polson-mt/>

Montana Department of Environmental Quality. 2019. Riparian Evaluation and Wetland Priorities Results. June 2019.

Montana Department of Natural Resource and Conservation (DNRC). 2014. Clark Fork & Kootenai River Basins: Water Plans 2014. Prepared by: MT DNRC in cooperation with the Clark Fork River Basin Task Force.

Montana Natural Heritage Program (MNHP). 2019. Environmental Summary Report. For Latitude 45.44922 to 46.69039 and longitude -113.57162 to 114.5537. Retrieved on 09/03/2019

Montana State Wildlife Action Plan 2015.

<http://fwp.mt.gov/fishAndWildlife/conservationInAction/swap2015Plan.html>

National Weather Service (NWS). 2019. Climate data. <https://forecast.weather.gov>.

Ravalli County. 2019. Air Quality. <https://ravalli.us>

Ravalli Water Resource Survey (Ravalli WRS). 1958. Ravalli County Montana Water Resource Survey. Published by: State Engineers Office, Helena, MT. June 1958.

Ravalli County Long Range Plan: NRCS

United States Bureau of Census (USBC). 2018. Quick Facts: Ravalli County, Montana. Accessed: November 2019. <https://www.census.gov/quickfacts/ravallcountymontana>

US Census Bureau,

<https://www.census.gov/quickfacts/fact/table/sanderscountymontana,US/PST045218>

United States Department of Agriculture (USDA) -NASS and MT Department of Agriculture. 2018. Montana Agricultural Statistics. Issn: 1095-7278, Vol LV, Oct 2018

USDA NRCS. Bitterroot Valley Soil Survey (Soil Survey Area MT645) was completed from 1947-1951 and published in 1959. This survey was remapped and major revisions were made in the 2000s and released via Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>)

US Dept. of Agriculture, Forest Service. General Technical Report INT-236 Forest Habitat Types of Northern Idaho: A Second Approximation. April 1991

US Dept. of Agriculture, Forest Service. Silvics Guide: Volume1.

Appendices

Appendix A

Montana Natural Heritage Program: Animal Species of Concern Report

<http://mtnhp.org/SpeciesOfConcern/?AorP=a>

This Report Generated on: 2019-09-09 Time:10:14:33

S_Sci_Name	S_Com_Name	G_Rank	S_Rank	S_Rank_Reasons
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	G4	S3	Species is widespread, but uncommon and appears to occur at low densities. Disturbance of cave and mine roosts and the hard closure of occupied mines threaten long-term persistence.
<i>Gulo gulo</i>	Wolverine	G4	S3	
<i>Lasiurus cinereus</i>	Hoary Bat	G3G4	S3	
<i>Myotis lucifugus</i>	Little Brown Myotis	G3	S3	Species is common and widespread, but under significant threat of catastrophic declines due to White-Nose Syndrome, a fungal disease responsible for the collapse of populations of this species in the eastern US.
<i>Myotis thysanodes</i>	Fringed Myotis	G4	S3	Although this species is distributed across much of Montana, recent surveys have found it to be uncommon within range. Species occasionally uses caves to over-winter so threats to persistence from White-Nose Syndrome are a concern, but due to its western distribution the extent of impacts are as yet unknown.
<i>Pekania pennanti</i>	Fisher	G5	S3	
<i>Sorex preblei</i>	Preble's Shrew	G4	S3	Observations of this species are infrequent resulting in limited data to assess threats. Species may only breed once in its brief life, so is more vulnerable than many small mammal species.
<i>Synaptomys borealis</i>	Northern Bog Lemming	G5	S2	Although populations of this species exist across much of western Montana, most appear isolated due to the species-specific habitat requirements and total area occupied is relatively small. Species faces significant threats to persistence from degradation of wetland habitats and isolation of populations that increase risk of local extirpation.
<i>Ursus arctos</i>	Grizzly Bear	G4	S2S3	
<i>Accipiter gentilis</i>	Northern Goshawk	G5	S3	
<i>Aquila chrysaetos</i>	Golden Eagle	G5	S3	
<i>Ardea herodias</i>	Great Blue Heron	G5	S3	Small breeding population size, evidence of recent declines, and declining regeneration of riparian cottonwood

