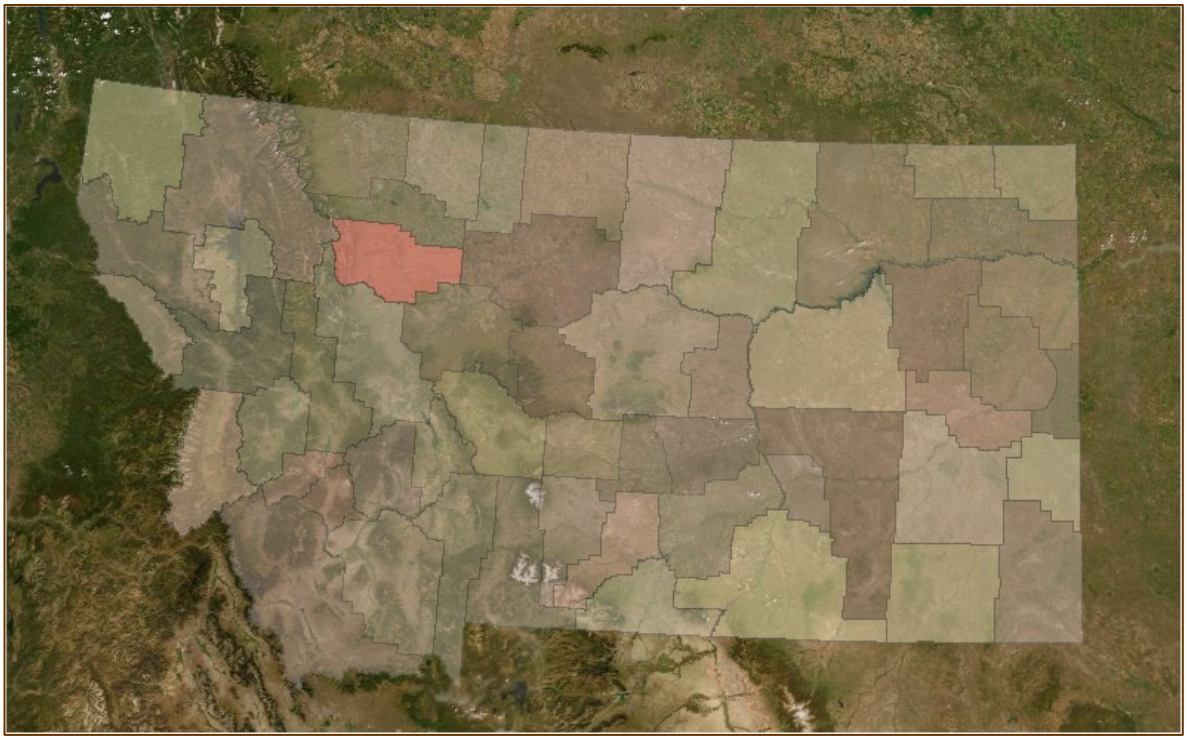


TETON COUNTY LONG-RANGE PLAN

USDA NRCS CHOTEAU FIELD OFFICE

Contents

SECTION I INTRODUCTION

Vision

Working effectively with producers in Teton County to address natural resource concerns while improving economic returns.

Mission

Work with partners and stakeholders in Teton County to positively impact natural resources.

Purpose

The Teton County Long Range Plan is a working document incorporating natural resource data, economic and agricultural trends, and resource concerns from local partners.

The goal of the Long-Range Plan is to review natural resource concerns in Teton County and surrounding areas. This document will be reviewed annually and updated as required. The Long-Range Plan will highlight high priority resource concerns and direct future planning of Targeted Implementation Plans.

The Teton County Long Range Plan was developed by the NRCS Choteau Field office with help from the Teton Conservation District. Multiple partners were consulted during the completion of this plan. Information from four community outreach meetings have been referenced and incorporated into this document. A full listing of resources can be found in References.

Partners in Natural Resources

- Teton Conservation District (TCD)
- Natural Resources Conservation Service (NRCS)
- Teton County Weed Roundtable
- Greenfields Irrigation District (GID)
- MillerCoors Brewing Company
- Pheasants Forever (PF)
- Teton County Commissioners
- U.S. Fish and Wildlife Service (USFWS)
- Sun River Watershed Group (SRWG)

Time Frame

This Long-Range Plan addresses historical and current issues for Teton County. The expected life of this version of the plan is five years. The document will be reviewed and updated yearly to ensure landowner concerns can be addressed in a timely manner.

SECTION II NATURAL RESOURCE INVENTORY

Consider the treasures, the character, the richness and the complexities of Teton County, Montana. It is located along the eastern front of the Rocky Mountains with the Lewis and Clark National Forest and majestic mountain peaks comprising the western most portion of the County. The forested habitat, home to grizzly bears and mountain goats, gives way to the dramatic landscape of the great plains. Teton County is about 32% cropland with the remaining land either rangeland or wildlands. About four fifths of the cropland is dryland, the 20.4% is irrigated (USDA NASS, 2019). From resource management

perspectives the diversity of landscapes throughout the county creates unique challenges and opportunities for natural resource conservation.

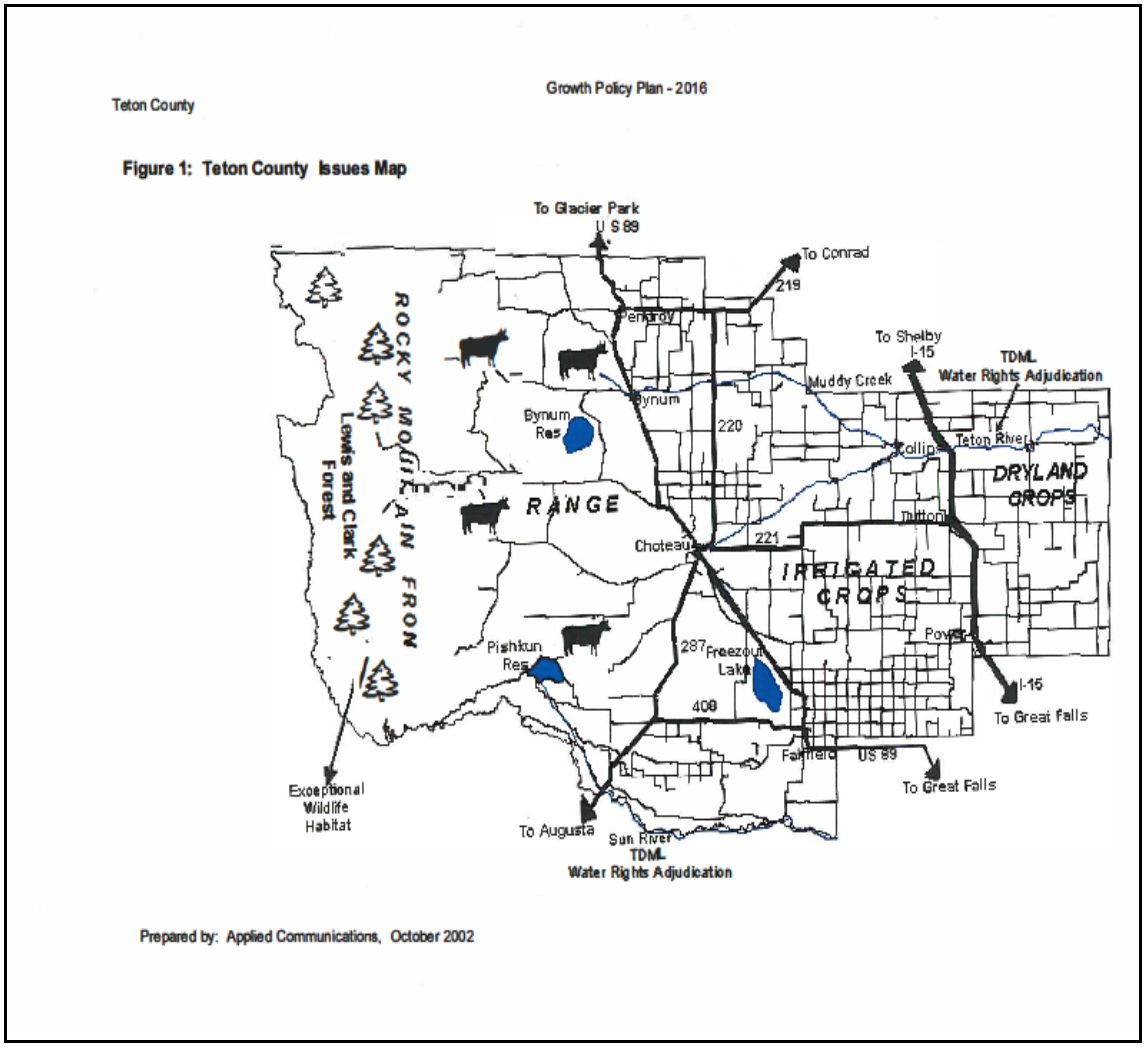


Figure 1

Teton County at a Glance

Teton County covers 2,293 square miles or approximately 1,454,080 acres of land in northwest Montana (Appendix A1). It shares borders with Flathead Lake to the west, Lewis and Clark County to the south, Cascade County to the southeast, Chouteau County to the east and Pondera County to the north. The city of Choteau, the county seat, has about 1,686 residents. Dutton (population 316) and Fairfield (population 708) are the only towns in the county. More than half of the residents of Teton County live on farms and ranches in the vicinity of unincorporated communities such as Blackleaf, Diamond Valley and Koyl, or in one of three Colonies in the county.

Elevations range from 8,875 feet at Mount Wright to 3,200 feet on the eastern border. As expected in a mountainous area, precipitation varies considerably from the mountainous western edge to the lower elevations in the central and eastern part of the county. Rainfall at the lower elevations averages 11.5 inches per year with 14-15 inches at the higher elevations. As much as 82% of this falls between April 1st

and September 30th. May and June are the wettest months over the lower elevations while seasonal variations over the mountains are less pronounced. The county receives an average of 42 inches of snow every year. Annual snowfall can accumulate to 60 inches or more on some of the western mountains.

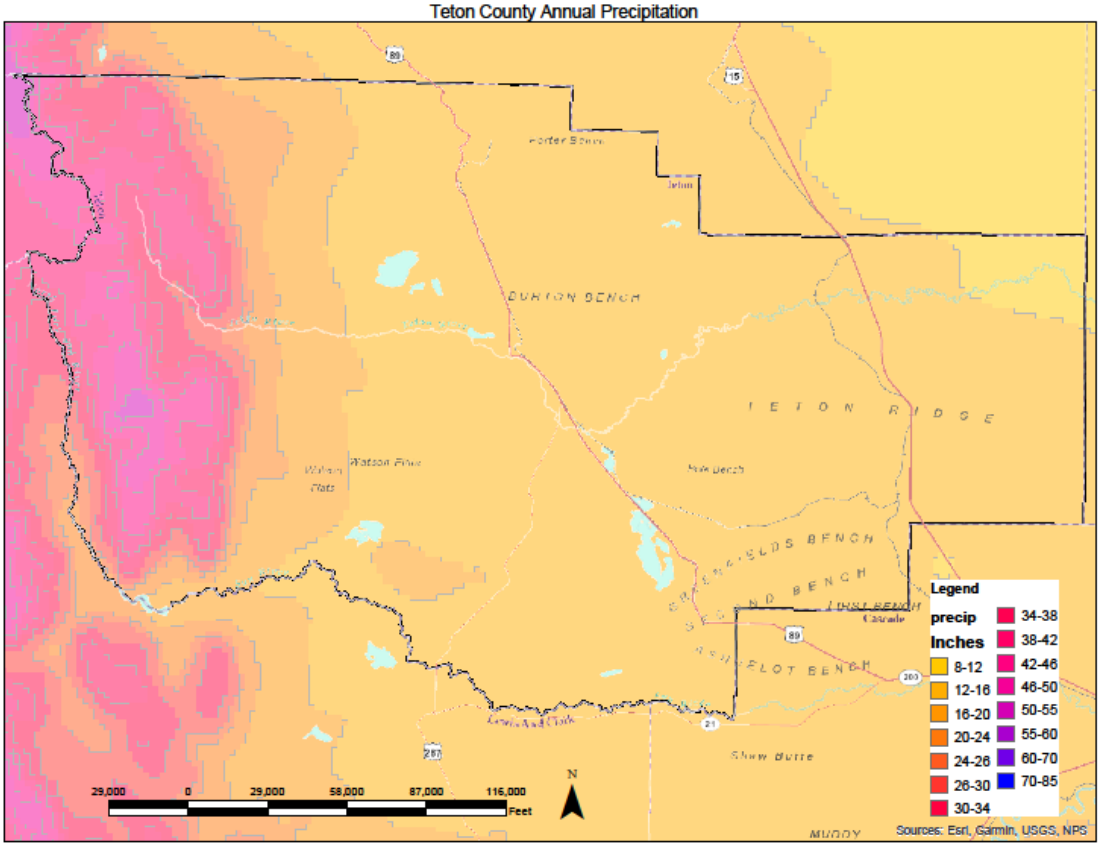


Figure 2 Average Annual Precipitation, Teton County, Montana

Relative Effective Annual Precipitation (REAP) can be thought of as the amount of rain or snowmelt that will be available for plants to use. REAP across Teton County is shown in Appendix A2.

High winds occur in February and March when windspeeds can be as high as 29 miles per hour (mph). August and November are also typically windy with windspeed up to 24 mph (USA.com, 2019). Highest temperatures usually occur in July when the average high is around 82° Fahrenheit (F). January is the coldest month; the average temperature is around 14° F. Most of the county is in USDA Plant Hardiness Zone 4a, which indicates that winter temperatures can be as low as -25°F to -30°F. Areas of lower elevation are in Zone 4b, where winter lows can fall to -20°F to -25°F. A map of Montana plant hardiness zones is included as Appendix A3.

People

The population of Teton County was 6,162 in 2018 (US Census Bureau, 2019). According to the Teton County Growth Policy, 2016, Teton County is experiencing slow to no population growth with a growing senior population that reflects the maturing of the baby boom generation and longer life spans. The

median age in Teton County is 44.5 years; 22.7 % of the population is age 65 or older (US Census Bureau, 2019).

The economy of Teton County employs around 2,750 people. Major industries are agriculture, forestry, fishing and hunting, retail trade and health care. The highest paying jobs are in the mining, quarrying, and petroleum extraction industries. Most Teton County adults (93%) are high school graduates; nearly one-quarter have earned a bachelor's degree or higher. The poverty rate in the county is 13.5% of the population (US Census Bureau, 2019), only slightly higher than the rate for the state of Montana (Statista, 2019).

Agriculture

According to the National Agricultural Statistics Survey (NASS) 2017 Census Data, Teton County is home to 686 farms covering 887,436 acres. The census definition of a farm is any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. The average farm size is 1,294 acres. There are 1,162 agriculture producers in the county; 25% of these are beginning farmers or ranchers, defined as those who have been in the business for ten years or less. Sixty-one percent of producers are male and nearly two-thirds of Teton County producers are age 55 or older. (USDA NASS, 2019).

In 2017, farmers in Teton County irrigated 93,837 acres, a decrease from 2012 of 18.25%. Teton County ranked number one in the state for acres of barley harvested in 2018 and came in second in the state after Choteau County for all dry beans harvested in 2017 and 2018. Major crops include winter and spring wheat, durum, malt and feed barley, forage crops, chickpeas, and lentils.

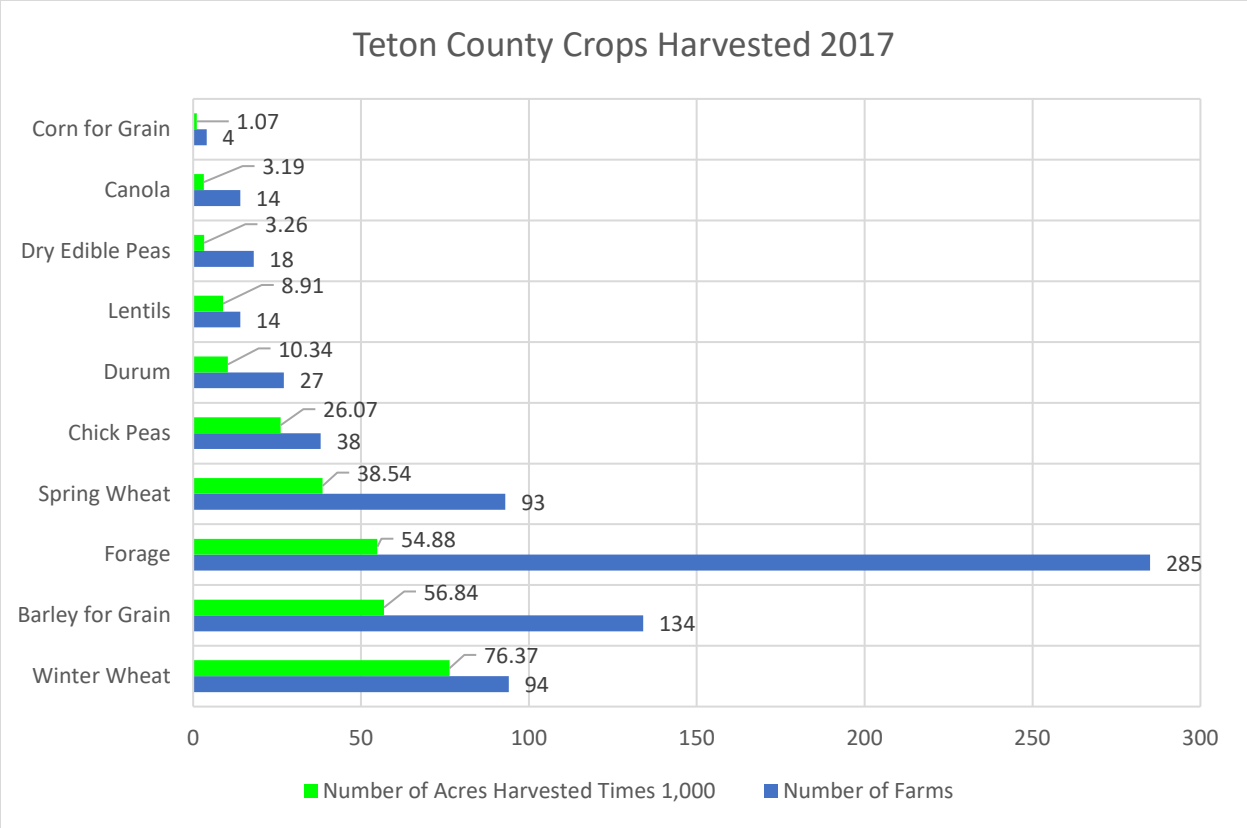


Figure 3. Major Crops, Number of Farms That Raised Each Crop and Acres of Each Crop Harvested In 2017, Teton County, Montana. (USDA NASS, 2019)

Most of the ranching and cattle operations are in the western part of the county. Livestock production includes cattle, chickens, sheep, goats, and horses.

Table 1 Class of Livestock, Number of Farms Producing Each and Number in Each Class in 2017

Livestock	Number of Farms	Number of Animals
Sheep	31	6,849
Cattle	222	46,002
Horses	263	18,16
Donkeys and Mules	55	193
Poultry	29	87,796

(USDA NASS, 2019)

Agricultural is the main contributor to the local economy and reflects the rural quality of life that is attractive to most people in Teton County. Agricultural trends such as decreasing farm income, increasing age of farmers and land development are putting pressure on agricultural operators to take land out of production.

Land Ownership

Teton County's western edge lies in the Bob Marshall Wilderness Area in the Helena-Lewis and Clark National Forest managed by the Rocky Mountain Ranger District with an office in Choteau, Montana.

There are 234,355 forest acres in Teton County. There are 234,355 forest acres in Teton County. Private Conservation Lands own 21,739 acres (1%). There are 122,022 acres of conservation easements with 77,538 acres privately owned. The remaining 44,464 acres are federally owned throughout the county.

Landcover Systems

The Montana Natural Heritage Program provides information on the types of landcover systems that are found in Teton County. Figure 4 shows the relative extent of the nine systems. Data labels display the acres of each system and percent of total landcover in the county that it occupies. Figure 5 is a landcover map of the county from MNHP. Descriptions of the landcover systems follow.

