Natural Resources Long Range Plan
Townsend NRCS Field Office: Broadwater County

Section I. Introduction

Purpose: ***To define the current resource concerns in Broadwater County, the partnership that exists to treat the priorities, and the focused approach to conservation needed to facilitate change.***

There are many conservation partners active in Broadwater County, including the Broadwater Conservation Distinct (BCD), Farm Service Agency (FSA), USDA Forest Service (USFS), Montana Fish, Wildlife, & Parks (MT-FWP), Montana Watershed Coordination Council (MWCC), Montana Department of Natural Resources and Conservation (MT-DNRC), Montana Association of Conservation Districts (MACD), Broadwater County Weed District, Montana State University Extension Service (MSU), Tri-County Fire Safe, Bureau of Land Management (BLM), Montana Department of Environmental Quality (MT-DEQ) US Bureau of Reclamation (BOR), Townsend Schools, Big Elk Divide Restoration Committee (BEDRC), Elkhorn Steering Committee, Elkhorn Restoration Committee, Elkhorn Working Group, Broadwater County Local Working Group and Landowner Advisory Groups, Rocky Mountain Elk Foundation (RMEF), Mule Deer Foundation (MDF) Missouri River Resource Advisory Council (MRAC), Wild Sheep Foundation (WSF), Wild Turkey Federation (WTF), Trout Unlimited (TU), Montana Land Reliance, Prickly Pear Land Trust, Broadwater Missouri Water Users Association (BMWUA) , Big Springs Ditch Company, Montana Ditch Company, Toston Irrigation District (TID), Broadwater County and landowners

This plan will look at priorities for conservation work in Broadwater County over the next 5-10 years. However, the plan should be reviewed annually and adjusted as necessary based on current events and changing resource concerns.

Section II. County Profile and Natural Resource Inventory

Broadwater County was named for Colonel Charles Broadwater and made an official county by the Montana Legislature in 1897. Broadwater County is roughly defined by the Big Belt Mountains to the east and north, the Elkhorn Mountains to the west, and the Horseshoe Hills to the south.

Townsend is the first city on the Missouri River and is the county seat. Townsend is the only incorporated city in the county, although there are several other communities, including Toston, Radersburg, Winston, the Wheatland area, Silos Area, and the Spokane Flats.

Broadwater County is in Western Montana and has an area of 1,239 square miles (796,000 acres). Broadwater County is 50 of 56 counties in total land area with the 7th most square miles of water area in the state. Broadwater County population is 6,774 according to the 2020 Census data which is a 20.7% increase from 2010.

Approximately 35% of Broadwater County is publicly owned land managed by Helena Lewis & Clark National Forest, Bureau of Land Management, State of Montana, and the US Bureau of Reclamation. Canyon Ferry (3rd largest reservoir in MT is comprised of 33,500 acres or 4.6% of the counties surface area). Private Lands make up about 65% of Broadwater County and is made up of about 65% rangeland (315,000 acres), 14% forest (69,000 acres), 9% irrigated (44,000 acres) and 12% dryland crop (57,000 acres).

There are 287 farms in Broadwater County, covering 476,797 acres (2018 NASS Census). Over $38 million of agricultural products were sold in 2012, with the predominant products being beef cattle and hay. Average age of the principal operators is 58.8 years old. About 54% of the principal operators list farming as their primary occupation.

The Elkhorn Mountains are an island mountain range that provide open space, clean water, and diverse animal and plant communities. About 160,000 acres within the Elkhorn Mountains are managed by both the Helena-Lewis and Clark and Beaverhead-Deerlodge National Forests as a Wildlife Management Unit, the only one of its kind in the entire National Forest System. In addition, there are another 70,000 acres of foothills that are managed by the Bureau of Land Management as an “Area of Critical Environment Concern” (ACEC). ACEC designations highlight areas where special management attention is needed to protect important historical, cultural, and scenic values, or fish and wildlife or other natural resources

The remaining area comprises State school trust lands, the Limestone Hills managed by the Montana Army National Guard, and private lands.

In the interest of managing this ecosystem with an emphasis on fish and wildlife values, the land and wildlife management agencies in the Elkhorns – BLM, Montana Fish, Wildlife, and Parks, and the Helena and Beaverhead-Deerlodge National Forest - entered into a Memorandum of Understanding in 1992 in order to provide consistent management across administrative boundaries with the Elkhorn Cooperative Management Area (ECMA). In 2013, NRCS signed on as a partner. The MOU establishes the framework for interagency cooperation and management in the Elkhorns through the identification of roles and responsibilities. Agency staff fulfill those roles and responsibilities through an assemblage of committees to cooperatively manage resources in the Elkhorns. A collaborative Elkhorn-specific program of work is developed annually that is decided upon by the Elkhorn Steering Committee.

Northwestern Energy and Vigilante Electric Cooperative service Broadwater County. In general Northwestern Energy covers the western portion of the county and Vigilante Electric Co-Op covers the eastern portion.

Canyon Ferry Reservoir: Montana's third largest water body covering 33,500 acres with 96 miles of shoreline. Peak power generation is 50,000 KW's.

Construction of Canyon Ferry Power Plant started in 1949 and was completed in 1954. Unit 1 began operation in December 1953, and Units 2 and 3 in March 1954. Canyon Ferry Power Plant is part of the Eastern Division of the Pick-Sloan Missouri Basin Program.