				forests due to altered hydrology and grazing.
<i>Artemisiospiza nevadensis</i>	Sagebrush Sparrow	G5	S3B	
<i>Athene cunicularia</i>	Burrowing Owl	G4	S3B	Species has a negative short-term population trend.
<i>Botaurus lentiginosus</i>	American Bittern	G5	S3B	The American Bittern is dependent on large wetland complexes, which have declined across the species range. Declines in Montana and the species specialized habitat requirements warrant general concern about the persistence of the species.
<i>Catharus fuscescens</i>	Veery	G5	S3B	
<i>Certhia americana</i>	Brown Creeper	G5	S3	
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	G5	S3	Populations in Montana and across North America have experienced rangewide declines, although the causes of these declines are unclear (Bonter and Harvey 2008).
<i>Cypseloides niger</i>	Black Swift	G4	S1B	Species is limited in distribution and requires very specific features for nesting that are rare on the landscape making it vulnerable to extirpation in all or part of its range.
<i>Dolichonyx oryzivorus</i>	Bobolink	G5	S3B	Species has undergone recent large population declines in Montana and a patchwork of declines and increases have been documented in surrounding states and provinces.
<i>Dryocopus pileatus</i>	Pileated Woodpecker	G5	S3	
<i>Falco peregrinus</i>	Peregrine Falcon	G4	S3	
<i>Haemorhous cassinii</i>	Cassin's Finch	G5	S3	Data show recent short-term declines in population for this species
<i>Himantopus mexicanus</i>	Black-necked Stilt	G5	S3B	
<i>Ixoreus naevius</i>	Varied Thrush	G5	S3B	The Varied Thrush has undergone recent population declines in Montana and across the Northern Rockies and where timber harvest, insect outbreak, and fire result in a loss of suitable breeding habitat.
<i>Leucosticte atrata</i>	Black Rosy-Finch	G4	S2	
<i>Melanerpes lewis</i>	Lewis's Woodpecker	G4	S2B	
<i>Nucifraga columbiana</i>	Clark's Nutcracker	G5	S3	
<i>Numenius americanus</i>	Long-billed Curlew	G5	S3B	
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	G5	S3B	
<i>Picoides arcticus</i>	Black-backed Woodpecker	G5	S3	
<i>Psiloscops flammeolus</i>	Flammulated Owl	G4	S3B	

Ravalli County Long Range Plan: NRCS

<i>Spizella breweri</i>	Brewer's Sparrow	G5	S3B	Species faces threats from loss of sagebrush habitats it is dependent on as a result of habitat conversion for agriculture and increased frequency of fire as a result of weed encroachment and drought.
<i>Strix nebulosa</i>	Great Gray Owl	G5	S3	
<i>Troglodytes pacificus</i>	Pacific Wren	G5	S3	
<i>Elgaria coerulea</i>	Northern Alligator Lizard	G5	S3	
<i>Plestiodon skiltonianus</i>	Western Skink	G5	S3	
<i>Anaxyrus boreas</i>	Western Toad	G4	S2	Over the last few decades this species has undergone serious declines in abundance due primarily to infection with Chytrid fungus. While declines in breeding site occupancy appear to have stabilized in the last decade, changes to abundance across the species range within Montana remain unknown. Significant threats to the persistence of this species remain from continued impacts of disease and mortality of adults and young during breeding and local migration.
<i>Plethodon idahoensis</i>	Coeur d'Alene Salamander	G4	S2	
<i>Oncorhynchus clarkii lewisi</i>	Westslope Cutthroat Trout	G5T4	S2	The Westslope Cutthroat trout is currently ranked "S2" in Montana because it is at risk due to very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to extirpation in the state.
<i>Salvelinus confluentus</i>	Bull Trout	G5	S2	
<i>Rhyacophila potteri</i>	A Rhyacophilan Caddisfly	G3	S2	This Rhyacophilan Caddisfly is currently ranked a "S2" Species of Concern in MT and at risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to extirpation in the state. Limited sites with small populations, and the species is difficult to identify without adult specimens.
<i>Isocapnia crinita</i>	Hooked Snowfly	G5	S2	The Hooked Snowfly is currently ranked "S2" in Montana because it was thought to be at risk due to very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to extirpation in the state. But, recent range extensions due to newly reported collections may warrant re-evaluating this SOC rank.
<i>Hemphillia danielsi</i>	Marbled Jumping-slug	G3	S1S2	
<i>Magnipelta mycophaga</i>	Magnum Mantleslug	G3	S2S3	