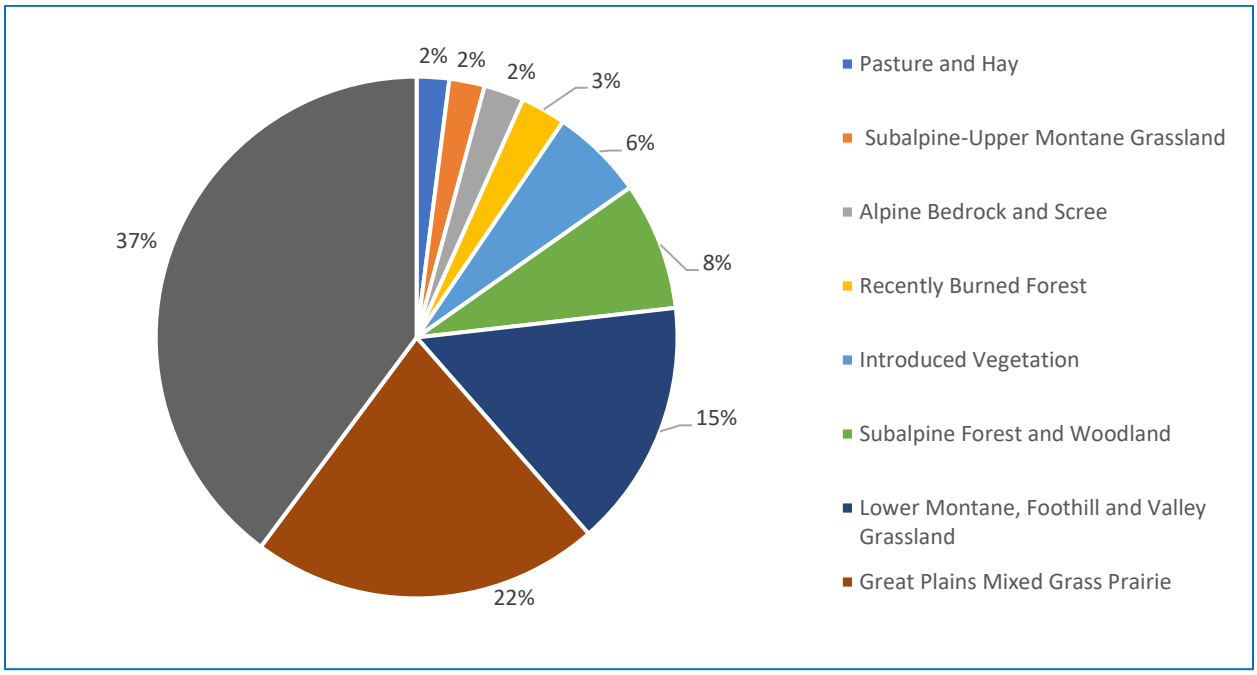


Figure 4. Distribution of Landcover Systems in Teton County, Montana

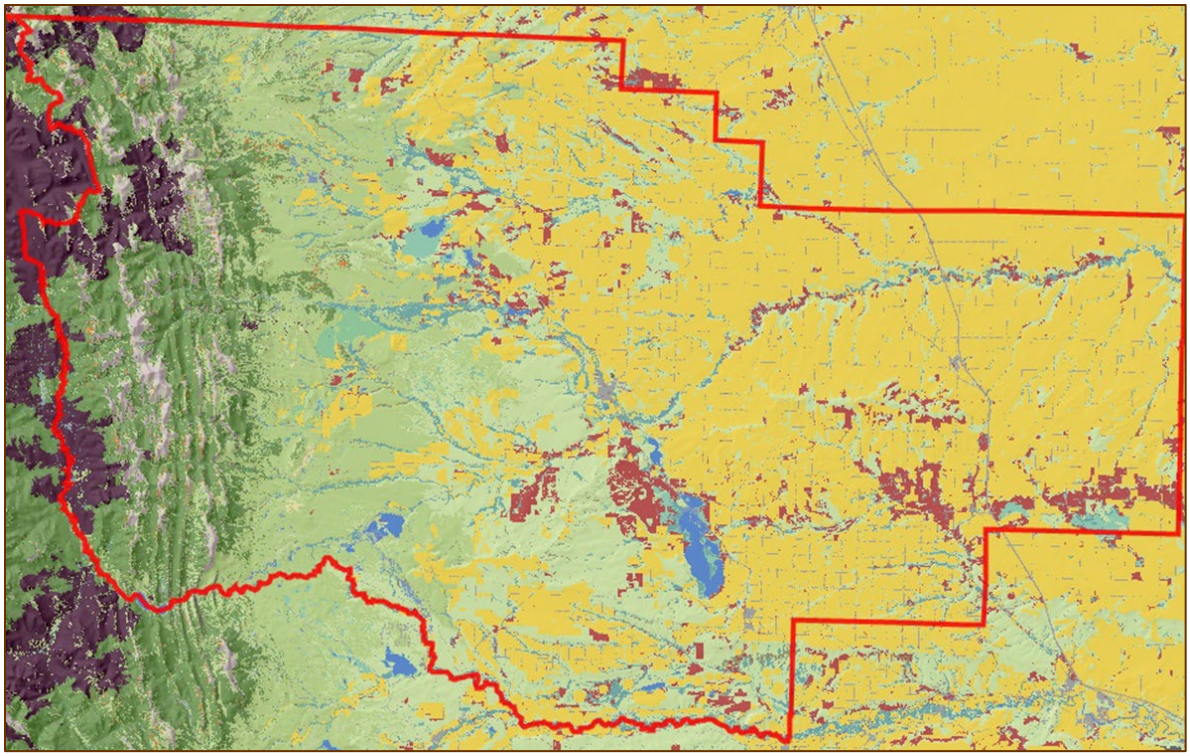
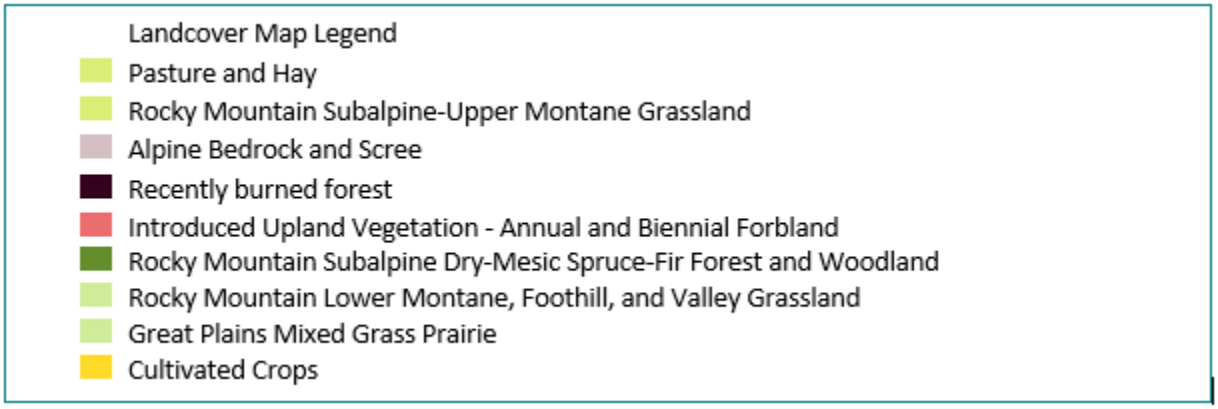


Figure 5 Teton County Landcover



Pasture and Hay. These agriculture lands typically have perennial herbaceous cover used for livestock grazing or hay production. Management such as irrigation and haying distinguish it from natural grasslands. CRP lands are included in this land cover type.

Rocky Mountain Subalpine-Upper Montane Grassland systems are found in upper montane to subalpine, high-elevation zones, and are shaped by short summers, cold winters, and young soils derived from recent glacial and alluvial material. Dry grasslands may occur as small meadows or large open parks surrounded by higher elevational forests. In Montana this system generally occurs as two plant communities: a rough fescue (*Festuca campestris*)-Idaho fescue (*Festuca idahoensis*) association occurring on moister sites, such as the north and east-facing slopes and benches in the mountains; and the Idaho fescue-bluebunch wheatgrass (*Pseudoroegneria spicata*) association occurring on drier sites, such as ridges, hilltops, and south

and west facing slopes and benches. At elevations greater than 7,500 feet, Idaho fescue becomes dominant, sometimes associated with slender wheatgrass (*Elymus trachycaulus*), or in certain areas, tufted hairgrass (*Deschampsia cespitosa*). Noxious species invasion, fire suppression, heavy grazing, and oil and gas development are major threats to this system.

Alpine Bedrock and Scree. This ecological system is restricted to the highest elevations of the Rocky Mountains. It is composed of barren and sparsely vegetated bedrock outcrop and scree slopes, with lichen-dominated communities. Exposure to desiccating winds, rocky and sometimes unstable substrates, and a short growing season limit plant growth. Typically, there is sparse cover of forbs, grasses, and low shrubs. Lichen cover is high on exposed talus and bedrock. Soils are very poorly developed, often only occurring in fractures of bedrock. This system is characterized by a very cold winters, high winds, high ultra-violet radiation, and high surface daytime temperatures during summer on south and west facing slopes. Solitary plants grow among the exposed rocks or in bedrock fractures. Plant species are typically cushioned, matted or succulent, or grow as flat rosettes, often with thick leaf cuticles or a dense cover of hairs.

Recently burned forest. In this system, the landcover has been modified by recent fires which have burned forest and woodland vegetation. Vegetation is a mixture of herbaceous, shrub, and tree species.

Introduced Upland Vegetation. Land cover is significantly altered by introduced forbs. Natural vegetation types are no longer recognizable. Typical species that dominate these areas are knapweed (*Centaurea spp.*), oxeye daisy (*Leucanthemum vulgare*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), pepperweed (*Lepidium spp*.), and yellow sweetclover (*Melitlotus altissimus*).

Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland. Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) make up a substantial part of the montane and lower subalpine forests of the Montana Rocky Mountains and mountain island ranges of north-central and west-central Montana. Dry to mesic spruce-dominated forests range from elevations of 5,200 to 6,800 feet east of the Continental Divide in the northern and central portions of the state. Forests are found on mountain slopes, high-elevation ridge tops and upper slopes, plateaus, basins, alluvial terraces, well-drained benches, and inactive stream terraces. In northern Montana, Engelmann spruce, white spruce (*Picea glauca*), Douglas-fir (*Pseudotsuga menziesii*), and lodgepole pine (*Pinus contorta*) are often present in these forests. The understory is a mixture of shrubs, forbs and grasses. The drier area within this system are especially common on steep slopes at upper elevations throughout the easten Rocky Mountains.

Rocky Mountain Lower Montaine, Foothill and Valley Grasslands are found at lower montane to foothill elevations in mountains and valleys throughout Montana. These grasslands are similar to Big Sagebrush Steppe but are defined by shorter summers, colder winters, and young soils derived from recent glacial and alluvial material. In the lower montane zone they range from small meadows to large open parks surrounded by conifers; below the lower treeline they occur as extensive foothill and valley grasslands. Soils are relatively deep, fine-textured, often with coarse fragments, and non-saline. This system is typified by cool-season perennial bunch grasses and forbs with a sparse shrub cover. Rough fescue is dominant in the northwestern portion of the state and Idaho fescue is dominant or co-dominant throughout system. Bluebunch wheatgrass occurs as a co-dominant throughout the range as well, especially on xeric sites. Western wheatgrass (*Pascopyrum smithii*) is consistently present.

Farmland conversion, noxious weed invasion, fire suppression, heavy grazing and oil and gas development are major threats to this system.

The Great Plains Mixed Grass Prairie system covers much of the eastern two-thirds of Montana, occurring continuously for hundreds of square kilometers, interrupted only by wetlands or riparian areas or by sand prairies. Soils are primarily fine and medium-textured. Grasses typically comprise the greatest canopy cover, and western wheatgrass is usually dominant. Other species include thickspike wheatgrass (*Elymus lanceolatus*), green needlegrass (*Nassella viridula*), blue grama (*Bouteloua gracilis*), and needle and thread (*Hesperostipa comata*). Forb diversity is typically high. In areas where sagebrush steppe borders the mixed grass prairie, common plant associations include Wyoming big sagebrush—western wheatgrass. Fire and grazing are the primary drivers of this system. Drought can also impact it, in general favoring the shortgrass component at the expense of the mid-height grasses. With intensive grazing, cool season exotics such as Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), and Japanese brome (*Bromus japonicus*) increase in dominance.

Cultivated Crops. These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, or vegetables typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards (MNHP, 2019).

Land Use

See Appendix A5.

Geology

Teton County is in North Central Montana along the Eastern front of the Rocky Mountains. This whole region is underlain by a thick sequence of Cambrian to Cretaceous-aged sedimentary rocks that range in age from 600 to 650 million years old.

Geologic formations underlying Teton County are shown in Figure 6. A formation in this context is a rock unit that has a distinctive appearance compared to surrounding layers and is of enough thickness and extension to be plotted on a map. Formations often contain a variety of related or interlayered rock types and are sometimes divided into smaller units called members.

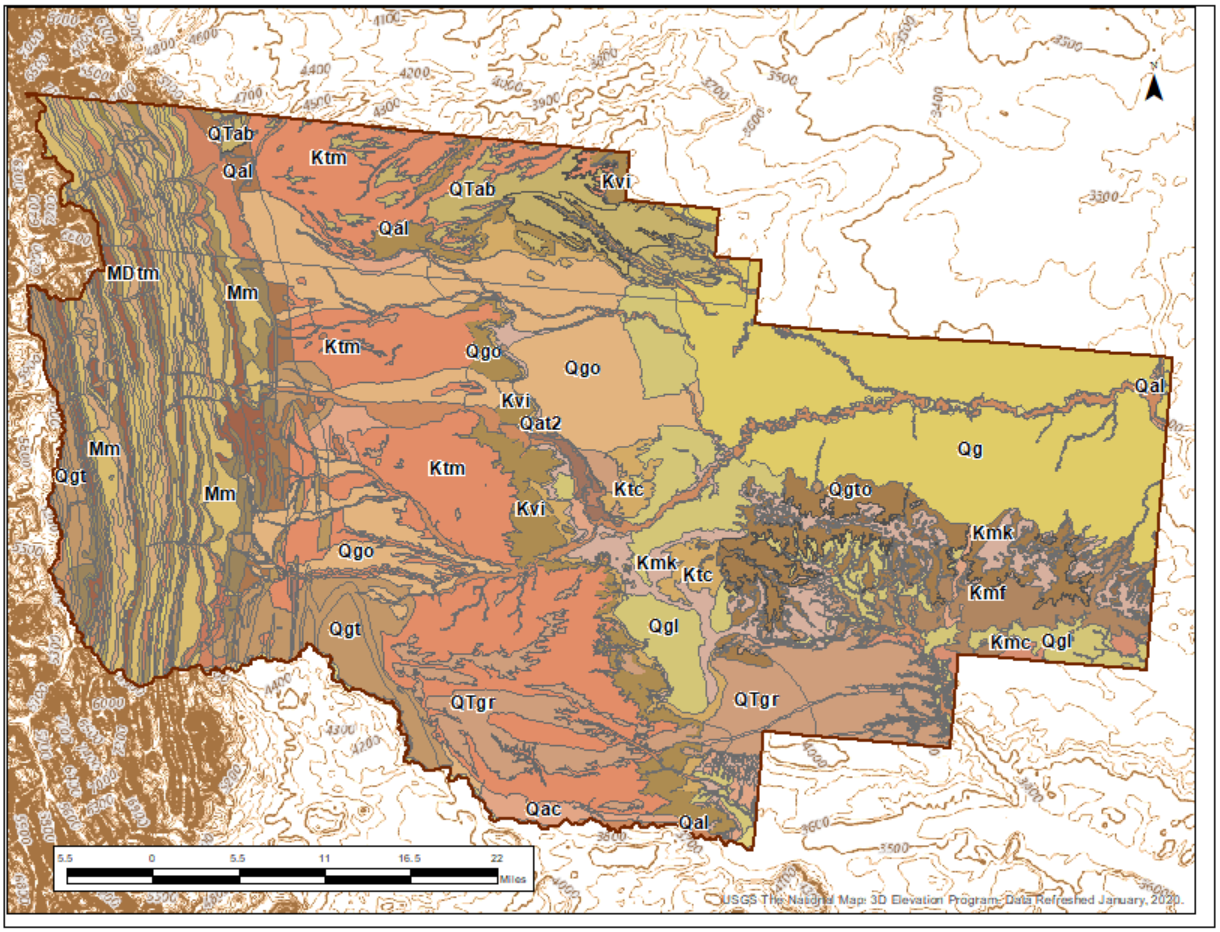


Figure 6 Geology of Teton County, Montana

Kmf. **Ferdig Member** (Upper Cretaceous). The upper layer is dark-grey hard shale that contains a few thin beds of grey limestone concretions and grey concretionary limestone. The middle layer is brownish grey, very fine-grained wavy-or lenticular-bedded relatively resistant sandstone or siltstone with numerous trace fossils on bedding surfaces, underlain by bluish-grey shale littered with numerous flakes of iron-stained siltstone. The lower layer is dark-bluish-grey shale that contains a few fine-grained sandstone stringers and rusty-brown to greyish-red and very dusky red ferruginous dolostone and limestone concretions that break into chips that litter the shale surfaces. Thickness is 100 to 200 feet (Vuke, 2002).

MDtm. Sedimentary Rocks Undivided (Mississippian and Devonian) - Includes Three Forks, Jefferson, and Maywood Formations (Berg, 2002).

Ktc. Telegraph Creek Formation. Upper Cretaceous. Yellowish-grey, fine-grained calcareous (containing calcium carbonate) sandstone interbedded with yellowish-grey weathering silty mudstone and grey-weathering fissile (easily split) shale. Thickness is up to 150 feet (Berg, 2002).

QTab. Alluvial deposits of braided streams that spread out onto the plains from the mountains

to the west (Quaternary and Tertiary). Gravel deposits do not form distinct terrace levels but are remnants of alluvial surfaces covered by generally less than 15 feet of gravel. The gravel is composed mainly of limestone or quartzite clasts, with less abundant metamorphic rocks transported from the Canadian Shield. Gradients of the bedrock surfaces on which the gravels were deposited range from 80 feet per mile near the mountain front to 25 feet per mile for those most distant from the mountains. The general downgradient trend of these surfaces as now preserved is east to slightly north of east (Berg, 2002).

Qgto. Older glacial till, dominantly Illinoian or pre-Illinoian, 110 to 200 feet thick (Vuke, 2002).

Kvi. The **Virgelle Formation** forms mesas and buttes surrounded by spectacular sandstone cliffs where the erosion-resistant titaniferous (containing titanium) magnetite (a common black iron oxide mineral, Fe_3O_4, that is strongly attracted by magnets) sandstone bed at the top of this formation protects underlying more easily eroded sandstone. The Virgelle Formation is easily recognizable from a distance by the magnetite beds above sandstone that appear white from a distance. Brown-weathering sandstone concretions are prominent just below the uppermost titaniferous magnetite sandstone beds. The sandstone is calcite cemented with prominent cross-beds and some ripple marks. Sandstone color on a weathered surface ranges from dark yellowish brown to yellowish grey. Thickness is estimated to range between 95 and 115 feet (Berg, 2008).

Ktm. Two Medicine Formation. (Upper Cretaceous) - Nonmarine mudstone with some sandstone. Upper and middle parts mostly grey green to grey mudstone with reddish-grey, red-brown, and purple interbeds. Fossils, including dinosaur bones and bivalves, are common in the upper 490 feet. The lower 560 feet contain many thick beds of grey to greenish-grey sandstone interbedded with grey-green, olive-drab, and grey mudstone. Sandstone beds in the lower part are poorly hardened, fine to medium grained, massive to thinly bedded, and locally as thick as 165 feet. Thin coal beds are present at the top and base of the formation and in a zone about 250 feet above the base. The Two Medicine Formation has a maximum thickness of about 2,200 feet. Where outcrops are extensive, the formation erodes into badlands topography and is generally poorly exposed (Berg, 2002).

Kmk. Kevin Member of the Marias River Formation. (Upper Cretaceous). Upper: Dark-grey shale that contains many beds of yellowish-grey-weathering concretionary limestone and yellowish-grey-weathering, thin, shaly beds of very fine-grained sandstone interbedded with shale. Middle: Dark-grey shale with numerous beds of reddish-weathering ironstone concretions and concretionary limestone and dolostone. May include a bed of granule- and pebble-conglomerate with clasts of polished grey and black chert and olive-grey phosphatic siltstone. Lower: Dark-grey shale with numerous thin bentonite beds and grey calcareous limestone concretions. Thickness ranges from about 600 to 700 ft (Vuke, 2002).

Qal. Alluvium. Alluvial sand, silt, and clay deposits along major streams (Quaternary).

Qgt. Glacial till – Includes both glacial till near the Rocky Mountain Front along the Teton River that was deposited by mountain glaciers, and that (northeast of Choteau) deposited by the continental ice sheet. The extent of the till deposited by the continental ice sheet is recognized not only by its hummocky topography, but also by the occurrence of pebbles, cobbles, and boulders of granitic igneous rocks and metamorphic rocks. Where glacial till overlies the Kevin Shale along the Teton River south of the New Rockport Colony, the upper meter of the Kevin Shale is deformed and mixed with glacial erratics (Berg, 2008).

Qgl. Glacial lake deposit. These sediments consist of brown to black silt and clay (Berg, 2002).

QTgr Gravel. Remnants of older gravel on terraces in the area west of Bynum Reservoir and around Choteau characterized by abundant grey limestone presumably eroded from the exposures of limestone of the Madison Group along the Rocky Mountain Front. An estimated 5% or less of the clasts are immature sandstone, perhaps derived from Cretaceous formations exposed to the west. Abundance of pink and white quartzite clasts increases to the south and they are inferred to have been derived from quartzite in the Belt Supergroup that is exposed in the Sun River Valley west of the Rocky Mountain Front. QTgr along the Sun River west of Augusta consists mainly of similar quartzite clasts. This gravel also contains rare clasts of a fine-grained porphyritic (igneous with crystals embedded in a finer groundmass of minerals) rock, also derived from exposures in the Sun River Valley west of the Rocky Mountain Front (Berg, 2008).

Qgo. Glacial outwash deposit forms extensive gravel plains at elevations lower than QTgr. Gravel consists almost exclusively of limestone clasts derived from exposures in the Rocky Mountain Front. The largest of these deposits is Burton Bench that was deposited when meltwater flowed through Ralston Gap south of Bynum. Farther north meltwater flowed along the valley now occupied by Muddy Creek and formed the outwash deposit. Remnants of outwash deposits form prominent flat surfaces in the area between Willow Creek and Deep Creek (Berg, 2008).