<i>Margaritifera falcata</i>	Western Pearlshell	G5	S2	The Western Pearlshell is currently ranked a "S2" Species of Concern in MT and is at risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to extirpation in the state. This species is widespread in geographic area, but is declining in terms of area occupied and the number of sites with viable individuals; populations showing repeated reproduction (at least several age classes) are now the exception rather than the rule. Montana currently has only 14 "excellent" viable populations out of ~200 known locations (Stagliano 2010). Short term trends show populations declining by ~20% over the last decade (Stagliano 2015).
<i>Polygyrella polygyrella</i>	Humped Coin	G3	S1S2	
<i>Pristiloma idahoense</i>	Thinlip Tightcoil	G3	S1S3	
<i>Prophysaon humile</i>	Smoky Taildropper	G3	S2S3	
<i>Udosarx lyrata</i>	Lyre Mantleslug	G3	S1	
<i>Zacoleus idahoensis</i>	Sheathed Slug	G3G4	S2S3	
<i>Stygobromus montanensis</i>	A Subterranean Amphipod	G1G2	S1S2	This Subterranean Amphipod is currently listed as "S1S2" in MT due to extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state. These subterranean amphipods are generally endemic to a few locations.
<i>Stygobromus obscurus</i>	A Subterranean Amphipod	G1G2	S1S2	This Subterranean Amphipod is currently listed as "S1S2" in MT due to extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state. These subterranean amphipods are generally endemic to a few locations.
<i>Stygobromus tritus</i>	A Subterranean Amphipod	G1G2	S1S2	This Subterranean Amphipod is currently listed as "S1S2" in MT due to extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state. These subterranean amphipods are generally endemic to a few locations.

Montana Natural Heritage Program: Plant Species of Concern Report

<http://mtnhp.org/SpeciesOfConcern/?AorP=p>
 This Report Generated on: 2019-09-09 Time:10:26:59

S_Sci_Name	S_Com_Name	G_Rank	S_Rank	S_Rank_Reasons
<i>Botrychium sp.</i> (SOC)	Moonworts (SOC)	G1G3	S1S3	This is a general record for Botrychium species tracked by MTNHP. MTNHP tracks and maintains observation data for all Botrychium species in the state excluding <i>B. multifidum</i> and <i>B. virginianum</i> which are fairly common and readily identifiable from all other Botrychiums. Global and State Ranks for this record are placeholders only to allow Botrychium SOC to appear in searches using global and state ranks. For information pertinent to specific Botrychium species, please see the individual species' accounts.
<i>Cryptogramma cascadiensis</i>	Cascade Rockbrake	G5	S3	<i>Cryptogramma cascadiensis</i> is known from 11 locations in western Montana, of which 2 locations are poorly defined and considered historical, 5 locations occur in Wilderness areas, and the remaining 4 locations occur on U.S. Forest Service lands. Although the fern is thought to be undercollected and could be more common, current population and location data is needed to remove this plant from the Species of Concern list.
<i>Dryopteris cristata</i>	Crested Shieldfern	G5	S3	Rare to uncommon in Montana where it is known from scattered occurrences across the western portion of the state. Most documented occurrences are on National Forest lands, though State Trust Lands and private lands also host significant populations.
<i>Equisetum palustre</i>	Marsh Horsetail	G5	S3	<i>Equisetum palustre</i> is known from a small number of sites in seven counties of western Montana.

Ravalli County Long Range Plan: NRCS

<i>Equisetum pratense</i>	Meadow Horsetail	G5	S2	<i>Equisetum pratense</i> has accurately been identified to occur in a few places within three counties of Montana. This species can be easily mis-identified. Specimens deposited in herbaria outside of Montana will need to be examined before it can be demonstrated that this plant is more widely distributed.
<i>Isoetes echinospora</i>	Spiny-spore Quillwort	G5	S3	<i>Isoetes echinospora</i> is known from 8 occurrences scattered in western Montana. At one occurrence, the species has been observed in 1940, 1967, and 1998 indicating persistence. However, current survey work is needed to document locations, population sizes, and threats.
<i>Polystichum scopulinum</i>	Mountain Swordfern	G4	S1S2	Only two known locations from western Montana. Very little data are available for the known occurrences. Additional surveys are needed.
<i>Pinus albicaulis</i>	Whitebark Pine	G3?	S3	Whitebark pine is a common component of subalpine forests and a dominant species of treeline and krummholtz habitats. It occurs in almost all major mountain ranges of western and central Montana. Populations of whitebark pine in Montana and across most of western North America have been severely impacted by past mountain pine beetle outbreaks and by the introduced pathogen, white pine blister rust. The results of which have been major declines in whitebark pine populations across large areas of its range. Additionally, negative impacts associated with encroachment and increased competition from other trees, primarily subalpine fir have occurred as a result of fire suppression in subalpine habitats.

Ravalli County Long Range Plan: NRCS

<i>Ageratina occidentalis</i>	Western Joepyeweed	G4	S2	This peripheral species in Montana is known from a handful of small to large populations in the extreme western part of the state. Minor impacts associated with a rock quarry at one location and rock climbing at another site are possible. Otherwise, few threats have been documented for the species in Montana.
<i>Antennaria densifolia</i>	Dense-leaved Pussytoes	G4G5	S1	Known from one high elevation site in the Anaconda-Pintler Wilderness on the border of Deerlodge and Granite counties. The single occurrence is in a designated wilderness, which should protect it from most human-caused disturbance. However, it is susceptible to trail-building and maintenance activities.
<i>Arctostaphylos patula</i>	Greenleaf Manzanita	G4	S1	Known from two or three separate locations in Montana. Population sizes are very small and are susceptible to the negative effects associated with such. Additional negative impacts from timber harvesting, invasive weeds and development are possible. Primarily a species of the Great Basin and California, and disjunct in Montana. Not known from either Idaho or Wyoming.
<i>Artemisia tilesii</i>	Tilesius Wormwood	G5	S3	<i>Artemisia tilesii</i> is known from seven locations located at higher elevations in western Montana. This species can be difficult to separate from <i>Artemisia ludoviciana</i> and <i>A. michauxiana</i> . Survey work to identify occurrences, determine population sizes, and assess threats is greatly needed before re-evaluating its status.
<i>Athysanus pusillus</i>	Sandweed	G4	S1S2	Known in Montana from a limited area of the Bitterroot Mountains. Only three occurrences have a large number of individuals and several occurrences have populations of spotted knapweed and/or cheatgrass established. Invasive weeds may threaten the long-term viability of the species in Montana.

Ravalli County Long Range Plan: NRCS

<i>Boecheera fecunda</i>	Sapphire Rockcress	G2	S2	Sapphire rockcress is a state endemic known from several locations in southwest Montana where it is restricted to specific and localized habitats. Encroachment of spotted knapweed threatens several populations, particularly in Ravalli County. It is unclear whether grazing has significant negative impacts
<i>Castilleja covilleana</i>	Coville Indian Paintbrush	G3G4	S3	This species is known in Montana, primarily from the West Fork of the Bitterroot River on the Bitterroot National Forest. 5 occurrences are known from historical collections or have unknown status. A few occurrences contain minor amounts of spotted knapweed and others occur in habitats that are susceptible to invasion by knapweed and other invasive species. Timber harvest activities may also pose a threat to some populations.
<i>Centunculus minimus</i>	Chaffweed	G5	S2	Known from scattered locations across the state, though it is rare to uncommon in Montana. May be susceptible to some adverse impacts from human-caused disturbance due to its preference for vernal moist habitats in valley locations.
<i>Clarkia rhomboidea</i>	Diamond Clarkia	G5	S3	Rare in Montana, where it is known from only a small portion of the northwest corner of the state, primarily along the lower Clark Fork River drainage. Some detrimental impacts from invasive weeds and subsequent herbicide treatments are possible as are loss of habitat due to fire suppression.
<i>Collomia debilis var. camporum</i>	Alpine Collomia	G5T2	S1S2	Only known from a few sites in western Montana and Lemhi County, Idaho, from low elevation scree, talus or rocky slopes. Negative impacts from human disturbance and weed invasion are possible. Current status of most of the documented locations is not known. Survey and monitoring data are needed.

Ravalli County Long Range Plan: NRCS

<i>Draba daviesiae</i>	Bitterroot Draba	G3	S3	A Montana endemic, known from several occurrences in alpine areas of the Bitterroot Mountains. Overall abundance and distribution are still poorly known though the high elevation habitat would likely limit most potential impacts.
<i>Draba densifolia</i>	Dense-leaf Draba	G5	S2	<i>Draba densifolia</i> is distributed in the western half of the state in four moderate to large populations, six small occurrences and nine historical or poorly documented occurrences. Occupied habitats are at moderate to high elevation which help to minimize disturbance to some of the populations. However, livestock grazing, invasive weeds and off-road ATV use impact some populations.
<i>Drosera anglica</i>	English Sundew	G5	S3	Known from over two dozen populations in the state, most of these are moderate to large-sized, healthy populations. Most occurrences are on federally managed lands with several of these in designated wilderness areas, research natural areas or Glacier National Park which help to protect the occurrences from many potential threats. However, one population is vulnerable to ski area expansion and activity, and the species may be negatively impacted by fire as observations at one location appear to indicate. Plants are also sensitive to and negatively impacted by trampling of peat mats on which the species grow.
<i>Erigeron asperugineus</i>	Idaho Fleabane	G4	S2	Idaho fleabane is a regional endemic that has been documented from a few locations in Montana. It grows in alpine habitats, which tend to be relatively isolated from anthropogenic disturbance. Updated population data are needed for most occurrences and it is likely that a few additional occurrences will be documented.