Mm. Madison Group, undivided. Mainly limestone and dolomite ranging through calcific dolomite and dolomite limestone with chert and minor calcareous shale, thickness is 900 to 1,800 feet (Berg, 2008).

Table 2 displays the relative proportion of the twelve geologic formations and members that each cover more than 2.8 percent of the land in Teton County. Together these add up to nearly 81% of the land surface of the county. Other formations are not included due to their relatively small presence on the landscape.

Table 2 Geologic Formations and Members, Teton County, Montana

Map Unit	Name	Acres in Teton County
Kmf	Ferdig Member of the Marias River Formation	61,742
MDtm	Three Forks, Jefferson & Maywood Formations	71,380
Ktc	Telegraph Creek	73,395
QTab	Alluvium of braid plains	92,000
Qgto	Glacial Till, Older than Qgt	99,514
Kvi	Virgelle Formation	112,894
Ktm	Two Medicine Formation	115,407
Kmk	Kevin Member of the Marias River Formation	118,299
Qal	Alluvium	118,489
Qgt	Glacial Till	138,334
Qgl	Glacial Lake Deposit	175813
QTgr	Gravel	190991
Qgo	Glacial Outwash Deposit	192612
Mm	Madison Group	202757

LRRs and MLRAs

Land Resource Regions (LRRs) are large geographic areas that are characterized by a pattern of soils, climate, water resources and land uses. Major Land Resource Areas (MLRAs) are subregions of the Land Resource Regions and comprise smaller, homogeneous areas. MLRAs represent landscape-level areas with distinct physiography, geology, climate, water, soils, biological resources, and land uses. These features are incorporated into the distinctions between ecological sites.

Teton County contains areas of three MLRAs, within two different Land Resource Regions. MLRA 43B, Central Rocky Mountains and MLRA 46, Northern Rocky Mountains Foothills, lie within LRR-E, Rocky Mountain Range and Forest Region. MLRA 52, Brown Glaciated Plains is part of LRR-F, Northern Great Plains Spring Wheat Region. Appendix A4 is a map of all LRRs in the United States; LRR-E and LRR-F are labeled.

MLRA 43B, Central Rocky Mountains, is entirely in the Rocky Mountains. Many National Forests and wilderness areas occur within MLRA 43B including Yellowstone and Teton National Parks. The area is characterized by rugged, glaciated mountains, thrust and block-faulted mountains, hill, plateaus, and valleys. Rivers run in steep canyons and lakes are common, especially in glaciated areas. The highest point in Montana, Granite Peak, occurs in MLRA 43B. Dominant soil orders are Alfisols and Mollisols. More than three-fourths of the area is owned and administered by the U.S. Forest Service (NRCS, 2006).

The area of **MLRA 46**, Northern Rocky Mountain Foothills, that occurs within the Teton County border is in the Missouri Plateau, Unglaciated Section of the Great Plains Province of the Interior Plains. Foothills east of the Northern Rocky Mountains are on al old plateau of uplifted marine sediments. Hills and mountains are cut by steep, narrow valleys and the rivers are bordered by broad flood plains and fans. The dominant soil orders in this MLRA are Mollisols and Entisols. They are shallow to very deep, generally well drained, and loamy or clayey. Much of the MLRA is rangeland; nearly all the farming is dryland crop production (NRCS, 2006).

MLRA 52, Brown Glaciated Plains, contains the rest of Teton County. Almost all MLRA 52 is covered by glacial till plains. Alluvial deposits occur along the Milk River and in narrow, discontinuous strips along other streams and rivers. Low Terraces occur along major rivers and some alluvial fans occur at the western boundary of the area. Alfisols, Mollisols and Entisols are the dominant soil orders in this MLRA. Nearly all the area was grassland; now about 45% of the MLRA is used for mostly dryland crop production (NRCS, 2006). Teton County MLRAs are shown in Figure 7.

Soil Order Definitions:

Alfisols are in semiarid to moist areas. These soils result from weathering processes that leach clay minerals and other constituents out of the surface layer and into the subsoil. The soils formed primarily under forest or mixed vegetative cover and are productive for most crops.

Entisols are soils that show little or no evidence of development. They occur in areas of recently deposited parent materials or in areas where erosion or deposition rates are faster than the rate of soil development, such as dunes, steep slopes, and flood plains.

Mollisols are soils that have a dark-colored surface horizon containing relatively high amounts of organic matter. These soils are quite fertile. They characteristically form under grass in regions that experience seasonal moisture deficit, such as the Great Plains.

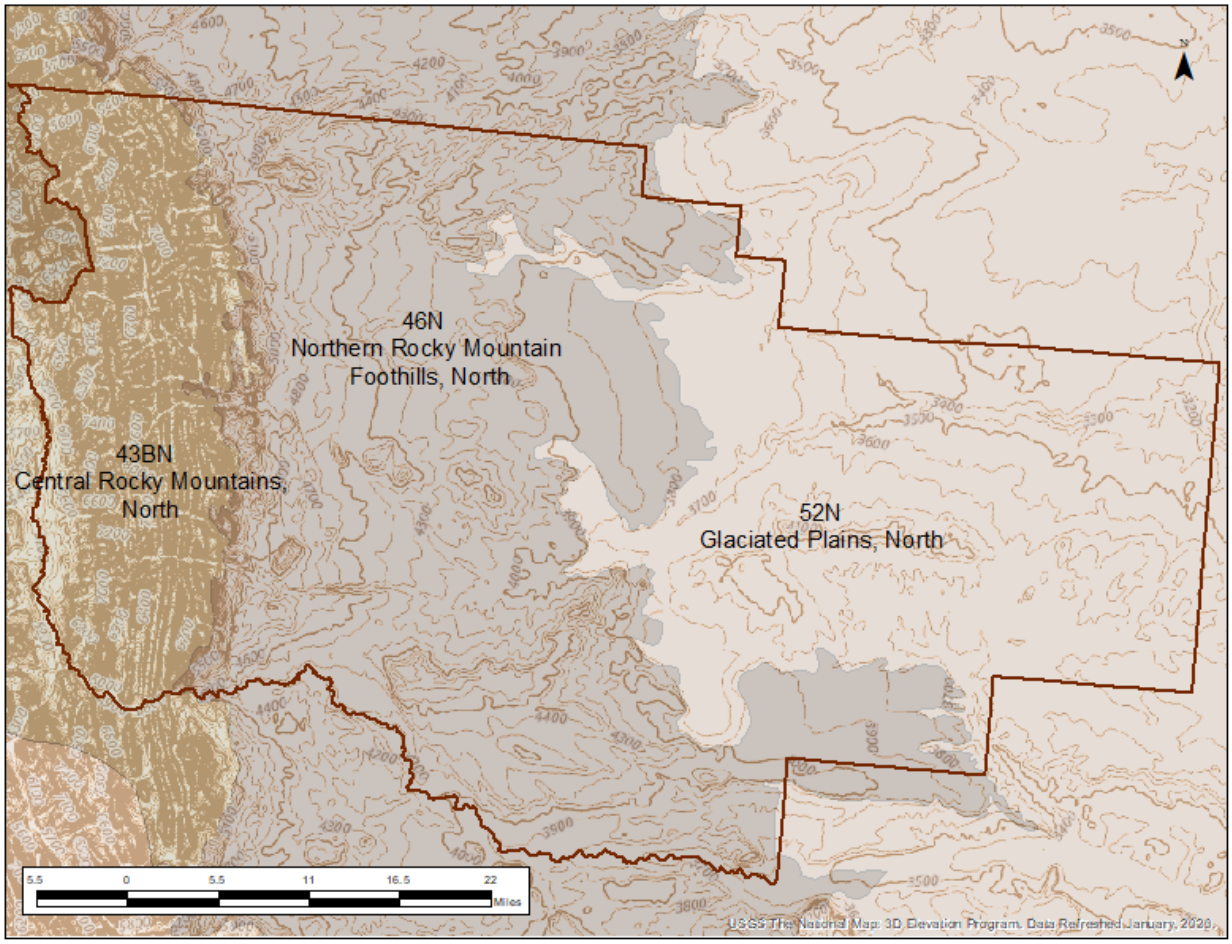


Figure 7. Major Land Resource Areas in Teton County, Montana.

Soils

Much of the county is underlain by a thick sequence of Cambrian to Cretaceous aged sedimentary rocks that dip gently to the west and consist of both marine and terrestrial sediments. Overlying the Cretaceous rocks are poorly consolidated, Tertiary-aged lake and streambed sediments; some of which stand out now as elevated terraces. Thick deposits of glacial drift blanket the northeastern part of the county. Quaternary-aged alpine glaciers in the Rocky Mountains have deposited lobes of alpine glacial till at the base of the mountains in the western part of the county.

About half of the soils in the county are formed in glacial till or in glacial outwash material. Some of the soils formed in alluvium derived from mixed sources, and other soils formed in material that weathered from limestone, mudstone, sandstone, shale, or siltstone. Soils that formed in soft sandstone are generally sandy. Soils that formed over hard rock are generally loamy and have a high content of rock fragments. Soils that formed in soft shale or siltstone are generally loamy and soils that formed in clay shale are clayey. Soils formed in alluvium range from sandy to loamy, to extremely gravelly.

Teton County has five distinct soil types each found in different regions of the county.

- The western area has gently sloping to very steep, shallow to deep well-drained soils in the foothills and mountains. Cover consists of grass, pine trees, brushy forbs, and grass.

- From the foothills to the City of Choteau, soils are nearly level to steep, shallow to deep, and well drained in the shale and sandstone uplands. These are interspersed with nearly level to steep, deep, well-drained soils on upland fans and terraces. Shallow and gravelly soils are subject to drought.
- East of Choteau is a band of dominantly nearly level to moderately sloping, deep, well-drained soils of the glaciofluvial and glaciolacustrine fans and terraces. These soils developed under lower precipitation than the areas near the mountains and can be subject to drought unless irrigated.
- Soils in the eastern half of the county are dominantly nearly level to moderately steep, deep, well-drained soils of the continental glacial till plains. Some areas contain soils adversely affected by absorbed sodium causing a dense impervious layer a few inches below the surface.
- Several square miles of clayey, salty soils occur in the southeast corner of the county, much of which is poorly drained.

Hydric Soils

Hydric soils are characterized by frequent, prolonged saturation and low oxygen content, which lead to anaerobic chemical environments where reduced iron is present. This definition includes soils that developed under anaerobic conditions in the upper part but no longer experience these conditions due to hydrologic alteration such as those that have been artificially drained or are protected by ditches or levees.

The Choteau-Conrad Soil Survey Area, which includes parts of Teton and Pondera Counties, has 102 soils that meet the criteria for hydric soils. Hydric Soils occur on 44,182.1 acres in the survey area. Many of the hydric soils occur in very small areas across the landscape. Table 3 lists those that occur on 500 (total) acres or more. This is fewer than half of the hydric soil map units in the area but adds up to over 76% of the landscape on which hydric soils are found.

Hydric Criteria Definitions:
1: All Histels except Folistels and Histosols except Folists.

2: Map unit components that, based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or show evidence that the soil meets the definition of a hydric soil.

3: Map unit components that are frequently ponded for long duration or very long duration during the growing season that, based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States or show evidence that the soil meets the definition of a hydric soil.

4: Map unit components that are frequently flooded for long duration or very long duration during the growing season that, based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or show evidence that the soils meet the definition of a hydric soil.

Table 3 Hydric Soils, Acres and Landforms Where Each is Most Commonly Found

Map Unit Symbol	Map Unit Name	Acres	Landform	Hydric Criteria
55A	Tetonview loam, 0 to 2 % slopes	4396.2	Stream Terraces	2
164B	Scobey-Kevin clay loams, 0 to 4 % slopes	4109.7	Depressions	2, 3
38A	McKenzie clay, 0 to 2 % slopes	4057.2	Depressions	2, 3
263C	Scobey-Kevin clay loams, 2 to 8 % slopes	2955.1	Depressions, Moraines	2, 3
52A	Nishon silt loam, 0 to 2 % slopes	2829.7	Depressions	2, 3
268A	Saypo-Tetonview complex, 0 to 2 % slopes, rarely flooded	2796.3	Flood Plains	2
102A	Winginaw-Birchfield mucky peats, 0 to 2 % slopes	2724.8	Terraces	1, 3
102A	Winginaw-Birchfield mucky peats, 0 to 2 % slopes	2422	Terraces	2
468A	Saypo-Tetonview complex, saline, 0 to 2 % slopes, rarely flooded	1553	Flood Plains	2
403	Haploborolls-Argiborolls complex, 0 to 4 % slopes, rarely flooded	997.2	Depressions	2
202A	Winginaw-Dougcliff mucky peats, 0 to 2 % slopes	689.5	Alluvial Fans	1, 3
50B	Marias-Nunemaker complex, 0 to 4 % slopes	671.7	Depressions	2, 3
119A	Tetonview-Birchfield complex, 0 to 2 % slopes	594.5	Depressions	2
119A	Tetonview-Birchfield complex, 0 to 2 % slopes	528.4	Depressions	2

Rangeland

The rangeland in Teton County falls into two Major Land Resource Areas (MLRAs).
The Northern Rocky Mountain Foothills region can generally be delineated as the rolling foothills West of Interstate 15 (or the Fairfield Bench and West). Soils within this part of the county are generally loamy with high limestone content and/or gravelly or shallow in places. Precipitation ranges from 13 to 15 inches within the private land below the USFS and BLM holdings. Vegetation and soils can be diverse within this region, but the climax plant communities could be represented by rough fescue and bluebunch Wheatgrass communities.

The Brown Glaciated Plains region is roughly the East end of the Fairfield Bench near Interstate 15 and East. Soils within this part of the county are like Northern Rocky Mountain Foothills but with higher instances of Clay, Claypan, and saline uplands in the bottoms. Precipitation within this MLRA range from 10 to 14 inches. Vegetation can be very diverse with bluebunch wheatgrass on the sidehills and short to medium-stature vegetation in the bottoms.

With precipitation ranging from 10 to 19 inches across two MLRAs, resource concerns, management, and rangeland production are very diverse. Various noxious weeds are present throughout the county, but leafy spurge and spotted knapweed are more persistent along the Teton and Sun River drainages. Most livestock producers are cow/calf operations with farming/ranching being common in the east half.

There is habitat potential for virtually any wildlife species in this part of the state occurring within Teton County.

Forestland

Teton County's western edge lies in the Bob Marshall Wilderness Area in the Helena-Lewis and Clark National Forest managed by the Rocky Mountain Ranger District with an office in Choteau, Montana. This puts it in the North-Central Montana Forest Region. This region supports the most extensive aspen groves in the state as well as large patches of limber pine woodland along the lower skirts of the mountains. Ponderosa pine is absent. A narrow band of subalpine fir forest along the Rocky Mountain front supports the easternmost occurrences of bear-grass (*Nolina spp*) and woodrush (*Lazula DC*). Douglas-fir (*Pseudotsuga Carrière)*, lodgepole pine, white-bark pine *(*P*inus albicaulis* Engelm.*)*, and alpine larch (*Larix lyallii* Parl.) are included as the elevation rises with a lower timberline around 5,000 feet and the alpine tree line around 8,000 feet. Chinook winds and dramatic fluctuations of winter temperatures often injure forest trees, causing a "red belt" of desiccated trees. The growing seasons are short, as are the tree heights.

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

A century of fire suppression and manipulation of the natural disturbance mechanisms leave many forests, both public and private, in a state that fires quickly surpass the historic norm and become high severity, stand replacement fires. Teton County has a Community Wildfire Protection Plan that discusses the hazards of wildfire in the urban interface, so it is not repeated here.
Forest insect and disease issues are ever-present and in a constant state of flux. 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.
Approximately 92% of the forested acres in Teton county are federal and state owned. With such a small number of acres of forest in private ownership, the local working group has not identified forestry as a priority resource concern for NRCS efforts.

Unique Features

Freezeout Lake is 11,333 acres within Teton County. Freezout Lake Wildlife Management Area's management goal is to provide habitat for waterfowl and upland game bird production and public hunting and viewing opportunity. The Freezout Lake Wildlife Management Area (spelled without the third e) is also an Important Bird Area and is Montana's primary snow goose staging area. As many as 300,000 snow geese and 10,000 tundra swans gather and rest before flying onward for Alberta and central Saskatchewan in Canada. Snow geese usually reach Freezeout Lake in early March, where they rest up from a nearly 1,000-mile flight from California. The Freezout Lake Wildlife Management Area offers general public hunting for waterfowl and upland game birds as well as a year-round opportunity for viewing wildlife including raptors in winter, waterfowl migrations in spring and fall, and waterfowl and shorebirds in summer. For more information about the Wildlife Management Area, see https://myfwp.mt.gov/fwpPub/landsMgmt/siteDetail.action?lmsId=39753634

Pine Butte Swamp Preserve located west of Choteau is a unique wetland encompassing 13,000 acres along Montana's Rocky Mountain Front managed and protected as a Nature Conservancy Preserve. Well over 150 species of birds, as well as bighorn sheep, elk, mule deer, moose, mountain lions and both black and grizzly bears, find forage and shelter within this rare wetland habitat. Like a giant thumb protruding from the peaks, the Pine Butte Swamp Preserve extends downward from Ear Mountain, taking in limber pine forests, foothills prairie and the swamp. Golden eagles hunt for jackrabbits. Warblers and flycatchers nest in dense shrubs surrounding beaver ponds.

The faulted layers of earth also reveal startling reminders of ancient wildlife. The preserve includes Egg Mountain, where the Maiasaura dinosaur once nested. Fossil hunters discovered a series of small badlands hills that yielded the first known nests of baby dinosaurs, eggshell fragments, and whole, fossilized eggs. Jack Horner and Bob Makela, named the adult duck-billed dinosaur unearthed at that location Maiasaura peeblesorum. The first name coming from Greek and meaning 'Good mother lizard' and the second acknowledgment of the Peebles family, the local ranchers who owned the badlands up until 1987, when they sold that portion of their ranch to The Nature Conservancy. The badlands then became a part of the Conservancy's Pine Butte Swamp Preserve (Dawson, 2014).

Water

Surface Water

There are two major rivers in Teton County. The Teton River flows west to east roughly through the center of the county. the Sun River marks the county's southern boundary. The Teton River drainages include the tributaries of Willow and Deep Creeks flowing from the south and Blackleaf and Muddy Creeks flowing from the north. Water is diverted from the Teton River to feed Bynum, Eureka, and Harvey Reservoirs. The Teton River drainage contains Black Leaf and Pine Butte swamps near the foothills. Muddy Creek drains Blackleaf Swamp north of the Teton river. McDonald Creek and the North Fork of Willow Creek drain Pine Butte Swamp south of the Teton River (USDA NRCS, 2003). Appendix A6 shows the locations of the Teton and Sun Rivers, major streams and larger lakes and reservoirs.

Stream Gauges

USGS Wyoming-Montana Water Science Center in cooperation with U.S. Army Corps of Engineers maintains four stream gauges in Teton County as part of the Groundwater and Streamflow Information Program network of Federal Priority Stream gages (FPS). The stream gauges are located on the North Fork of the Sun River near Augusta, on the Sun River below Willow Creek near Augusta, on the Teton River below the South Fork near Choteau and the Teton River near Dutton, Montana.

The average annual discharge at the North Fork of the Sun River from 1912 to 2020 ranged from 202.7 cubic feet per second (cfs)[1] in 2016 to 459.2 cfs in 1959. Peak streamflow is shown in Figure 8. The highest value was 51,100 cfs on June 8, 1964, a volume of more than 154 times the mean discharge for the site. The lowest peak streamflow, 1,160 cfs, was recorded in May of 2016.

[1] One cubic foot of water is a little less than 7.5 gallons. One cubic foot per second is a little less than 449 gallons per minute.

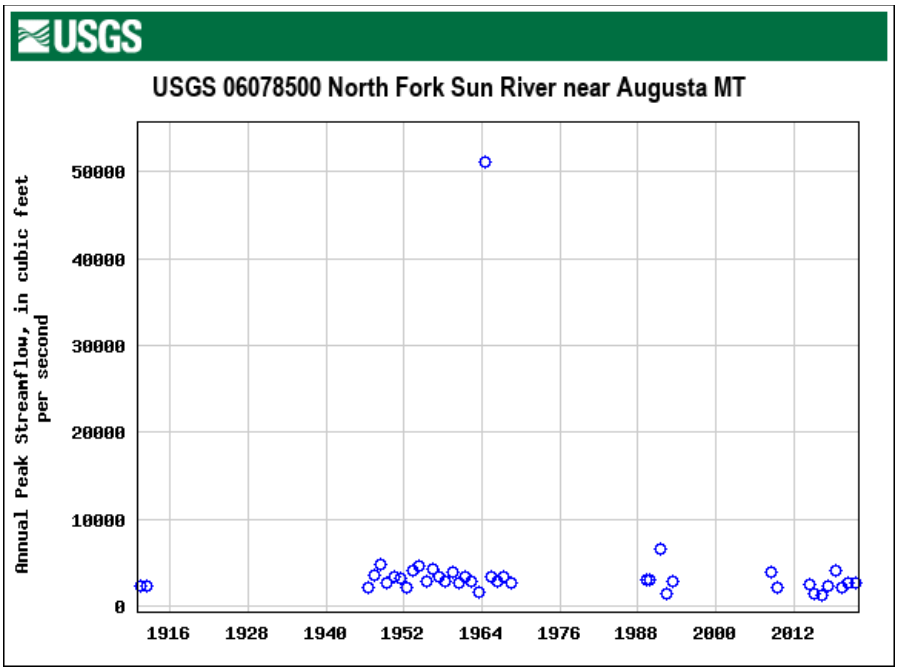


Figure 8. Peak Streamflow at the North Fork Sun River Gauge

Data for the gauge on the Sun River near Augusta is only given for 17 of the last 56 years. Annual discharge at the site was highest in 2018 when an average of 783.3 cfs was recorded. The lowest recorded value was 143.7 in 2016. Figure 9 illustrates the peak annual streamflow at this site.