Ravalli County Long Range Plan: NRCS

<i>Erigeron evermannii</i>	Evermann Fleabane	G4	S2?	Rare in Montana, where it is currently known from two alpine peaks in the Bitterroot Mountains. Available data are based on specimen collections from the 1960's and 1970's, though there is no reason to believe that these populations no longer exist or that they have been negatively impacted. More current data are needed.
<i>Erigeron linearis</i>	Linear-leaf Fleabane	G5	S2	<i>Erigeron linearis</i> is a peripheral species known from a few small and moderate-sized, localized occurrences. Almost all populations are on federally-managed lands or lands under conservation easement. However, development on adjacent lands may fragment some areas of suitable habitat. Two historical locations are also known. The occupied habitats and population are susceptible to negative impacts from invasive weeds.
<i>Eriogonum crosbyae</i>	Crosby's Buckwheat	G4	S3	Rare to Uncommon. This entity is restricted to high elevation sites in the Bitterroot Range and in the Anaconda-Pintlers, where it may be locally common in some areas. Good population data are lacking for most occurrences, though it's long-term viability does not appear to be a major concern at this time due, in part, to the remoteness of its habitat.
<i>Glossopetalon spinescens</i>	Spiny Greasebush	G5	S1	A peripheral species in Montana where it is only known from one small occurrence on the Bitterroot National Forest. Population is vulnerable to human impacts as it occurs adjacent to a road.

Ravalli County Long Range Plan: NRCS

<i>Heterocodon rariflorum</i>	Western Pearl-flower	G5	S2	Over a dozen known occurrences, including a half-dozen moderate to large-sized populations, a few small populations and several occurrences that need further survey work to document population sizes. Most populations are on National Forest lands. Invasive weeds infest several populations and are likely infest others. Hiking and ORV trails occur though or adjacent to a few populations and associated use may impact <i>H. rariflorum</i> plants.
<i>Idaho scapigera</i>	Scalepod	G5	S1S2	Rare and peripheral in Montana. Currently known from approximately a half-dozen sites in western Montana, mostly along the lower slopes of the Bitterroot Mountains. Populations are highly susceptible to negative impacts from invasive weeds, primarily spotted knapweed and cheatgrass. Data on population trends are lacking, though levels likely fluctuate widely from year to year.
<i>Impatiens aurella</i>	Pale-yellow Jewelweed	G4	S3	<i>Impatiens aurella</i> is known from about 20 locations documented from 1886 to 2016. It is considered uncommon in Lake and Flathead Counties, where the majority of observations have been found, and rare in other counties of western Montana. It grows in wet, often organic soil in both disturbed and undisturbed wetlands, and rarely appears abundant. However, it may require or persist better with some hydrological disturbance. Revisits to known locations and more surveys are needed to better document locations, population sizes, and threats.

Ravalli County Long Range Plan: NRCS

<i>Ipomopsis minutiflora</i>	Small-flower Ipomopsis	G4	S1S2	Rare and peripheral in Montana. Currently documented in the state from one collection from the Bitterroot Valley. Very little is known about this species in the state. Additional surveys are needed. Species may be overlooked/undercollected or perhaps the Montana occurrence could be the result of a more recent and isolated establishment event.
<i>Lewisia columbiana</i>	Columbia Lewisia	G4G5	S1S2	Rare and peripheral in Montana, where it is known from only one location in the Bitterroot Mountains. Its relatively inaccessible habitat reduces the potential for negative impacts.
<i>Ligusticum verticillatum</i>	Idaho Lovage	G4G5	S3	<i>Ligusticum verticillatum</i> occurs in northern Idaho, western Montana, and British Columbia. It has been found in Lincoln and Ravalli Counties, growing in moist forests and meadows of spruce-fir habitats, becoming common in Idaho. Herbarium specimens from Missoula and Granite Counties may be mis-identified. Current data on locations, population sizes, and threats is greatly needed.
<i>Lomatogonium rotatum</i>	Marsh Felwort	G5	S1S2	Only two known occurrences in Montana on BLM and private lands, including one moderate-sized population. Livestock grazing occurs in the occupied habitat, though it is unclear what effect it may have on <i>L. rotatum</i> . Changes in the hydrology, particularly lowering of the water table may adversely affect populations.
<i>Micranthes tempestiva</i>	Storm Saxifrage	G2G3	S2S3	State endemic known from approximately a dozen extant sites in southwest Montana. The high elevation habitat of the species in conjunction with approximately half of the populations in designated wilderness areas minimize the potential for negative impacts to the species.
<i>Mimulus ampliatus</i>	Stalk-leaved Monkeyflower	G3	S3	See rank details.
<i>Mimulus floribundus</i>	Floriferous Monkeyflower	G5	SH	

Ravalli County Long Range Plan: NRCS

<i>Mimulus nanus</i>	Dwarf Purple Monkeyflower	G5	S2S3	<i>Mimulus nanus</i> is only known from a few extent occurrences in the state, plus two historical collections. Populations are generally small and in habitats susceptible to weed invasion. At least a few of the occurrences contain scattered spotted knapweed plants.
<i>Mimulus primuloides</i>	Primrose Monkeyflower	G4	S3	Known from several watersheds in southwest Montana, occurring almost entirely on National Forest lands. Eight of the occurrences are moderate to large-sized populations. Two historical locations are also known. Fire may adversely impact <i>M. primuloides</i> though more study is needed. It is also vulnerable to changes in hydrology and one population could be adversely affected by activity at an adjacent ski area.
<i>Pedicularis contorta</i> <i>var. ctenophora</i>	Pink Coil-beaked Lousewort	G5T3	S2S3	Restricted to extreme southwestern Montana where it is documented from a few populations. Limited data is available for the species and it may be more common than the few collections indicate.
<i>Pedicularis contorta</i> <i>var. rubicunda</i>	Selway Coil- beaked Lousewort	G5T3	S2S3	Restricted in Montana to the Bitterroot Mountains where it is documented from several occurrences. Limited data are available for the species and it may be more common than the few collections indicate.
<i>Penstemon flavescens</i>	Yellow Beardtongue	G3	S3	Restricted in Montana to the Bitterroot Range primarily in Ravalli County but also documented from Mineral County. The species can be relatively common or widely scattered in areas of suitable habitat, though detailed information on the abundance of the species is lacking. More detailed information documenting the abundance, distribution and any potential threats is needed.
<i>Penstemon humilis</i>	Low Beardtongue	G5	S1S3	Known in Montana from 1 collection from Beaverhead County

Penstemon lemhiensis Lemhi Beardtongue G3 S3

Penstemon lemhiensis is a regional endemic that occurs only in southwest Montana and adjacent Idaho. There are numerous occurrences in Beaverhead and Ravalli Counties with a few additional occurrences located in Deer Lodge and Silver Bow Counties in Montana, but most are small to moderate in size. The number of plants in Montana is estimated at approximately 10,000 individual plants based on recent survey efforts. Plants occur on a mix of federal, state and private ownerships with National Forest lands supporting the majority of the occurrences. The species is primarily sensitive to negative impacts associated with drought conditions and fire suppression, both of which are believed to have played a significant role in the species' decline. Additional impacts to populations are occurring from noxious weed invasion, primarily spotted knapweed in the Bitterroot region. Heavy livestock grazing also negatively impacts the species. Several occurrences are found adjacent to roadsides and thus may be impacted by activities associated with road construction, maintenance and use.



United States Department of the Interior Fish and Wildlife Service

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



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

December 12, 2019

C = Candidate

LT = Listed Threatened

LE = Listed Endangered

P = Proposed

PCH = Proposed Critical Habitat

CH = Designated Critical Habitat

XN = Experimental non-essential population

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

County/Scientific Name	Common Name	Status
BEAVERHEAD		
<i>Spiranthes diluvialis</i>	Ute Ladies' Tresses	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
BIG HORN		
<i>Mustela nigripes</i>	Black-footed Ferret	LE
BLAINE		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Mustela nigripes</i>	Black-footed Ferret	LE
<i>Charadrius melodus</i>	Piping Plover	LT
BROADWATER		
<i>Spiranthes diluvialis</i>	Ute Ladies' Tresses	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
CARBON		
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Zapada glacier</i>	Western Glacier Stonefly	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C

Ravalli County Long Range Plan: NRCS

County/Scientific Name	Common Name	Status
CARTER		
<i>Grus Americana</i>	Whooping Crane	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
CASCADE		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
CHOUTEAU		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
CUSTER		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
DANIELS		
<i>Grus Americana</i>	Whooping Crane	LE
DAWSON		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
DEER LODGE		
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
FALLON		
<i>Grus Americana</i>	Whooping Crane	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
<i>Charadrius melodus</i>	Piping Plover	LT
FERGUS		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C