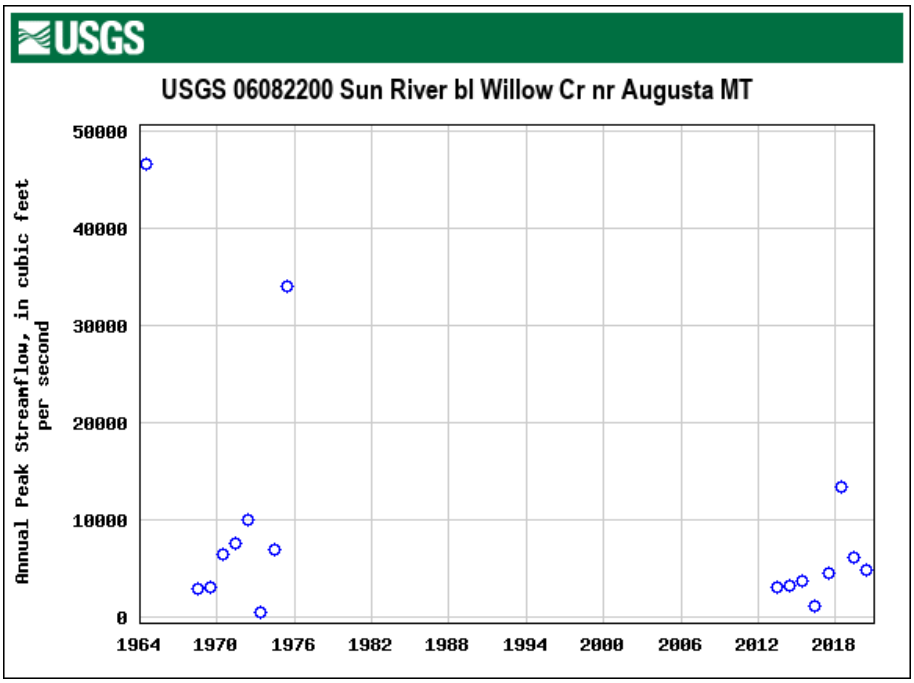


Figure 9. Peak Annual Streamflow at the Sun River Station Near Augusta, Montana

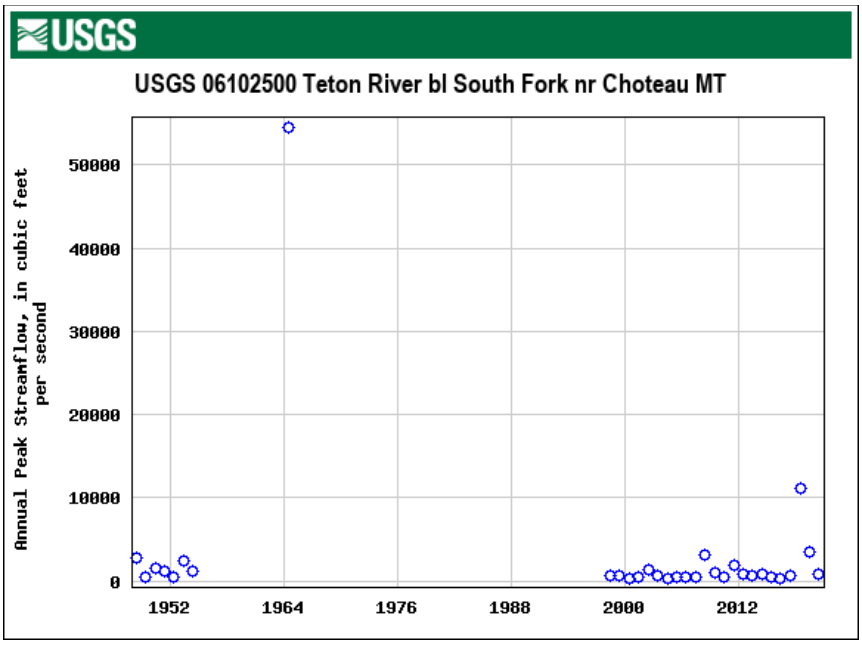


Figure 10 Annual Peak Streamflow on the Teton River near Choteau, Montana.

Figure 10 shows the annual peak streamflow on the Teton River near Choteau. The highest value, 54,600 cfs, occurred on June 8, 1964, the same date as the high vale at the North Fork of the Sun River gauge (Figure 7). The lowest annual peak occurred in May 2016 when 281 cfs was recorded as the peak streamflow for the year. Data depicting average annual discharge at this gauge is only available for 13 of the last 74 years. The highest average annual discharge is recorded in 2018 (195.2 cfs) and the lowest in 2016 (79.1 cfs).

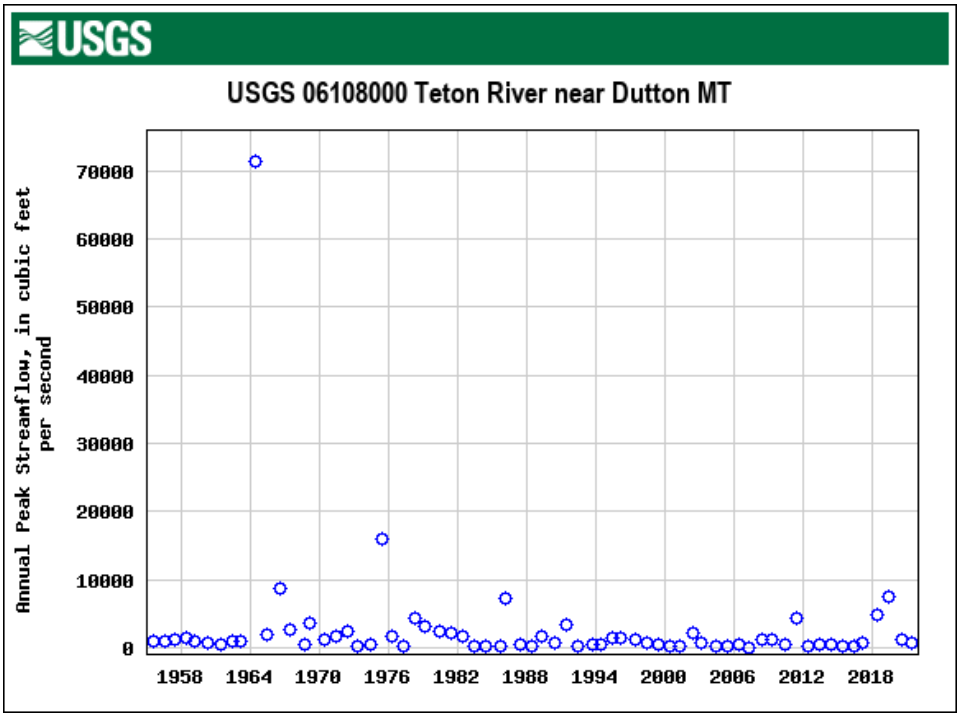


Figure11. Annual Peak Streamflow on the Teton River near Dutton, Montana (USGS, 2019)

Figure 11 shows the annual peak streamflow at the station on the Teton River located near Dutton, Montana. The highest peak occurred on June 9, 1964, just a day later than the record high flows at the Teton River station near Choteau and the station on the North Fork of the Sun River. May 2016 was the lowest peak streamflow, just 92 cfs.

The peak streamflows of June 1964 are measurements taken during a cataclysmic flood that killed 30 people, injured 350 more and caused over 55 million dollars (equivalent to $457 million today) in damage. In some places, peak discharge was as high as 115 times the level of a probable 50-year flood.

Flooding occurred on both sides of the Continental Divide. On the eastern slope, waters overtopped Gibson Dam, breached Two Medicine Lake Dam, and destroyed many smaller structures. Floodwater inundated the city of Great Falls and nearly washed away several smaller communities including Sun River and Dupuyer (Boner, 1967). A detailed report of the conditions that precipitated the flooding, the extent of the areas affected, the amount of damage and much more information, including photographs, can be found in the Geological Survey's Paper 1840-B, Flood of June 1964 in Northwestern Montana, available on the internet at https://pubs.usgs.gov/wsp/1840b/report.pdf.

Since the 1964 flood, spring runoff events have been largely moderate until 2018, when a rain-on-snow event generated a Teton River flood that exceeded a 50-year event. The next year brought another substantial flood in late May of 2019 that exceeded a 10-year event. These floods collectively drove major changes on the Teton River, primarily due to sediment deposition that has driven shifts in channel locations, damaged irrigation structures, bridges, and roads, and rejuvenated aquatic and riparian habitats. Detailed information of the Geomorphic Assessment of Upper Teton River can be found in the November 2020 report prepared for the Teton Conservation District and Montana Department of Natural Resources and Conservation (Geomorphic Assessment of Upper Teton River, November 2020).

Current conditions and historical data on all stream gages throughout the state can be accessed at the USGS National Water Information System Web Interface at https://waterdata.usgs.gov/mt/nwis/current/?type=flow&group_key=county_cd

Hydrography

The Hydrologic Unit Code (HUC) is a numbering system for watersheds developed by the U.S. Geological Survey (USGS) to provide a common coding system for State and Federal agencies. The United States has been mapped with three levels of hydrological unit codes: 8-digit codes for large watersheds known as sub-regions, 10-digit codes for watersheds, and 12-digit codes for the smaller sub-watersheds.

Six major fourth level (8-digit) watersheds or sub-regions divide Teton County; they are shown as black polygons and labeled in black in Figure 12. Fifth level (10-digit) watersheds are drawn and labeled in brown; 12-digit sub-watersheds appear in the image as colored polygons.

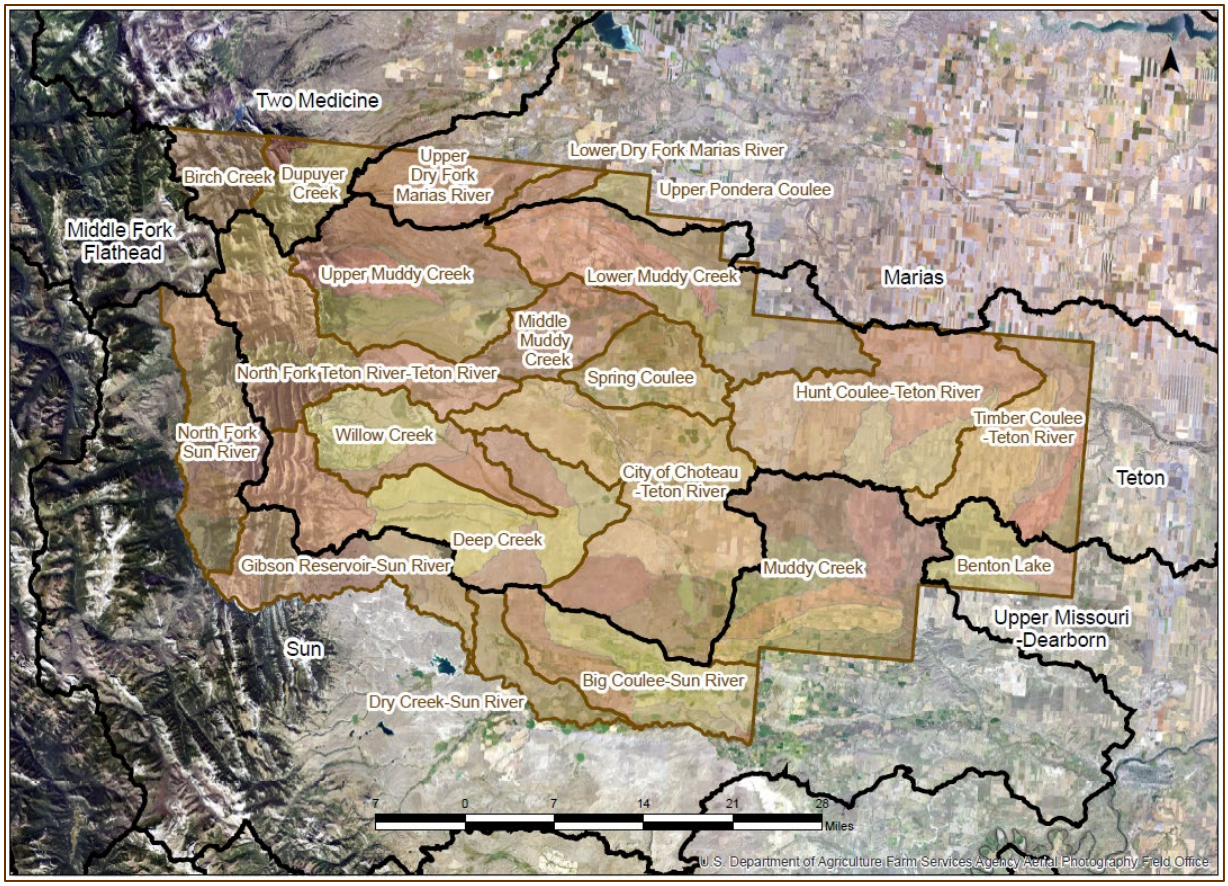


Figure 12 Teton County Hydrologic Units

Irrigation Districts

Three hundred forty farms in Teton County grew irrigated crops on 93,837 acres in 2017 **(USDA NASS, 2019)**. Five Irrigation Districts provide water to most of these farms.

- Greenfields Irrigation District is located north of the Sun River and extends from Highway 287 (the Choteau-Augusta Highway) eastward to Muddy Creek. The Sun River Project (US Bureau of Reclamation) is comprised of the Greenfields Division headquartered in Fairfield, Teton County, and the Fort Shaw Division with headquarters in Ft. Shaw, Cascade County. The District irrigates a total of 83,000 acres along 377 miles of lateral canals; 70,000 of the acres are in Teton County. Most of the water comes from rain and snowmelt, with some from underground springs.

- The Teton Co-operative Canal Company is linked to the Eureka reservoir which supplies water during the latter part of the irrigation season when the Teton River becomes depleted. The canal is 16 miles long and feeds approximately 15 miles of lateral ditches irrigating around 4,700 acres of cropland.

- El Dorado Cooperative Canal Company is one of the oldest in Teton County. Its articles of incorporation are dated May 23, 1883. All the water rights owned and used by the Eldorado

Co-operative Canal Company were decreed in the adjudication of the Teton River. This company diverts directly out of the Teton River into a main canal which flows northeast for 14.5 miles. The system provides water for somewhere between 13,000 and 15,000 acres.

- Farmers' Co-operative Canal Company manages a system that includes two storage reservoirs east of Bynum Reservoir, Harvey Lake (a natural lake) with a capacity of 2,100 acre-feet and Farmers Lake (constructed) with a capacity of 2,400 acre-feet. A feeder canal from the Teton River supplies water for storage in both lakes, flowing first into Harvey Lake then to Farmers Lake. From there, water flows through the main canal to irrigate 5,000 to 7,000 acres.

- The Bynum Irrigation District was created in conjunction with the Teton Co-operative Reservoir Company. Bynum Reservoir is the source of water for the district. Bynum Reservoir has a maximum capacity of 90,000 acre-feet. Water comes from the Teton River to the reservoir and is then conveyed to croplands through lateral canals. The district encompasses 32,436 acres of which 20,538 acres are irrigated cropland.

- The Brady Irrigation District, located in Pondera County, has developed its own water rights and canal from Muddy Creek. It also uses water rights from the Teton Co-operative Reservoir Company to supplement its Muddy Creek water rights.

Groundwater

Montana Bureau of Mines and Technology (MBMG) Groundwater Information Center (GWIC) provides statistics pertaining to groundwater for all Montana counties. GWIC has records for 2,756 wells in Teton County including the 21 wells that were drilled in 2019. The oldest well in the county was drilled in 1887, the deepest well is 1,907 feet and the shallowest is three feet deep.

GWIC also maintains the Statewide Monitoring Network of groundwater wells; there are ten monitoring wells in Teton County. Groundwater level and water quality measurements are collected over time to determine normal water levels in wells, changes in water levels relative to climatic conditions, responses of water levels to development, and long-term water-quality trends (MBMG, 2019). Locations, histograms of static water level and other information can be accessed at:

http://mbmggwic.mtech.edu/sqlserver/v11/data/dataProject.asp?MTCounty=WIBAUX&project=GWAAMON&datatype=swl&

Table 4 lists the geologic sources of groundwater and the number of wells drawing from each. Groundwater well uses and number of wells in each category are listed as are the number of wells drilled to eleven 100-foot depth ranges.

Table 4 Groundwater Source, Water Use and Depth for Most of the Wells in Teton County

Source	Number of Wells
Sand and Gravel (Pleistocene)	882
Sand and Gravel (Holocene)	380
Alluvium (Quaternary)	242
Two Medicine Formation	212
Virgelle Sandstone Member of the Eagle Sandstone Formation	126
Colorado Shale	99
Glacial Drift	57
Alluvium (Pliestocene)	46
Terrace Deposits (Quaternary)	43
Telegraph Creek Formation	29
Alluvial Fan Deposits	23
Alluvium	14
Marias River Fromation	13
Glacial Outwas (Pleistocene)	11
Ellis Group	10
Madison Group	10
Kootenai Fromation	7
Kevin Shale Member of the Marias River Formation	7
Terrace Deposits (Pleistocene)	5
Alluvial Fan Deposits (Holocene)	5
Other	24

Use	Number of Wells
Domestic	1466
Stockwater	972
Monitoring	525
Irrigation	273
Public Water Supply	75
Test Wells	27
Geotech	26
Industrial	11

Depth in Feet	Number of Wells
0-99	2412
100-199	244
200-299	62
300-399	16
400-499	8
500-599	4
600-699	3
700-799	2
800-899	1
900-999	1
>1000	3

Water Quality

The Teton and Sun Rivers are both listed as impaired water bodies. Weeds, run-off, flow and habitat alteration and siltation are problems. Watershed groups representing multiple parties have been successful in developing plans and implementing projects to improve water quality and quantity.

303(d) Listed Streams

Section 303(d) of the Clean Water Act requires states, territories, and authorized tribes to develop, and update every two years, lists of water that are impaired or threatened by one or more pollutants. Impaired waters are those that don't meet one or more Water Quality Standards.

A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody for the waterbody to meet water quality standards for that pollutant. Information about the Clean Water Act, impaired waters, TMDL calculations and other topics pertaining to water quality can be found on the Environmental Protection Agency's Impaired Waters and TMDLs website at: https://www.epa.gov/tmdl/overview-total-maximum-daily-loads-tmdls#1

Twenty-two waterbodies appear on the 303(d) list for Teton County. Each waterbody is assigned an assessment category based on its level of impairment.

> *Category 1: For which all applicable beneficial uses have been assessed and all uses are determined to be fully supported.*

- South Fork of Birch Creek.
- North Fork of Dupuyer Creek from the Bob Marshall Wilderness boundary to the mouth.
- McDonald Creek, the entire stream.
- Blackleaf Creek, headwaters to Cow Creek.
- North Fork of the Teton River, from the Wilderness boundary to the mouth.
- Clark Fork Muddy Creek, headwaters to Muddy Creek.

Category 2: Available data and information indicate that some, but not all the beneficial uses are supported.

- Gibson Reservoir
- Bynum Reservoir

Category 3: Waters for which there is insufficient data to assess the use-support of any applicable beneficial use; no use-support determinations have been made.

- Muddy Creek, headwaters to the mouth at the Teton River.

Category 4A: All TMDLs needed to rectify all identified threats or impairments have been completed and approved.

- Sun River, Gibson Dam to Muddy Creek
- Muddy Creek, headwaters to the mouth at Sun River
- Teton River, Deep Creek to Muddy Creek and Muddy Creek to the Marias River
- Willow Creek, entire stream
- Deep Creek, Willow Creek to the mouth at the Teton River
- Priest Butte Lake

Category 4B: Waterbodies are on lands where "other pollution control requirements required by local, state, or federal authority" [see 40 CFR 130.7(b)(1)(iii)] are in place, are expected to address all waterbody-pollutant combinations, and attain all WQS in a reasonable period of time. These control requirements act "in lieu of" a TMDL, thus no actual TMDLs are required.

Category 4C: Identified threats or impairments result from pollution categories such as dewatering or habitat modification and, thus, a TMDL is not required.

- South Fork of Dupuyer Creek, Bob Marshall Wilderness to the mouth at Dupuyer Creek.
- Blackleaf Creek from Cow Creek to the mouth at Muddy Creek.
- Teton River, North and South Forks to Deep Creek.

Category 5: Waters where one or more applicable beneficial uses are impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat.

- Lake Creek, entire stream.
- Pondera Coulee, entire stream.

Category 5/5N: Available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified manmade sources.