Ravalli County Long Range Plan: NRCS

County/Scientific Name	Common Name	Status
FLATHEAD		
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Silene spaldingii</i>	Spalding's Campion	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Coccyzus americanus</i>	Yellow-billed cuckoo (western pop.)	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Lednia tumana</i>	Meltwater Lednian Stonefly	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C
GALLATIN		
<i>Spiranthes diluvialis</i>	Ute Ladies' Tresses	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
GARFIELD		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
GLACIER		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Lednia tumana</i>	Meltwater Lednian Stonefly	LT
<i>Zapada glacier</i>	Western Glacier Stonefly	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C
GOLDEN VALLEY		
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C
GRANITE		
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
HILL		
JEFFERSON		
<i>Spiranthes diluvialis</i>	Ute Ladies' Tresses	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
JUDITH BASIN		
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C

Ravalli County Long Range Plan: NRCS

County/Scientific Name	Common Name	Status
LAKE		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Howellia aquatilis</i>	Water Howellia	LT
<i>Silene spaldingii</i>	Spalding's Champion	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Coccyzus americanus</i>	Yellow-billed cuckoo (western pop.)	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Lednia tumana</i>	Meltwater Lednian Stonefly	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C
LEWIS AND CLARK		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
LIBERTY		
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C
LINCOLN		
<i>Acipenser transmontanus</i>	White Sturgeon (Kootenai River Pop.)	LE
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Silene spaldingii</i>	Spalding's Champion	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
MADISON		
<i>Spiranthes diluvialis</i>	Ute Ladies' Tresses	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
McCONE		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Charadrius melodus</i>	Piping Plover	LT, CH
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
MEAGHER		
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
MINERAL		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C

Ravalli County Long Range Plan: NRCS

County/Scientific Name	Common Name	Status
MISSOULA		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Howellia aquatilis</i>	Water Howellia	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Coccyzus americanus</i>	Yellow-billed cuckoo (western pop.)	LT
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
MUSSELSHELL		
PARK		
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
PETROLEUM		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Calidris canutus rufa</i>	Red Knot	LT
PHILLIPS		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Charadrius melodus</i>	Piping Plover	LT, CH
<i>Mustela nigripes</i>	Black-footed Ferret	LE, XN
<i>Grus Americana</i>	Whooping Crane	LE
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Calidris canutus rufa</i>	Red Knot	LT
PONDERA		
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
POWDER RIVER		
<i>Grus Americana</i>	Whooping Crane	LE
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
POWELL		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
PRAIRIE		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
<i>Charadrius melodus</i>	Piping Plover	LT

County/Scientific Name	Common Name	Status
RAVALLI		
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Coccyzus americanus</i>	Yellow-billed cuckoo (western pop.)	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
RICHLAND		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
ROOSEVELT		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Charadrius melodus</i>	Piping Plover	LT, CH
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
ROSEBUD		
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Grus Americana</i>	Whooping Crane	LE
SANDERS		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Salvelinus confluentus</i>	Bull Trout	LT, CH
<i>Silene spaldingii</i>	Spalding's Campion	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
SHERIDAN		
<i>Charadrius melodus</i>	Piping Plover	LT, CH
<i>Grus Americana</i>	Whooping Crane	LE
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Calidris canutus rufa</i>	Red Knot	LT
SILVER BOW		
<i>Salvelinus confluentus</i>	Bull Trout	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
STILLWATER		
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C

County/Scientific Name	Common Name	Status
SWEET GRASS		
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
TETON		
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Lynx canadensis</i>	Canada Lynx	LT, CH
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Charadrius melodus</i>	Piping Plover	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
TOOLE		
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Pinus albicaulis</i>	Whitebark Pine	C
TREASURE		
<i>No listing at this time</i>		
VALLEY		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Charadrius melodus</i>	Piping Plover	LT, CH
<i>Calidris canutus rufa</i>	Red Knot	LT
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
WHEATLAND		
<i>Lynx canadensis</i>	Canada Lynx	LT
<i>Ursus arctos horribilis</i>	Grizzly Bear	LT
<i>Gulo gulo luscus</i>	Wolverine	P
<i>Pinus albicaulis</i>	Whitebark Pine	C
WIBAUX		
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	LE
<i>Sterna antillarum athalassos</i>	Interior Least Tern	LE
<i>Grus Americana</i>	Whooping Crane	LE
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT
<i>Charadrius melodus</i>	Piping Plover	LT
YELLOWSTONE		
<i>Grus Americana</i>	Whooping Crane	LE
<i>Calidris canutus rufa</i>	Red Knot	LT

Appendix C

Montana Noxious Weed List

Effective: February 2017

Highlighted = Present in Ravalli County

Underlined is High Priority

PRIORITY 1A These weeds are not present or have a very limited presence in Montana. Management criteria will require eradication if detected, education, and prevention:

- (a) Yellow starthistle (*Centaurea solstitialis*)
- (b) Dyer's woad (*Isatis tinctoria*)
- (c) Common reed (*Phragmites australis ssp. australis*)
- (d) Medusahead (*Taeniatherum caput-medusae*)

PRIORITY 1B These weeds have limited presence in Montana.