- Dupuyer Creek from the confluence of South Fork and Middle Fork Dupuyer Creek to Birch Creek (Montana DEQ, 2019).

These waterbodies are shown in Appendix A6. Information on the probable causes and sources of impairments affecting these waterbodies is available from Montana Department of Environmental Quality (DEQ) at:
http://svc.mt.gov/deq/dst/#/app/cwaic/results/cycle/2018/county/Teton%2520County/0/0

Water Rights

Water rights for the Teton and Sun River basins are under a preliminary decree. The Teton River is subject to legislative closure for new water rights. Additionally, irrigation practices may affect water tables in some areas.

Air & Energy:

Air Quality

Non-point sources of air pollution such as unpaved roads and cropland create air quality resource concerns in Teton County. Extremely windy days increase dust levels from gravel roads and poorly protected dry cropland. Dust from cropland has been somewhat mitigated in recent years due to the Conservation Reserve Program (CRP). Wildfires in the region tend to be frequent and of high intensity. They can create hazardous conditions of rapidly degrading air quality and reduced visibility.

Montana Department of Environmental Quality Air Quality Bureau maintains 21 air quality monitoring stations throughout the state. Nearest to Teton County are the Great Falls, Helena, Seeley Lake and Cut Bank stations. Ambient temperature, wind speed and direction and pollutants including NO, NO2, NOX, SO2, ozone and particulate matter are monitored. Ambient air quality monitoring information is available as maps, reports, and searchable data from the DEQ website at https://deq.mt.gov/Air/CurrentAQ.

Utilities

Most of Teton County is classified as Class 3 or “Fair” for potential wind energy development. Other parts of the county have good to excellent wind resources. Currently there are two wind energy projects in Teton County. The wind farm north of Fairfield was completed in 2014. It has six towers and produces 10 megawatts of electricity. (MT DEQ, 2019). Greenfield Wind is adjacent to the Fairfield facility. It came on-line in 2016. The wind farm is rated at 29.9 mega-watts; it has 13 towers with rotor diameters of 351 feet (MSU, 2019).

Many of the residences and businesses in Teton County purchase electricity from Sun River Electric Co-operative, a member of Central Montana Electric Power. Sun River Electric serves 3,073 members with 2,806 miles of power lines in Teton and adjacent counties. NorthWestern Energy provides service to areas of Montana, South Dakota, and Nebraska. Parts of Teton County are included in its service area; the local office is in Black Eagle, Montana in Cascade County.

Petroleum Industry

The Soil Survey of Choteau Conrad Area states, "Teton and Pondera Counties have produced significant quantities of oil and gas since deposits were discovered in the Sweetgrass Arch in the latter part of the 1920s. The Sweetgrass Arch is a gentle, north-plunging anticline 150 miles long and 60 miles wide that formed during the mid-Tertiary orogeny. The southwestern tip of the Northern District extends into the survey area and consists of more than twenty separate oil and gas fields" (USDA NRCS, 2003).

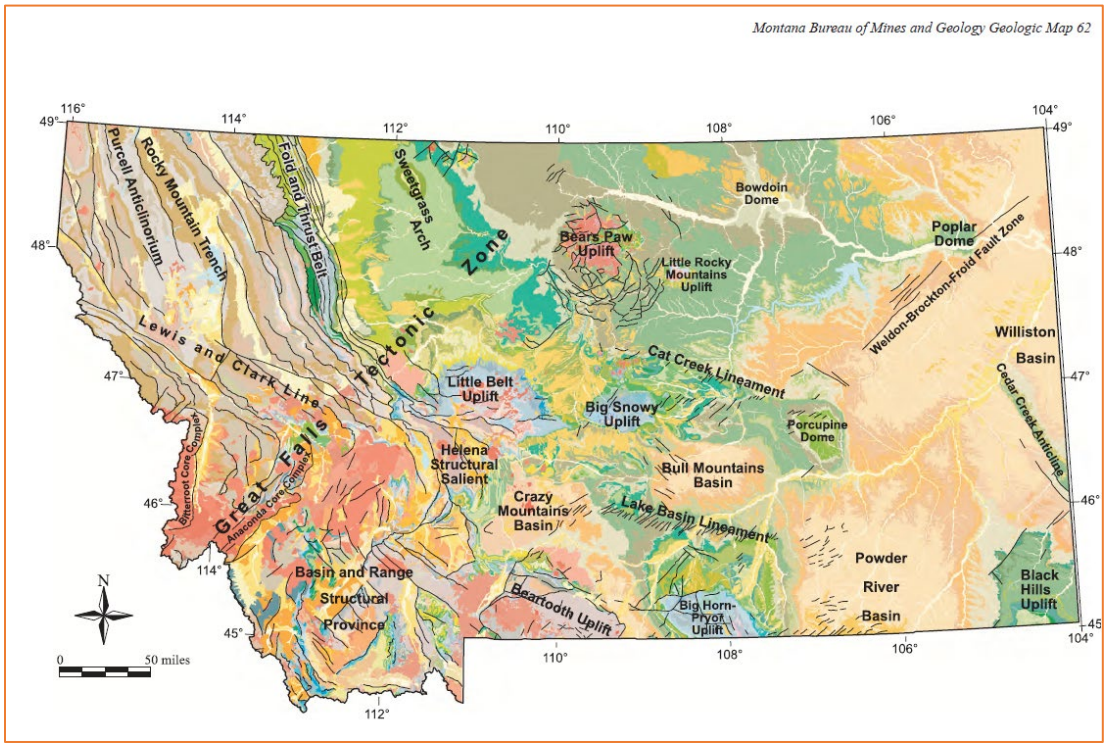


Figure 13 Montana Geologic Map showing the Sweetgrass Arch in north-central Montana **(MBMG, 2019)**.

Currently Teton County is ranked number 16 in Montana for total oil production. There are 82 active wells in the county (ShaleXP, 2019). Montana Department of Resources and Conservation (DNRC)'s Board of Oil & Gas Conservation data shows annual oil production from 1986 to 2019. Peak annual production was 138,197 barrels[2] in 1986. Production declined steadily through 1999, then began to stabilize somewhat with annual production ranging between 52,000 and 62,000 barrels per year (MT DNRC BOGC, 2019). For comparison, data collected through the same time period in Richland County, ranked number one in Montana, shows peak production in 2006 of over 21 million barrels. While production of crude oil and natural gas remain important to Teton County's economy, the industry is not nearly as lucrative as in other areas of the state.

Plants & Animals

Wetlands and Riparian Area

Wetlands play an extremely important role in Teton County. In addition to providing habitat for wildlife, they have the ability to clean the water that flows through them, mitigate large flood events and

[2] One barrel of oil is equivalent to 42 U.S. gallons.

recharge underground aquifers. Wetlands also help with climate change as they have the ability to store carbon.

Figure 14 shows the status of Montana Natural Heritage Program (MNHPO) Wetland Mapping in Teton County. Blue represents areas where wetland mapping is yet to be updated and only outdated information is available.

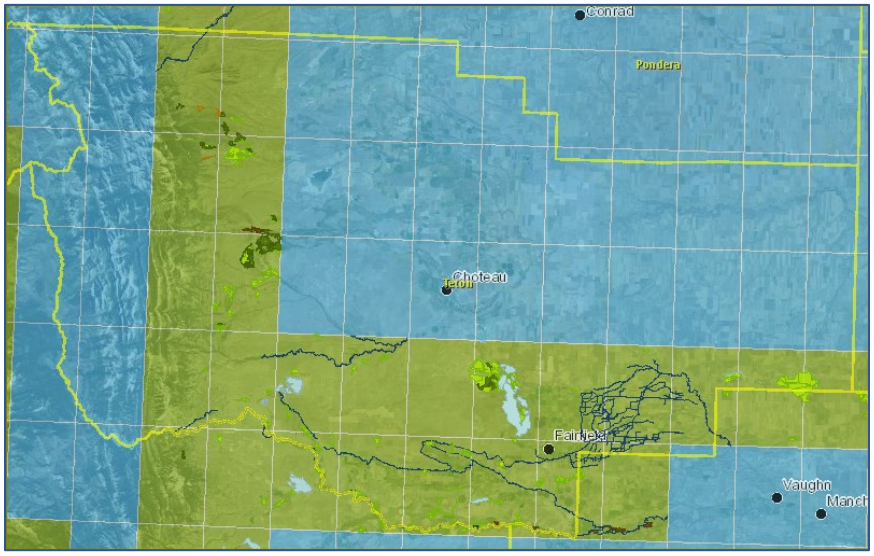


FIGURE 14 MNHP WETLANDS MAPPING STATUS

MNHP Wetlands Map Viewer provides the following information on wetlands and riparian systems for the parts of the county have been updated.

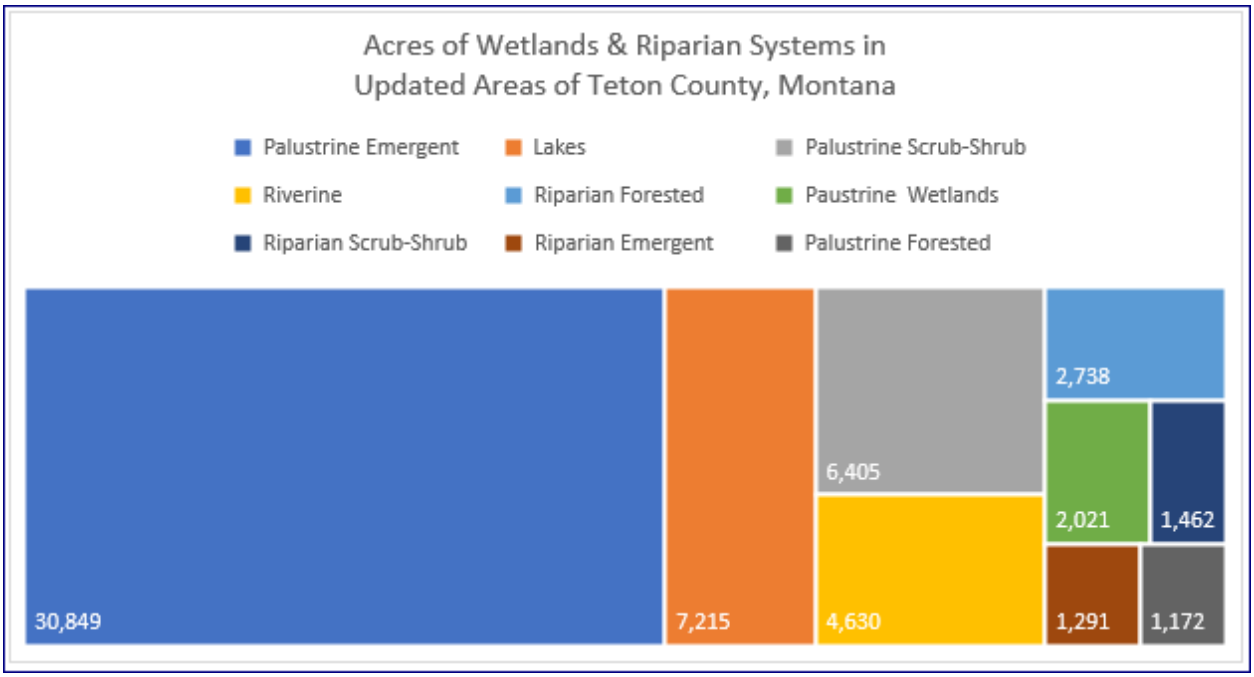


FIGURE 15. ACRES OF WETLANDS & RIPARIAN SYSTEMS IN UPDATED AREA

Owing to the proximity of the mountains, the soils, climate, topography and other characteristics, wetlands and riparian systems of various types and sizes are common throughout Teton County. Appendix A7 is a map of wetlands around Freezeout Lake and to the south, the Sun River. Freshwater emergent wetlands appear to be the most common system in this part of the county. Riparian forest, riparian emergent and riparian scrub-shrub areas occur along the banks of the Sun and Teton Rivers as well as intermittently along most other major streams.

Definitions:

Palustrine systems are vegetated wetlands commonly known as marshes, swamps, bogs, and fens. They include small, shallow, permanent, or intermittent ponds. They may also occur as islands in lakes or rivers.

Riverine Systems include all wetlands and deep-water habitats within the river channel.

Forested wetlands or riparian areas are dominated by woody vegetation more than 20 feet tall.

Scrub-shrub systems are dominated by woody vegetation that is less than 20 feet tall.

Emergent systems are those wetland or riparian zones supporting rooted herbaceous vegetation during most of the growing season.

A lake is any large body of water greater than 20 acres in size or more than 6.6 feet deep; a pond is a waterbody less than 20 acres in size and less than 6.6 feet deep.

Wildlife

Most of the central and eastern areas of the county are inhabited and agriculturally oriented. Wildlife that occurs in these areas include deer, birds, fish, and grass plant species. The Rocky Mountain Front is recognized for exceptional wildlife values and is part of the Lewis and Clark National Forest which encompasses the western edge of Teton County. Much wildlife habitat is located on public lands or protected with conservation easements which need to be coordinated with local agencies.

In 2014, Teton County ranked seventh in the state of Montana for acres enrolled in CRP. At that time there were 83,075 acres enrolled in the program. Figure 16 tracks CRP enrollment from 1996 to 2014. Data points representing the lowest (1996) and highest number of acres (2006) are labeled (EWG, 2019).

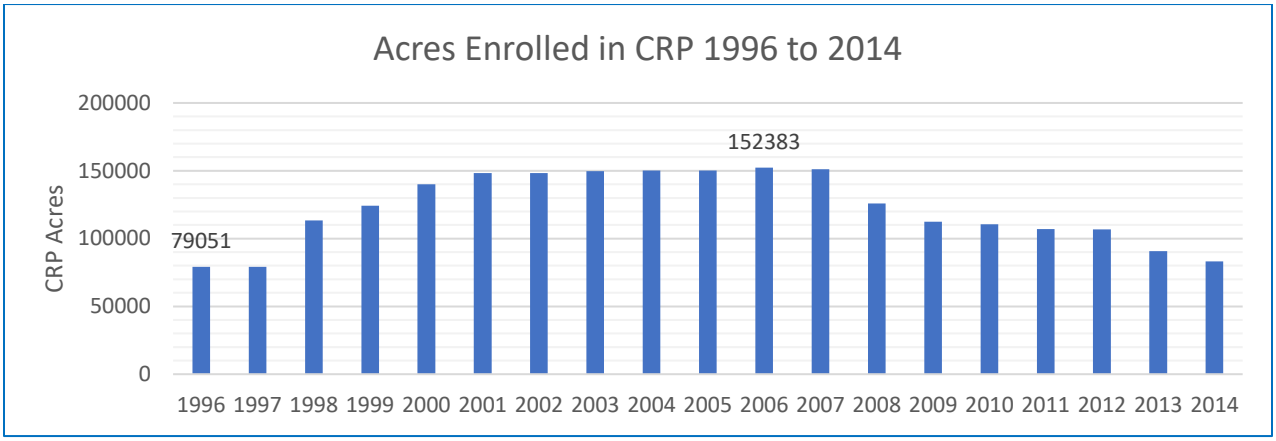


Figure 16, Conservation Reserve Program, Teton County, Montana

Teton County is projected to lose even more CRP acres; losses are estimated to be between 50,000 – 95,000 acres by 2021. The decrease in CRP acres affects upland game birds, short-eared owls, ungulates, small mammals, and songbirds.

Animal Species of Concern, Federally Listed Species

In order to receive protection under the Endangered Species Act, a species, subspecies, or distinct population segment must be placed on the Federal list of endangered and threatened species. A species listed as *endangered* is one that is in danger of extinction throughout all or a significant portion of its range. A species listed as *threatened* is one that is likely to become endangered within the near future throughout a significant portion of its range. A *proposed* species is one listed under the Endangered Species Act and a candidate is a species which US Fish and Wildlife Service (USFWS) or NOAA Fisheries has enough information on biological vulnerability and threats to support a proposal to list as endangered or threatened but is precluded by other higher priority listing actions. The USFWS Endangered, Threatened, Proposed and Candidate Species, Montana Counties Report, (December 12, 2019) includes two shorebirds and three mammals in Teton County (USFWS MT, 2019).

Piping Plover (*Charadrius melodus*)—Listed Threatened Piping plover populations are in decline due to habitat loss caused by alterations to river systems. These small shorebirds are distinguished by a single black band around their necks and very short yellow-to-orange bills with black tips. Piping Plovers nest on shorelines and islands of alkali lakes in North Dakota and Montana and on sandbar islands and reservoirs shorelines along the Missouri Rivers. Dam construction, water diversion and water withdrawals change river flow and drastically reduce the amount of available nesting habitat. Human activity has increased predation which decreases nest success and chick survival. (MT NHP, 2019). Critical habitat has been designated by USFWS for piping plover, but none occurs in Teton County (Zieglar, 2020).

Figure 17. Piping Plover

Figure18. Red Knot

Red Knot (*Calidris canutus rufa*)—Listed Threatened. The red knot is a medium-sized bulky sandpiper that exhibits distinctive reddish plumage during the breeding season. These birds migrate between their arctic tundra breeding grounds and marine winter habitat as far south as Tierra del Fuego. They commonly use stopover sites in the Northern Great Plains. Most observations in Montana occur in May; these have been rare.

Red knots are a global species; there are three subspecies in North America, and they all appear to be in decline. According to the USFWS, red knots depend on suitable habitat, food, and weather conditions at sites across the Western Hemisphere. They must be able to find favorable conditions at stopover sites within narrow seasonal windows as they migrate. Human development is one cause of the species' decline. Climate change is known to be another as it affects the arctic tundra

ecosystem, the quality and availability of coastal habitats and the invertebrate food resources throughout the birds' range (MNHP, 2019).

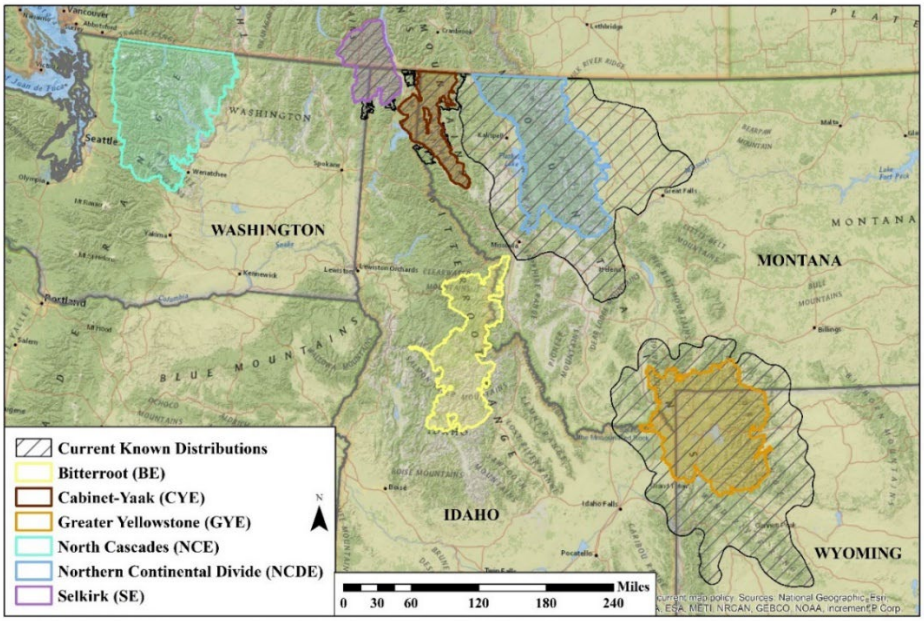
Grizzly Bear (*Ursus arctos horribilis*)—Listed Threatened

Grizzly bears are the second largest bear in North America after the polar bear. Grizzly bears can weigh as much 1500 pounds although most are between 350 and 850 pounds. Average adult height (standing on all fours) is around 42 inches. Males are much larger than females, with weights averaging 1.8 times greater. Their coloring varies across geographic areas from blond to deep brown or black. These differences, once attributed to sub-speciation, are now thought to be primarily due to the environment, particularly diet and temperature. Grizzlies are opportunistic carnivores; they will feed on whatever is available. Grizzlies' diets can include fungus, berries, plants roots, insects, small mammals, fish, fawns, elk and bison calves and carrion.

Female grizzlies begin bearing young at 3 to 8 years of age. Cubs are born in dens in late January or early February. Typically, half of all grizzly bear cubs die within their first year. Surviving cubs will remain with their mother for up to three years, during which time the mother will not mate (Western Wildlife Outreach, 2019).

The grizzly bear's historic range stretched across western North America, from the plains to California, and from central Mexico to Alaska. After the arrival of European settlers, grizzly bear populations were eliminated from all but approximately 2 percent of their historic range in the lower 48 states. Under the authority of the ESA, USFWS listed the grizzly bear as a threatened species in the lower 48 states in 1975. The recovery of the grizzly bear centered on establishing viable populations in six ecosystems where the species was known to or believed to exist when it was listed in 1975 (USFWS, 2019). These are now known as recovery zones, shown in Figure 19. Teton County occurs in the NCDE Recovery Zone (Zieglar, 2020).

Grizzly Bear Recovery Zones and Distributions



Estimated distributions are current as of 2018 for the GYE and the NCDE and are current as of 2017 for the CYE and the SE. The distribution for the NCE is currently unknown and a draft EIS was released in early 2017 to examine recovery options. The BE is currently unoccupied with a reintroduction proposal and a non-essential experimental population status.

Figure 19. Grizzly Bear Recovery Zones and Distribution. **(USFWS, 2019)**

It is estimated that prior to settlement 50 to 100,000 grizzly bears lived in the wilderness of the western United States. Excessive overhunting and loss of habitat have reduced populations less than 1,500 (National Wildlife Federation, 2019). Grizzly bears face continuing threats from climate change, dwindling key food resources (such as white bark pine seeds, cutthroat trout, and winter-killed ungulate carcasses), illegal poaching, lack of connectivity among populations, and the negative impacts of a crisscrossing system of roads fragmenting their habitat (WildEarth Guardians, 2019).

Canada Lynx (*Lynx canadensis*)—Listed Threatened, Designated Critical Habitat

The Canada lynx is a mid-size wild cat that lives in the boreal forest. Lynxes have short tails, long legs, and dark tufts at the tips of their ears. In the winter they are light grey with some mottling. In the summer their coats are shorter and reddish-brown.

Large feet, which are covered during winter by a dense growth of coarse hair, help the lynx to travel over snow. Canada lynx are solitary hunters, mostly active at night. In the northern part of its range, the lynx mostly hunts snowshoe hare. Hare populations follow a natural cyclical pattern, changing approximately every 10 years from abundance to scarcity and back. Adult lynx usually survives periods of hare scarcity, but their kittens often do not. As a result, the lynx population follows a similar pattern, with its peaks and valleys lagging one to two years behind those of the hare.

Figure 20. Canada Lynx

Lynxes are among the most endangered felines in North America, with only a few hundred animals suspected to remain in the lower 48 states. The greatest threat to Canada lynx are over-trapping and habitat destruction and fragmentation (Endangered Species Coalition, 2019).

Wolverine (*Gulo luscus*)—Proposed

Figure 21. Adult Wolverine

The wolverine is the largest land-dwelling member of the Mustelidae family which included weasels, otters, and badgers, among many others. Adult males weigh 26 to 40 pounds and adult females weigh up to 26 pounds. The wolverine has a broad, rounded head; short, rounded ears; and small eyes. Each foot has five toes with curved, semi-retractable claws used for digging and climbing. Wolverines are opportunistic omnivores and will eat carrion, small animals and birds, fruit, berries, and insects. Wolverines require a lot of space. The availability and distribution of food sources is likely the primary factor in determining wolverine movements and home range size (USFWS, 2019).

Currently, wolverines are found in the North Cascades in Washington and the Northern Rocky Mountains in Idaho, Montana, Oregon, and Wyoming. The total population in the lower 48 states is

estimated to be less than 300 (Painter, 2019). Threats to wolverine populations mostly come from expanding human activities in the back country. Climate change poses another set of challenges. Wolverines are "specially adapted to, and highly dependent on, habitats with year-round cool conditions and lingering snowpack. Although polar regions are heating up faster than other latitudes, similar temperature increases are happening in the planet's high altitudes, such as the Rockies. If climate change continues as predicted, wolverines could lose one-third of their present range south of Canada by 2050, and two-thirds before the end of this century" (Chadwick, 2019).

Plant Species of Concern, ESA Candidate Species

The USFWS Endangered, Threatened, Proposed and Candidate Species, Montana Counties Report, (October 8, 2019) for Teton County includes the whitebark pine. (USFWS MT, 2019).

Whitebark Pine (*Pinus albicaulis*)—Candidate Species

Whitebark pine is a 5-needled conifer classified as a stone pine which includes five species worldwide. Stone pines are distinguished by large, dense seeds that lack wings and therefore depend upon birds and squirrels for dispersal across the landscape. Whitebark pine is a common component of subalpine forests and a dominant species of tree line and Krumholtz[3] 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 mountain pine beetle outbreaks and the introduced pathogen, white pine blister rust. The results 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 (MNHP, 2019).

Figure 22 Whitebark Pine

Whitebark pine is typically found in cold, windy, high elevation or high-altitude sites in western North America and as a result, many stands are geographically isolated. It is a stress-tolerant pine whose hardiness allows it to grow where other conifer species cannot. Whitebark pine is considered a keystone species because it regulates runoff by slowing snowmelt, reduces soil erosion by initiating early succession after fires and other disturbances, and provides seeds that are a high-energy food source for some birds and mammals (USFWS, 2019).

Plant Species of Concern

Montana Natural Heritage Program Field Guide describes plant Species of Concern as, "Native taxa that are at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors". Montana Natural Heritage Program's Plant Species of Concern report lists 41 species of

[3] Krumholtz (or Krummholz) refers to the zone between the timberline and more open alpine vegetation where trees are limited by harsh temperatures and strong winds, and grow in dense, shrub-like forms often bent away from the direction of prevailing winds.

concern for Teton County. The plants listed in Table 5 occur rarely in the county and exhibit traits of environmental specificity allowing them to survive only in very particular niches.

Table 5 Teton County Plant Species of Concern

Scientific Name	Common Name	Family	State Rank	Habitat
Cinclidium stygium	A Cinclidium Moss	Mniaceae	S1	
Scorpidium scorpioides	A Scorpidium Moss	Amblystegiaceae	S2	
Salix serissima	Autumn Willow	Salicaceae	S3	Wetland/Riparian
Eleocharis rostellata	Beaked Spikerush	Cyperaceae	S3	Wetlands (Alkaline)
Catoscopium nigritum	Black Golf Club Moss	Catoscopiaceae	S1	
Gratiola ebracteata	Bractless Hedge-hyssop	Plantaginaceae	S2	Wetland/Riparian
Salix cascadensis	Cascade Willow	Salicaceae	S2	Alpine
Carex incurviformis	Coastal Sand Sedge	Cyperaceae	S2?	Wetland/Riparian
Carex crawei	Crawe's Sedge	Cyperaceae	S2S3	Wetland/Riparian
Saussurea densa	Dwarf Saw-wort	Asteraceae	S2S3	Alpine
Epipactis gigantea	Giant Helleborine	Orchidaceae	S2S3	Wetland/Riparian
Downingia laeta	Great Basin Downingia	Campanulaceae	S2S3	Shallow water ponds, lakes
Lobelia kalmii	Kalm's Lobelia	Campanulaceae	S3	
Erigeron lackschewitzii	Lackschewitz' Fleabane	Asteraceae	S3	Alpine
Astragalus lackschewitzii	Lackschewitz' Milkvetch	Fabaceae	S2S3	Alpine
Asplenium trichomanes-ramosum	Limestone Maidenhair Spleenwort	Aspleniaceae	S3	
Scorpidium revolvens	Limprichtia Moss	Amblystegiaceae	S1	
Elodea bifoliata	Long-sheath Waterweed	Hydrocharitaceae	S2?	Wetland/Riparian (Shallow water)
Braya humilis	Low Braya	Brassicaceae	S2	Alpine
Gentianopsis macounii	Macoun's Gentian	Gentianaceae	S2	Fens
Equisetum pratense	Meadow Horsetail	Equisetaceae	S2	
Primula incana	Mealy Primrose	Primulaceae	S3	Wetland/Riparian
Meesia triquetra	Meesia Moss	Meesiaceae	S2	
Phlox kelseyi var. missoulensis	Missoula Phlox	Polemoniaceae	S3	Slopes and ridges open areas in foothills to subalpine
Botrychium sp. (SOC)	Moonworts (SOC)	Ophioglossaceae	S1S3	
Ranunculus pedatifidus	Northern Buttercup	Ranunculaceae	S3	Meadows in woodlands in montane to alpine areas
Elymus innovatus	Northern Wildrye	Poaceae	S2	Wetland/Riparian (mesic openings /streambanks, low-elevation)
Pedicularis contorta var. ctenophora	Pink Coil-beaked Lousewort	Orobanchaceae	S2S3	Slopes (Montane/Subalpine)
Physaria saximontana var. dentata	Rocky Mountain Twinpod	Brassicaceae	S3	Gravelly slopes and talus in montane and subalpineregions
Trichophorum pumilum	Rolland's bulrush	Cyperaceae	S3	Fens
Amerorchis rotundifolia	Round-leaved Orchis	Orchidaceae	S3	Wetland/Riparian
Physaria ludoviciana	Silver Bladderpod	Brassicaceae	S2S3	Sandy sites
Kobresia simpliciuscula	Simple Kobresia	Cyperaceae	S3	Alpine
Carex stenoptila	Small-winged Sedge	Cyperaceae	S2S3	Grasslands (Montane)
Cypripedium passerinum	Sparrow's-egg Lady's-slipper	Orchidaceae	S2S3	Forests (Mesic bottoms)
Oxytropis podocarpa	Stalked-pod Locoweed	Fabaceae	S1	Alpine
Juncus acuminatus	Tapered Rush	Juncaceae	S1	Wetland/Riparian
Trichophorum cespitosum	Tufted Club-rush	Cyperaceae	S2	Fens and wet meadows
Ageratina occidentalis	Western Joepye-weed	Asteraceae	S2	Rock and talus slopes
Pinus albicaulis	Whitebark Pine	Pinaceae	S3	Subalpine forest, timberline
Lilium philadelphicum	Wood Lily	Liliaceae	S3	

State Ranking is categorized as follows:

S1: At high risk because of extremely limited and/or rapidly declining population numbers, range and/or habitat, making it *highly vulnerable* to global extinction or extirpation in the state.

S2: At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it *vulnerable* to global extinction or extirpation in the state.
S3: Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas (MNHP, 2019).

Animal Species of Concern

Montana Natural Heritage Program's Animal Species of Concern report lists 60 species of concern for Teton County. These are shown in Appendix A8.

Pollinators

According to USFWS, the most significant threats to pollinators involve loss of habitat or declining habitat quality. "As native vegetation is replaced by roadways, manicured lawns, crops and non-native gardens, pollinators lose the food and nesting sites that are necessary for their survival." Improper use of pesticides is known to adversely affect pollinators and their habitat as well. USFWS writes, "Pesticides are used in nearly every home, business, farm, school, hospital and park in the United States…[They] are found almost everywhere in our environment" (USFWS, 2019). Pesticides are routinely used in farming operations to control plant and invertebrate pests.

Aquatic Invasive Species (AIS)

Aquatic invasive species have not been identified as a resource concern in Teton County as they have in other areas of Montana. For information about aquatic invasive species, laws and regulations, maps of known locations and distribution and more, visit Montana Fish, Wildlife & Parks Aquatic Invasive Species web page at http://fwp.mt.gov/fishAndWildlife/species/ais/.

Noxious and Invasive Species

Teton County Weed Coordinator Mark Korte reports that among the noxious weed species known to be present in the county, spotted knapweed (*Centaurea maculosa*) is the "biggest threat to wildlife and agriculture". Korte also notes that there is "a lot" of leafy spurge in the county (Korte, 2019).

Houndstongue (*Cynoglossum officinale*) has infested many areas throughout the county, but Korte pins hope on a bio-control agent that is slowly moving south from Alberta, Canada. *Mogulones crucifer* is a root weevil that has had lasting population level impacts on houndstongue in Alberta and British Columbia (Montana Invasive Species Council, 2019). In October 2019, the insect had not yet been approved for use in the United States; it is illegal to intentionally move them across the border. It is hoped that the insect's range will continue to expand to the south as it becomes adapted to the climate in Montana. In time it may achieve the same level of control of houndstongue seen in Canada. In the meantime, Montana Invasive Species Council (MISC) has issued recommendations to guide the potential for approval of *M. crucifer* for classical biocontrol of houndstongue in the U.S. MISC recommendations and more information on invasive species is available at misc.mt.gov.

Other noxious weeds that are appearing in the county or are on the county watch list are whitetop (*Cardaria draba*), dalmatian toadflax (*Linaria dalmatica*) and Russian knapweed (*Centaurea repens)*. Ventenata (*Ventenata dubia*) is a winter annual grass that has become a problem in the western U.S. and several Montana counties. It is not known to be established in Teton County, but the County Weed

District is already committed to a program that focuses on preventing Ventenata establishment and immediate treatment of new infestations (Korte, 2019).

SECTION III CONSERVATION ACTIVITY ANALYSIS

Recent NRCS Works

The NRCS office in Teton County is in the town of Choteau. The office is housed in the USDA building along with the Farm Service Agency (FSA) and U.S. Forest Service (USFS) Rocky Mountain Ranger District.

Historically, the NRCS Choteau Field Office worked with the Teton Conservation District to address priority natural resource concerns identified by the Local Working Group. The priority has altered between grazing land resource conservation and issues associated with irrigated crop production. Financial assistance has been provided primarily through the Environmental Quality Incentive Program (EQIP).

Prior to fiscal year 2010, EQIP funding was allocated by percentage to four land-use initiatives. In Figure 23, the Dry category refers to dryland farming.

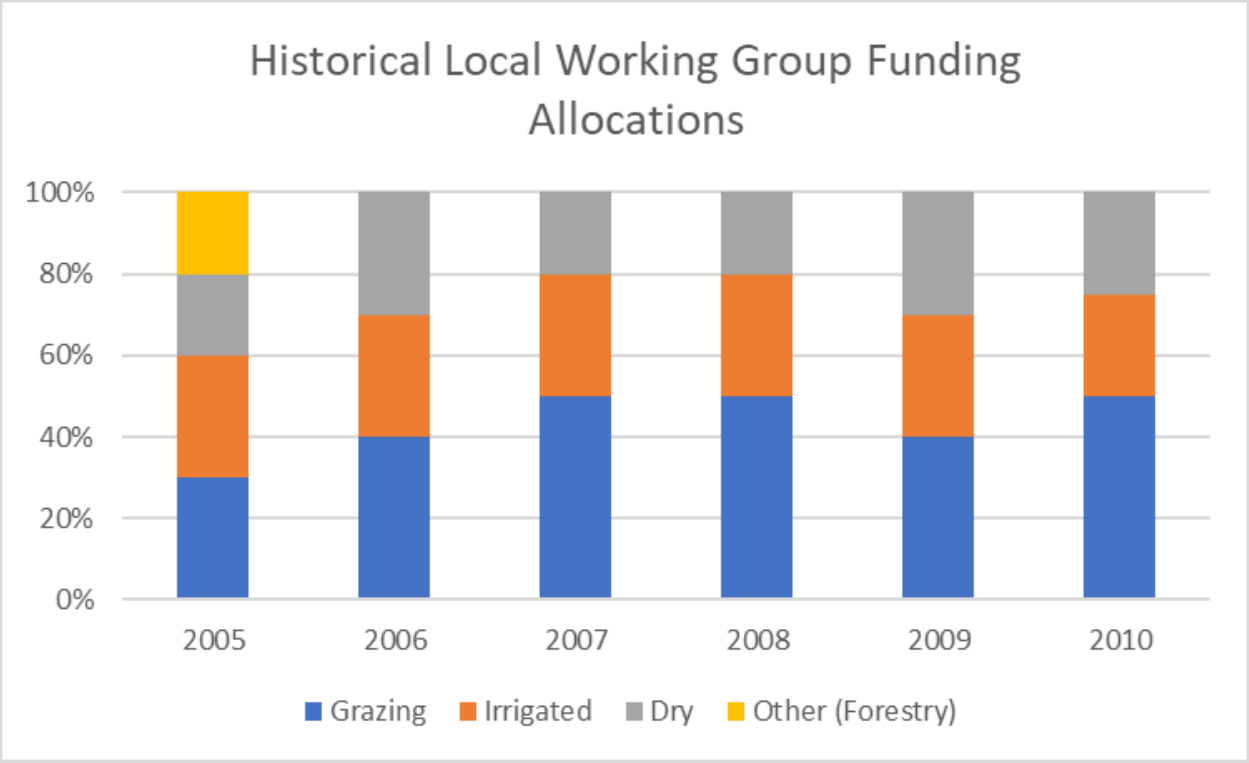


Figure 23 EQIP Allocations, 2005 through 2010

Starting in 2011, resource priorities were chosen based on land use. The Local Working Group did not meet in 2014.

Table 6 Local Working Group's Priority Resource Concerns 2011 through 2018.

2011	2012	2013	2015	2016	2017	2018
Resource Concerns						
Water Resources Management	Water Resources Management	Soil Quality	Native Range Health	Native Range Health	Irrigation Water Management	Irrigation Water Management
Soil Quality	Soil Quality		Irrigation Water Management	Irrigation Water Management	Water Quantity	Water Quantity
			Invasive Weeds & Grasses	Invasive Plants	Native Range Health	Native Range Health
			Erosion Control		Water Quality	Water Quality
			Saline Seeps		Invasive Plants	Invasive Plants
			Native Grassland Conversion			
			Noxious Weeds			

EQIP applications for fiscal year 2019 are 75% irrigation projects and 25% grazing. CSP applications are 90% dry cropland.

EQIP applications for fiscal year 2019 are 75% irrigation projects and 25% grazing. CSP applications are 90% dry cropland.

TABLE 7. NRCS EQIP AND WHIP IMPLEMENTATION OF COMMONLY APPLIED PRACTICES 2004 THROUGH 2018.

Practice Name	Unit	Applied Amount	Number of Projects
Agricultural Energy Management Plan - Written	No	7	7
Spill Prevention, Control and Countermeasure (SPCC) Plan - Written	No	3.00	3
Waste Storage Facility	No	1	4
Herbaceous Weed Treatment	Ac	2000	24
Composting Facility	No	1.00	1
Channel Bank Vegetation	Ac	998.3	1
Conservation Crop Rotation	Ac	200	2
Cover Crop	Ac	567.5	22
Critical Area Planting	Ac	446.4	3
Residue and Tillage Management, Reduced Till	Ac	100.00	1
Well Decommissioning	No	1.00	1
Diversion	Ft	2168	3

Windbreak/Shelterbelt Establishment	Ac	5	7
Fence	Mi	16	30
Field Border	Ft	14072	5
Filter Strip	Ac	7	2
Grassed Waterway	Ac	1.30	1
Irrigation Water Conveyance, Ditch and Canal Lining, Flexible Membrane	Ft	20,340.00	2
Irrigation Pipeline	Ft	15313	11
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic	Ft	18543	11
Irrigation System, Micro irrigation	Ac	0.10	1
Sprinkler System	Ac	2317	38
Irrigation Water Management	Ac	3252.1	56
Land Smoothing	Ac	2.5	2
Forage Harvest Management	Ac	1347.4	31
Forage and Biomass Planting	Ac	164.80	11
Livestock Pipeline	FT	98,211	34
Prescribed Grazing	Ac	15,050	2
Pumping Plant	No	38	38
Range Planting	Ac	1	5
Roof Runoff Structure	No	1	1
Heavy Use Area Protection	Ac	146.4	1
Spring Development	No	7	7
Channel Bed Stabilization	Ft	1.00	1
Structure for Water Control	No	29	29
Nutrient Management	Ac	56,590.30	146
Pest Management Conservation System	Ac	1.00	125
Herbaceous Wind Barriers	Ft	2,200.00	1
Tree/Shrub Establishment	Ac	34	24
Watering Facility	No	32	32
Underground Outlet	Ft	1,794.00	2
Waste Separation Facility	No	2	2
Waste Recycling	Ac	1,024.80	12
Waste Transfer	No	7	7
Vegetated Treatment Area	Ac	1.00	1
Water Well	No	8	8

Wetland Wildlife Habitat Management	Ac	25.4	3
Upland Wildlife Habitat Management	Ac	1181	61
Wildlife Watering Facility	No	1.00	1
Windbreak/Shelterbelt Renovation	Ft	12500	9
Wetland Creation	Ac	1.90	2
Agricultural Secondary Containment Facility	No	3	3
Invasive Plant Species Control	Ac	27	3
Seasonal High Tunnel System for Crops	Sq. Ft	1,440.00	1

SECTION IV: NATURAL RESOURCE PROBLEMS AND DESIRED FUTURE OUTCOMES

Since the beginning of the Local Working Groups, the locally led process has identified resource concerns in both widely spread and targeted areas in the county. In general, the widespread issues are located on rangeland and dry cropland while the targeted areas are usually irrigation related. There continues to be a myriad of resource concerns since migrating to the Targeted Implementation Plan program.

Identified Resource Concerns

Because of the diverse nature of the land, resource concerns varied depending upon land ownership and agricultural activity. The following list highlights the resource concerns for Teton County:

- Weeds
- Erosion (Wind & Water)
- Flooding Impacts to Streambeds
- Irrigation Efficiency
- Irrigation Infrastructure including Headgates/Water
- Bynum Irrigation Diversion on the Teton (Gravel Mitigation)
- Farming for Carbon Credit
- Water Efficiency
- Water Development/Streambed Loss
- Wildlife Habitat/Agriculture Values (balance)
- Grazing Management
- Soil Health & Soil Improvements
- Saline Seep Water Quality
- Drought Preparations
- Drought Management

SECTION V: PRIORITIZATION OF NATURAL RESOURCE PROBLEMS AND DESIRED OUTCOMES

2019	2021	2022
Weeds & Erosion	Weeds	Weeds
Water Capture—New dam or reservoir development	Runoff Erosion	Erosion (Wind & Water)
Streambed Stabilization away from diversion points (oxbow concerns)	Stock Water Improvements	Flooding Impacts to Streambeds: • Stabilization • Loss • Flow • Restoration • Migration next to Teton Canyon Road • Gravel Deposits • Aging Irrigation Infrastructure

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

Spring Creek Leafy Spurge Management Project

The Choteau Field Office along with partners including the Teton County Local Working Group, the Teton Conservation District and the Teton Weed Board have identified Spring Creek Watershed in Teton County as a priority for weed management. Heavy snow melt and high runoff events have heavily influenced the spread of noxious weeds along and within riparian areas in drainages in Teton County. Spring Creek is within the Teton River Watershed. It is a creek that is located 3 miles from Choteau. The creek is 8.5 miles long and is the headwaters to Choteau. Spring Creek is home to 7 species of fish including brook trout, longnose dace, longnose sucker, mottled sculpin, mountain sucker, rainbow trout, and white sucker. Impairments for Spring Creek have been identified as flow alteration, dewatering, riparian degradation, thermal modification, and siltation. Dewatering has been improved with the final adjudication of the Teton River. There are a limited number of producers in this watershed. This would allow us to focus efforts in the riparian area and adjacent ridges with producers controlling weeds on the adjacent areas. This would be a targeted system that would take place in incremental steps over a three-year period, utilizing herbicides and biocontrol.
Now that producers have a more consistent water flow due to adjudication, they are anxious to improve their riparian areas and noxious weed control would be a first step.