Management criteria will require eradication or containment and education:

- (a) **Knotweed complex** (*Polygonum cuspidatum*, *P. sachalinense*, *P. x bohemicum*, *Fallopia japonica*, *F. sachalinensis*, *F. x bohémica*, *Reynoutria japonica*, *R. sachalinensis*, and *R. x bohémica*)
- (b) **Purple loosestrife** (*Lythrum salicaria*)
- (c) **Rush skeletonweed** (*Chondrilla juncea*)
- (d) Scotch broom (*Cytisus scoparius*)
- (e) **Bluweed** (*Echium vulgare*)

PRIORITY 2A These weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts:

- (a) Tansy ragwort (*Senecio jacobaea*, *Jacobaea vulgaris*)
- (b) Meadow hawkweed complex (*Hieracium caespitosum*, *H. praealtum*, *H. floridundum*, and *Pilosella caespitosa*)
- (c) **Orange hawkweed** (*Hieracium aurantiacum*, *Pilosella aurantiaca*)

- (d) Tall buttercup (*Ranunculus acris*)
- (e) Perennial pepperweed (*Lepidium latifolium*)
- (f) Yellowflag iris (*Iris pseudacorus*)
- (g) Eurasian watermilfoil (*Myriophyllum spicatum*, *Myriophyllum spicatum* x *Myriophyllum sibiricum*)
- (h) Flowering rush (*Butomus umbellatus*)
- (i) Common buckthorn (*Rhamnus cathartica* L.)

PRIORITY 2B These weeds are abundant in Montana and widespread in many counties. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts:

- (a) Canada thistle (*Cirsium arvense*)
- (b) Field bindweed (*Convolvulus arvensis*)
- (c) Leafy spurge (*Euphorbia esula*)
- (d) Whitetop (*Cardaria draba*, *Lepidium draba*)
- (e) Russian knapweed (*Acroptilon repens*, *Rhaponticum repens*)
- (f) Spotted knapweed (*Centaurea stoebe*, *C. maculosa*)
- (g) Diffuse knapweed (*Centaurea diffusa*)
- (h) Dalmatian toadflax (*Linaria dalmatica*)
- (i) St. Johnswort (*Hypericum perforatum*)
- (j) Sulfur cinquefoil (*Potentilla recta*)
- (k) Common tansy (*Tanacetum vulgare*)
- (l) Oxeye daisy (*Leucanthemum vulgare*)
- (m) Houndstongue (*Cynoglossum officinale*)
- (n) Yellow toadflax (*Linaria vulgaris*)
- (o) Saltcedar (*Tamarix* spp.)
- (p) Curlyleaf pondweed (*Potamogeton crispus*)
- (q) Hoary alyssum (*Berteroa incana*)

PRIORITY 3 Regulated Plants: (NOT MONTANA LISTED NOXIOUS WEEDS)

These regulated plants have the potential to have significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. The state recommends research, education and prevention to minimize the spread of the regulated plant.

- (a) Cheatgrass (*Bromus tectorum*)
- (b) Hydrilla (*Hydrilla verticillata*)
- (c) Russian olive (*Elaeagnus angustifolia*)
- (d) Brazilian waterweed (*Egeria densa*)
- (e) Parrot feather watermilfoil (*Myriophyllum aquaticum* or *M. brasiliense*)

County Listed Regulated Plants: (NOT MONTANA LISTED NOXIOUS WEEDS)

These county listed weeds have the potential to have significant negative impacts and are present in Ravalli County. Management criteria will require eradication or containment and education:

- (a.) Common Bugloss (*Anchusa officianals*)
- (b.) Field Scabious (*Knautia arvensis*)
- (c.) Black Henbane (*Hyoscyamus niger*)
- (d.) Common Teasel (*Dipsacus fullionum*)
- (e.) Kochia (*Bassia scoparia*) – Raodside only
- (f.) Baby's Breath (*Gypsopila paniculate*)