Goal: Target Noxious Weed Management along Spring Creek focusing on Leafy Spurge Management.
Primary Resource Concern: Plant Pest Pressure.
Specific Objective: Work with landowners in the Spring Creek watershed to target leafy spurge.
Measure: Address 500 acres of weeds in the Spring Creek Watershed

Achievability: Once initial success is shown, this will encourage others to participate in other areas within the County.
Relevancy: Addresses a recurring resource concern in Teton County. Producers will work with NRCS and Teton County Weed Board to develop monitoring protocol to ensure results are met. Producers will also work with the Teton County Weed Board to develop targeted weed management protocols that line out herbicide products, rates, and timing along with biological weed assistance.
Timeframe: 2020-2023
Financial Resources Needed: To be determined and will be identified in the TIP proposal

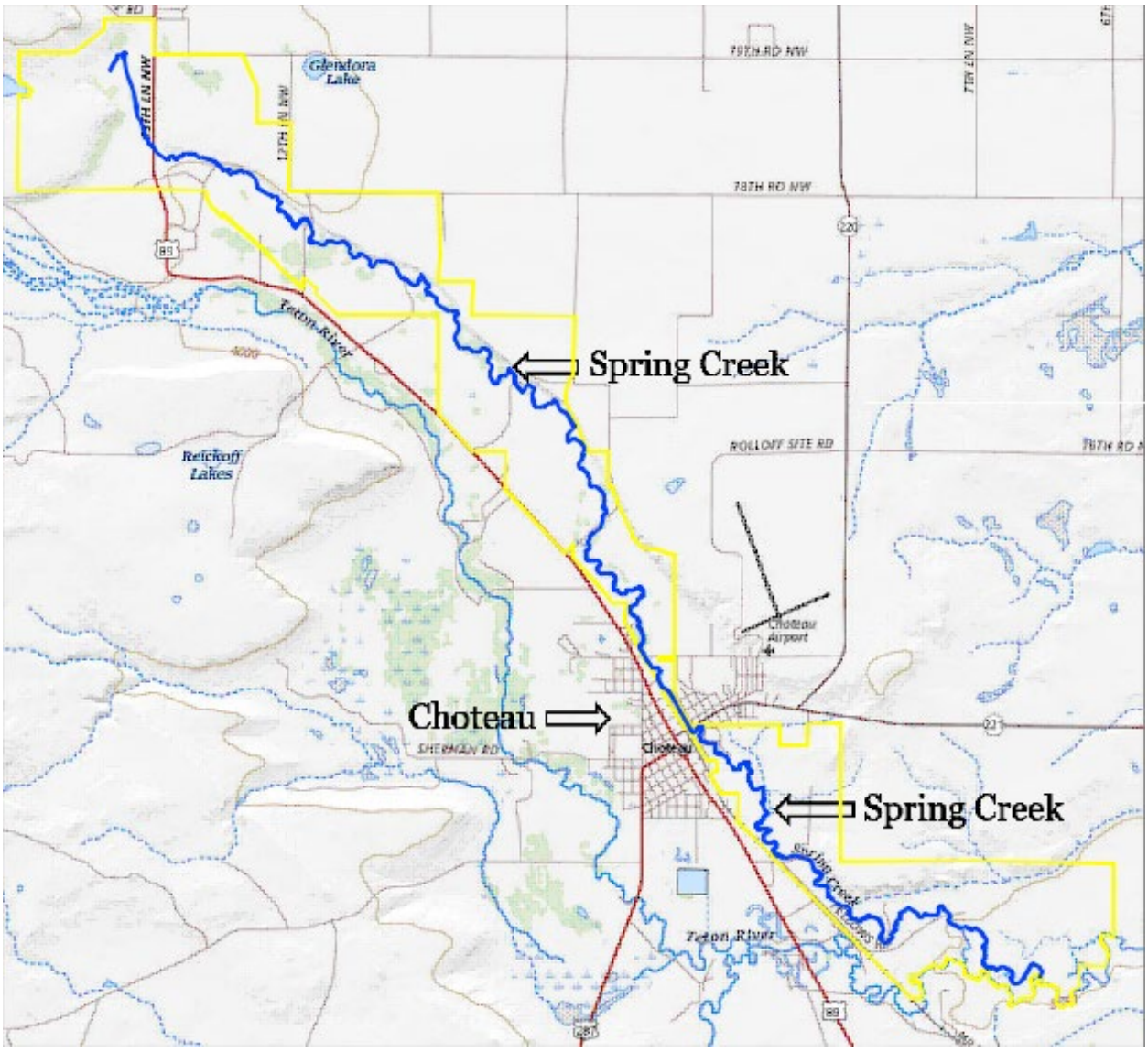


Figure 24. Spring Creek proposed TIP area

Muddy Creek and Spring Coulee Irrigation Efficiency 2022 and 2023 TIPS

The Muddy Creek Irrigation Efficiency Project for the 2022-- 2024 Targeted Implementation Plan and Spring Coulee Irrigation Efficiency Project for 2023 – 2025 Targeted Implementation Plan is in southeastern Teton County between the towns of Fairfield and Power. The majority of the acreage lies within the Greenfields Irrigation District (GID) established in 1926 to operate and maintain irrigation canals in the Greenfields division of the Sun River Project (US Bureau of Reclamation). GID irrigates 82,230 acres and the irrigation water comes from Gibson reservoir and the Sun River.

There has been continual interest by producers in Teton County to improve irrigation water efficiencies. During the summer of 2019, the NRCS Choteau field office partnered with Teton Conservation District (TCD) and the Sun River Watershed Group (SRWG) to hold community "town hall" style meetings to discuss natural resource concerns facing Teton County landowners. One of the most prevalent concerns was irrigation water management and water use efficiency. Irrigation water management has been one of the TCD's Local Working Group Priority Resource Concerns since 2015. These TIPs are in direct response to these landowner concerns and address those concerns.

Goal: Target Inefficient Irrigation Water Use focusing on nutrients
Primary Resource Concern: Inefficient Irrigation Water Use
Secondary Resource Concern: Nutrients and Pesticides Transported to Surface Water
Specific Objective: Work with landowners in the watershed to target nutrients and pesticides transported to ground and surface water
Measure: Producers will install a Flow Meter, implement, and follow an Irrigation Water Management Plan, nutrient Management Plan and Integrated Pest Management Plan on all irrigated waters identified within each TIP.
Achievability: Once initial success is shown, this will encourage others to participate in other areas within the County.
Relevancy: Addresses a recurring resource concern in Teton County. Producers will work with NRCS to ensure results are met.
Timeframe: 2022-2025
Financial Resources Needed: To be determined and identified in the TIP proposals.

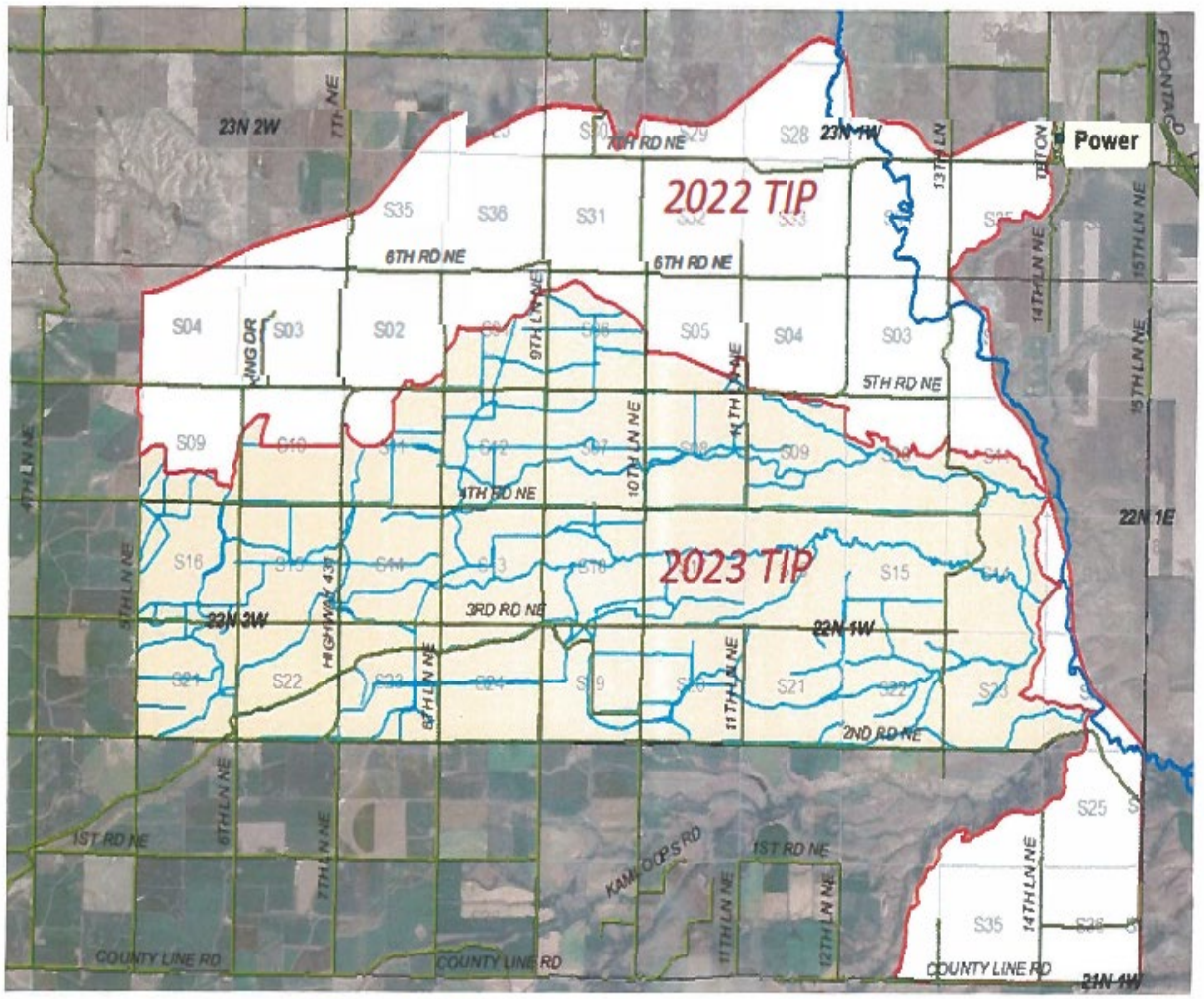
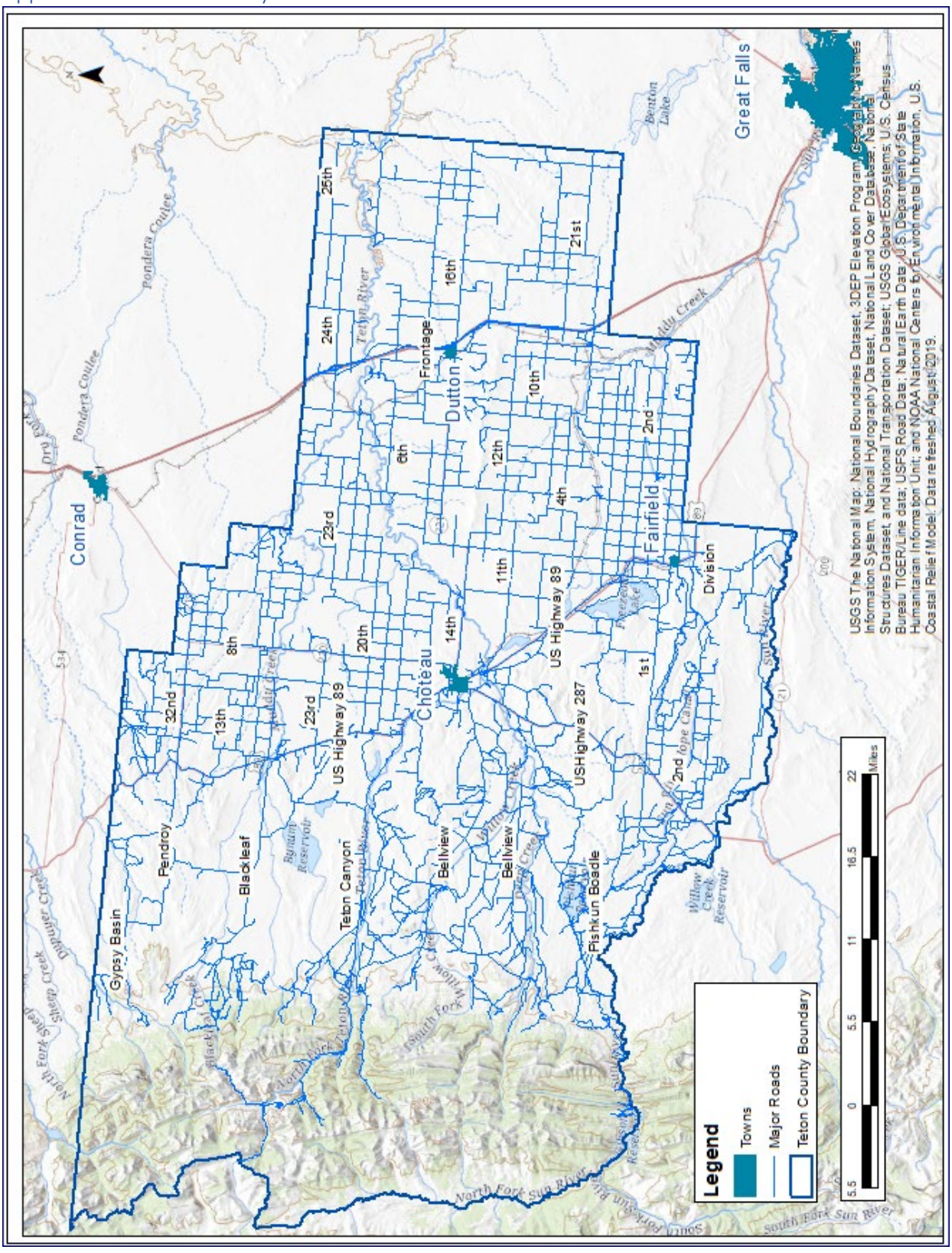


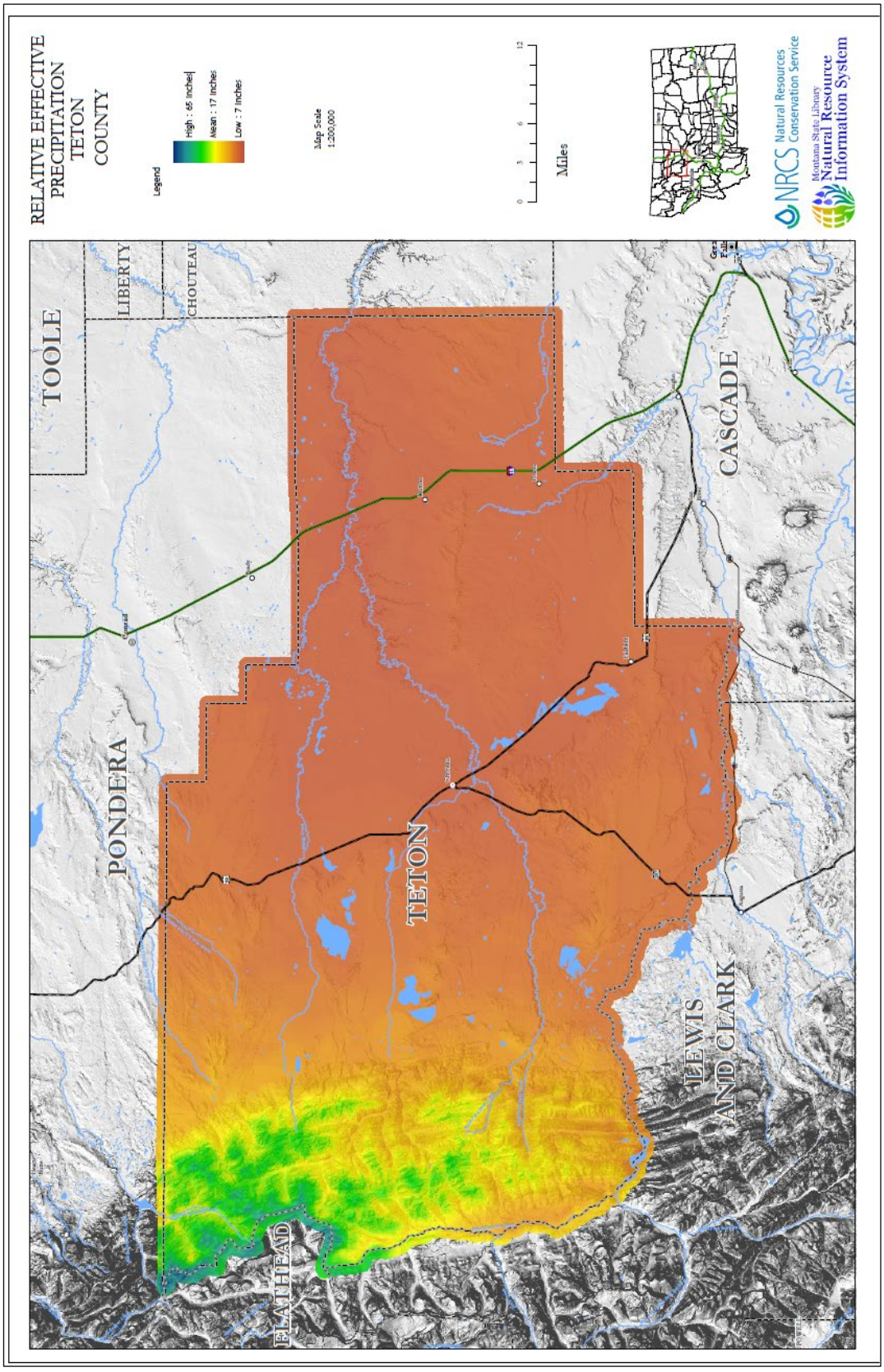
Figure 25. Muddy Creek 2022 TIP and Spring Creek 2023 TIP area

APPENDIX A

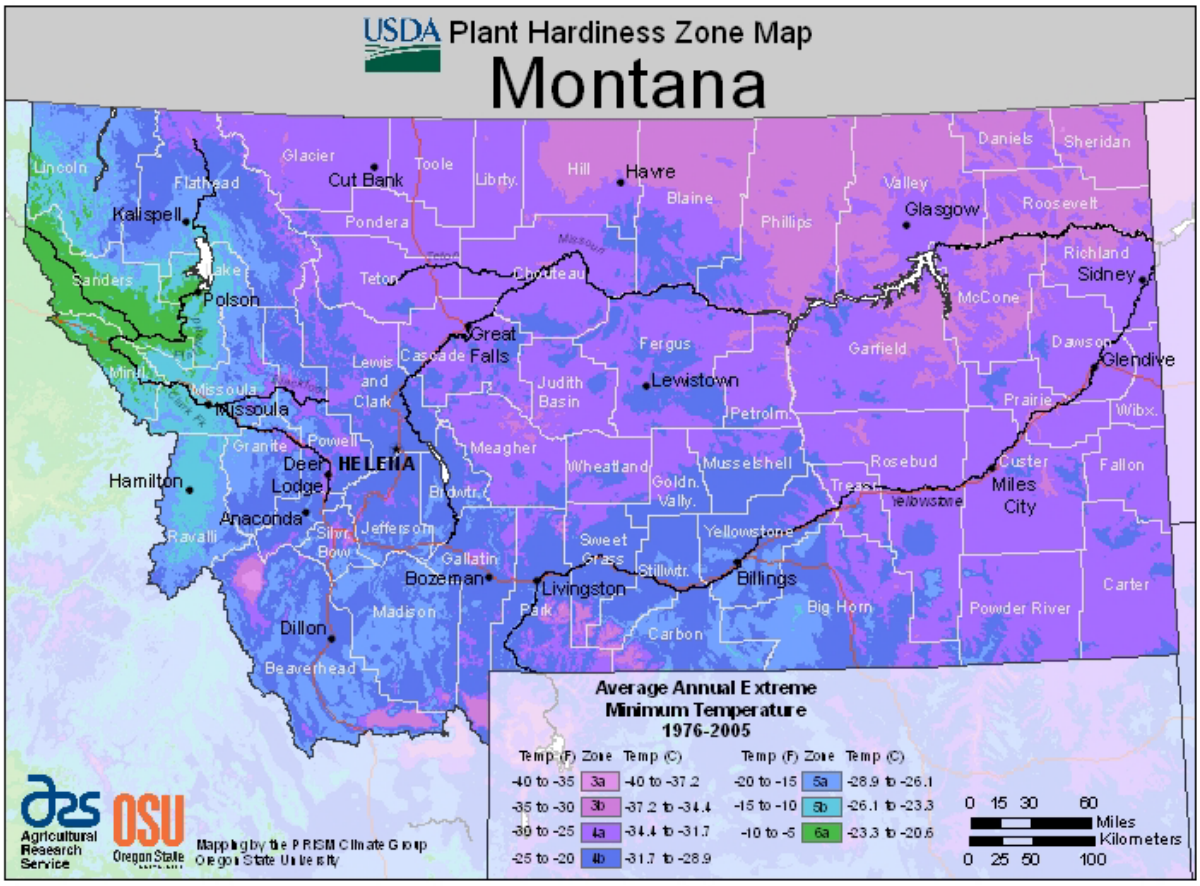
Appendix A1 Teton County



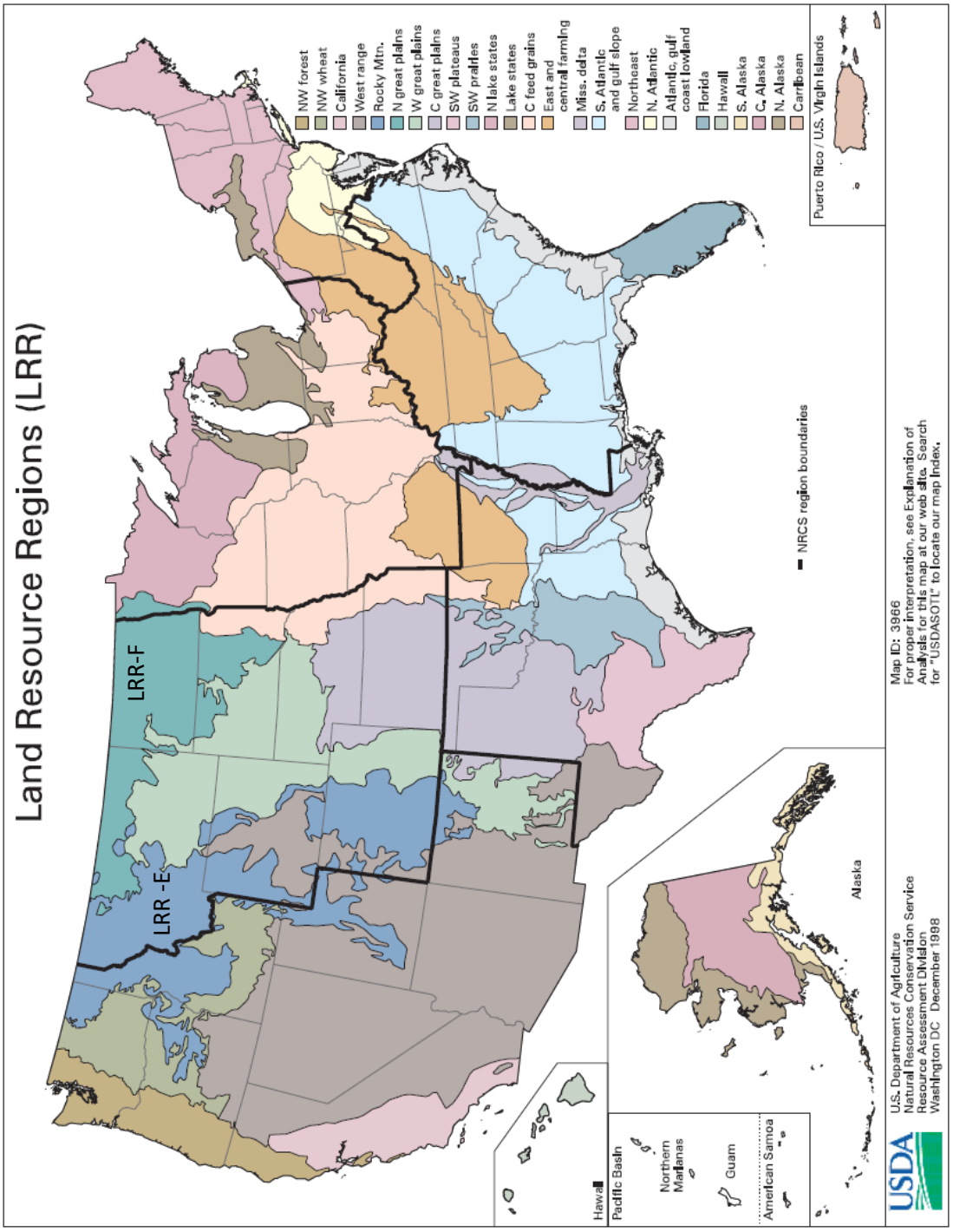
Appendix A2 Relative Effective Annual Precipitation in Teton County, Montana



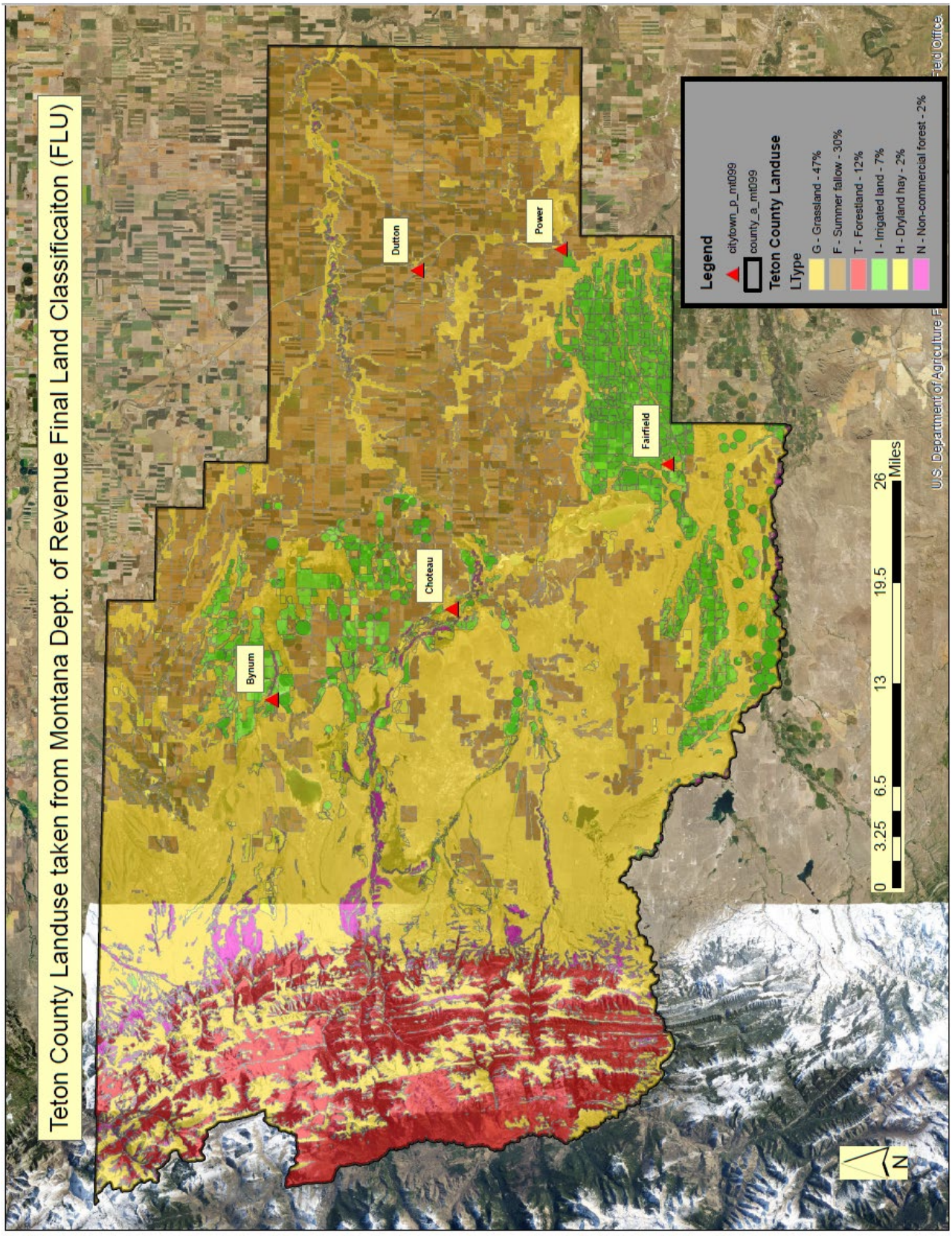
Appendix A3 USDA Plant Hardiness Zone Map of Montana



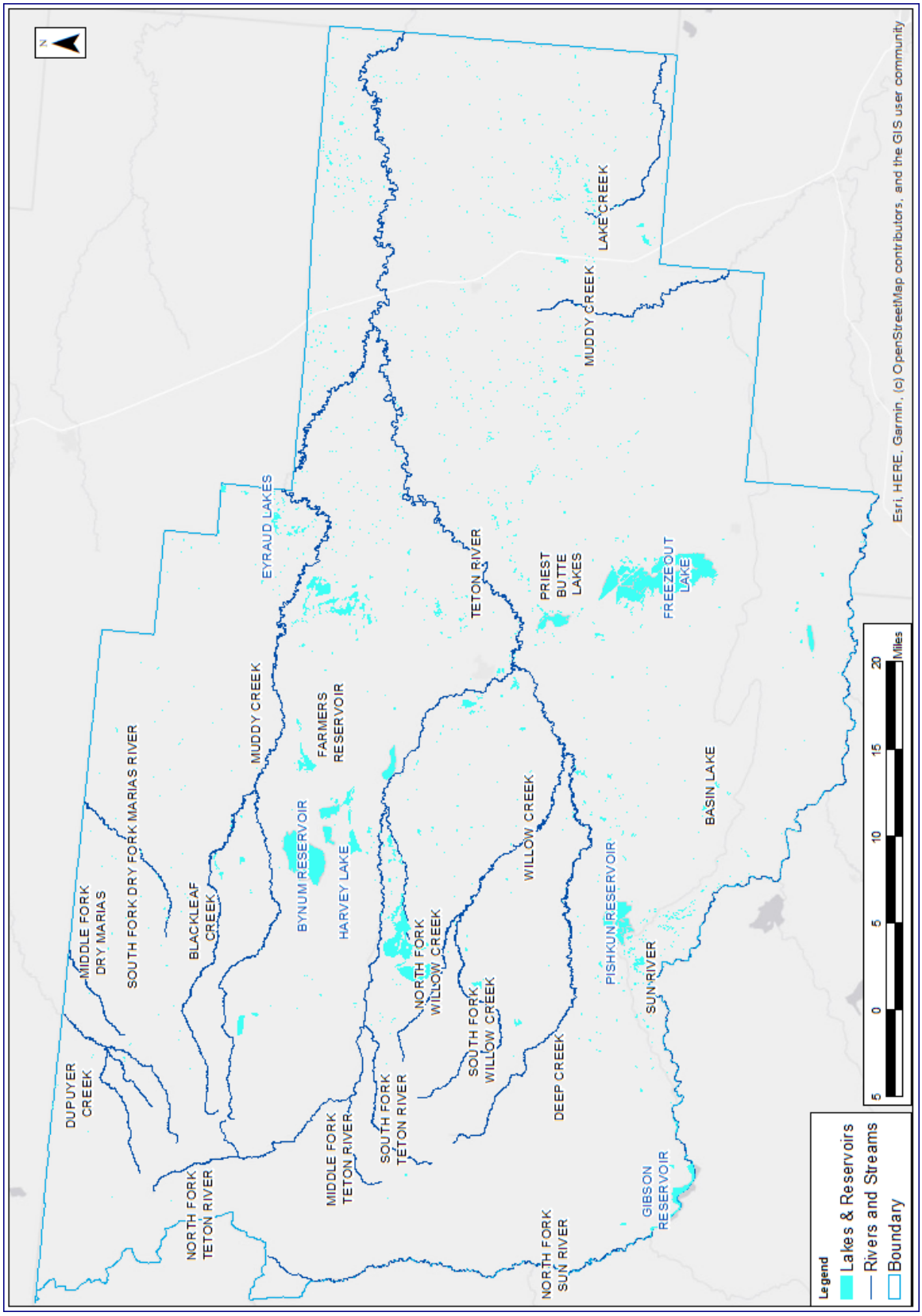
Appendix A4 Land Resource Regions in the U.S.



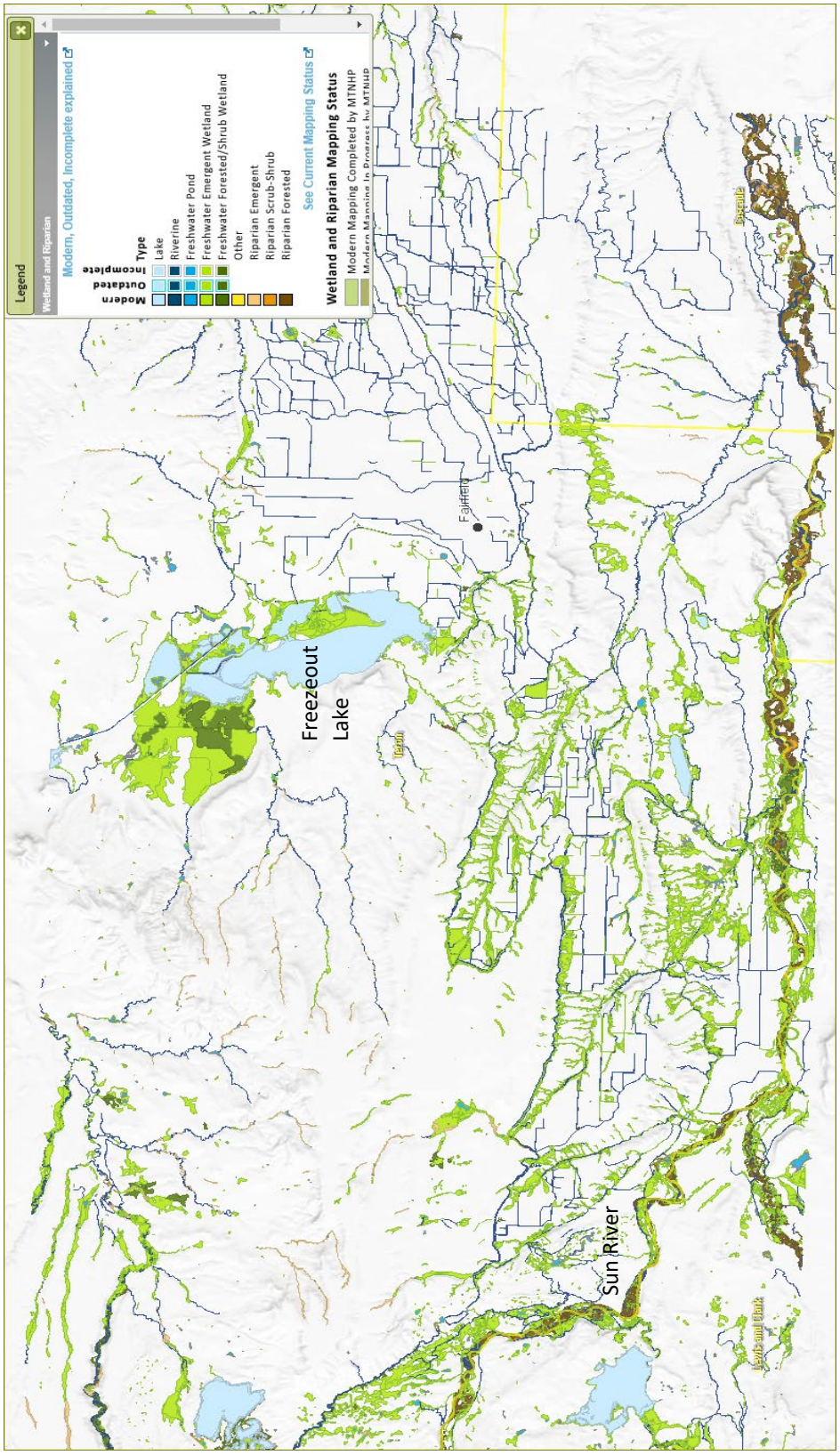
Appendix A5 Teton County Land Use



Appendix A6 Teton County Rivers, Streams and Waterbodies



Appendix A7 Wetland and Riparian Areas, Teton County



Appendix A8 Animal Species of Concern

Species	Scientific Name	Common Name	Habitat
Mammals	Gulo gulo	Wolverine	Boreal Forest and Alpine Habitats
Mammals	Lasiurus cinereus	Hoary Bat	Riparian and forest
Mammals	Lynx canadensis	Canada Lynx	Subalpine conifer forest
Mammals	Myotis lucifugus	Little Brown Myotis	Generalist
Mammals	Myotis thysanodes	Fringed Myotis	Riparian and dry mixed conifer forest
Mammals	Pekania pennanti	Fisher	Mixed conifer forests
Mammals	Sorex hoyi	Pygmy Shrew	Open conifer forest, grasslands, & shrublands, often near water
Mammals	Sorex merriami	Merriam's Shrew	Sagebrush grassland
Mammals	Sorex preblei	Preble's Shrew	Sagebrush grassland
Mammals	Ursus arctos	Grizzly Bear	Conifer forest
Birds	Accipiter gentilis	Northern Goshawk	Mixed conifer forests
Birds	Aechmophorus clarkii	Clark's Grebe	Lakes, ponds, reservoirs
Birds	Anthus spragueii	Sprague's Pipit	Grasslands
Birds	Aquila chrysaetos	Golden Eagle	Grasslands
Birds	Ardea herodias	Great Blue Heron	Riparian forest
Birds	Athene cunicularia	Burrowing Owl	Grasslands
Birds	Botaurus lentiginosus	American Bittern	Wetlands
Birds	Buteo regalis	Ferruginous Hawk	Sagebrush grassland
Birds	Calcarius ornatus	Chestnut-collared Longspur	Grasslands
Birds	Catharus fuscescens	Veery	Riparian forest
Birds	Centronyx bairdii	Baird's Sparrow	Grasslands
Birds	Certhia americana	Brown Creeper	Moist conifer forests
Birds	Charadrius montanus	Mountain Plover	Grasslands
Birds	Chlidonias niger	Black Tern	Wetlands
Birds	Coccothraustes vespertinus	Evening Grosbeak	Conifer forest
Birds	Dolichonyx oryzivorus	Bobolink	Moist grasslands
Birds	Empidonax alnorum	Alder Flycatcher	Woody wetlands
Birds	Falco peregrinus	Peregrine Falcon	Cliffs / canyons
Birds	Gavia immer	Common Loon	Mountain lakes w/ emergent veg
Birds	Haemorhous cassinii	Cassin's Finch	Drier conifer forest
Birds	Himantopus mexicanus	Black-necked Stilt	Wetlands
Birds	Histrionicus	Harlequin Duck	Mountain streams
Birds	Hydroprogne caspia	Caspian Tern	Large rivers, lakes
Birds	Ixoreus naevius	Varied Thrush	Moist conifer forests
Birds	Lagopus leucura	White-tailed Ptarmigan	Alpine
Birds	Lanius ludovicianus	Loggerhead Shrike	Shrubland
Birds	Leucophaeus pipixcan	Franklin's Gull	Wetlands

Birds	Leucosticte tephrocotis	Gray-crowned Rosy-Finch	Alpine
Birds	Nucifraga columbiana	Clark's Nutcracker	Conifer forest
Birds	Numenius americanus	Long-billed Curlew	Grasslands
Birds	Nycticorax	Black-crowned Night-Heron	Wetlands
Birds	Pelecanus erythrorhynchos	American White Pelican	Lakes, ponds, reservoirs
Birds	Plegadis chihi	White-faced Ibis	Wetlands
Birds	Podiceps auritus	Horned Grebe	Wetlands
Birds	Poecile hudsonicus	Boreal Chickadee	Spruce-fir forests
Birds	Rhynchophanes mccownii	McCown's Longspur	Grasslands
Birds	Spizella breweri	Brewer's Sparrow	Sagebrush
Birds	Sterna forsteri	Forster's Tern	Wetlands
Birds	Sterna hirundo	Common Tern	Large rivers, lakes
Birds	Strix nebulosa	Great Gray Owl	Conifer forest near open meadows
Birds	Surnia ulula	Northern Hawk Owl	Conifer forest
Birds	Troglodytes pacificus	Pacific Wren	Moist conifer forests
Reptiles	Apalone spinifera	Spiny Softshell	Prairie rivers and larger streams
Reptiles	Phrynosoma hernandesi	Greater Short-horned Lizard	Sandy / gravelly soils
Amphibian	Anaxyrus boreas	Western Toad	Wetlands, floodplain pools
Fish	Chrosomus eos	Northern Redbelly Dace	Small prairie rivers
Fish	Chrosomus eos x Chrosomus neogaeus	Northern Redbelly X Finescale Dace	Small prairie streams
Fish	Oncorhynchus clarkii lewisi	Westslope Cutthroat Trout	Mountain streams, rivers, lakes
Fish	Sander canadensis	Sauger	Large prairie rivers
Insects	Boloria alberta	Alberta Fritillary	Alpine

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