The Canyon Ferry Unit is a multi-purpose project, which provides low cost power generation and makes an important contribution to the flood control, irrigation, and power supply in the upper Missouri Basin. Canyon Ferry was constructed to provide regulation of runoff for low cost power and to permit increased irrigation diversions in the upper Missouri River Basin. With a total capacity of 2,051,000 acre-feet, Canyon Ferry Reservoir makes possible the irrigation of 155,600 acres of land and supplements irrigation of 82,000 acres in the upper Missouri area. The reservoir permits upstream irrigation development by reregulating residual flows of the river for downstream power plants.

Toston Reservoir: The project began generating power in June 1989 and has an operating capacity of 10 megawatts. DNRC owns and operates the facility; the electrical energy produced is sold to North Western Energy; Gross revenue power sales in 2014 totaled $4,221,877;

Provides irrigation water through 200 contracts for 29,218 acre-feet. Delivered to users through the Broadwater-Missouri Canal.

Revenue from the energy sales provides funds for other State Water Projects Bureau (SWPB) water project (which includes 22 dams and approximately 250 miles of irrigation canals) maintenance and repairs. Most of these large projects were completed in the 1930s and 1940s and have significant needs.

Broadwater County Soils

The original completed soil survey covers Broadwater County except for the lands within the Helena Lewis & Clark National Forest. The soil survey was published in 1977 and is available for public access online through the Web Soil Survey. The Helena Lewis & Clark National Forest soils information is also available on the Web Soil Survey. There is some prime farmland (if irrigated) in the county. Most of the prime farmland occurs along the historic flood plains and alluvial fans of the Missouri River and its tributaries. Soils are largely silty clays, clays, silty sands, and clayey sands weathered from sedimentary and igneous rocks. Shales, mudstones, and argillite rocks typically weather to calcareous silty clays and clays. Silty sands, sandy silts, and clayey sands typically weather from sandstones.

Geology

Most of Broadwater County is within the Townsend Basin, surrounded by the Big Belt Mountains on the east, Elkhorn Mountains on the west, Spokane Hills on the north, and Hossfeldt Hills on the south. The geology is predominated by Precambrian (4.6 billion years ago (bya)) to Recent sedimentary rocks with intrusive Precambrian to Tertiary (2.5 million years ago (mya)) igneous rocks of varying composition.

From the Precambrian to the beginning of the Mesozoic (251.9 to 66.0 mya), shallow seas advanced and retreated, depositing thick sequences of mostly marine sediments, evidenced by about 15,000-feet- thick of marine limestones and dolomites and non-marine shale, mudstone, siltstone, and sandstone rocks.

Precambrian (4.6 bya to 54.1 mya) rocks are divided into several formations, including the Greyson Shale, Spokane Shale, and Empire shale. Overlying, and in some cases transecting the shales, is the Cambrian Flathead quartzite. Above, are alternating layers of fossiliferous limestones and shales belonging to the Cambrian Wolsey, Meagher, Park, Pilgrim and Red Lion Formations. Of similar rock composition, Devonian (412.9 to 358.9 mya), Carboniferous (~358.9 to 298.0 mya), Permian (298.9 to mya), Jurassic (201.3 to 145.0 mya), and Cretaceous (145.0 to 66 mya) aged rocks collectively consist of at least 13 different formations. Depositional environments for these oscillating marine sediments are representative of a relatively stable, quiet environment, with some minor, regional scale epeirogenic (crustal warping) events.

By the Late Mesozoic (Late Cretaceous Period, 100.5 to 66.0 mya), the environment became more dynamic as the Western Interior seaway retreated for the last time. Volcanism and uplifting occurred, forming the Elkhorn and Big Belt Mountains. Volcanic rock composition consisted of breccias, tuffs, and andesitic flows of the Elkhorn Mountain Formation Volcanics. Local folding and faulting created major structural features, including the transversely faulted anticlinorium Limestone and Hossfeldt Hills. Steep north and east trending faults cut across folded rocks, displacing beds within the Elkhorn Mountains, and created pathways for intrusive sills, dikes, stocks, and batholiths.

Early Tertiary (Eocene, 56.0 to 33.9 mya) time was dominated by crustal stability and long, quiet erosional periods that sculpted and shaped the topography. Lacustrine and fluviatile systems deposited weakly indurated, sedimentary tuffs within a gradually subsiding basin, now referred to as the Townsend Basin. The tuffs are subdivided into three units: Oligocene (33.9 to 23.0 mya), Miocene (23.0 to 5.3 mya) or Pliocene (5.3 to 2.6 mya), and Undifferentiated tuffs. A relatively thin veneer of expansive pediment and alluvial fan gravels buried the tuffs and older Tertiary rocks that later would be partially or wholly stripped away by erosion.

Post-pediment deposition (late Tertiary, 33.9 to 2.6 mya), the Missouri River and recurrent uplifting and folding emplaced at least 200-feet-thick of flood plain and alluvial gravels. Local beds tilted, warped, and faulted, and another thick accumulation of sedimentary tuff covered the gravels and older rocks.
The Missouri River and local streams deeply incised broad valleys that are still evident today, creating a complex group of terraces, and remained unmoved by the renewed uplifting.

During the Quaternary, two glacial stages occurred, evidenced by remnants in the surrounding mountains and in the lower elevations in northern part of the county. Deposits are likely coarse glacial outwash or in part morainal.

Water

Existing water quality reports across Broadwater County indicate water quality is generally good. However, there is a possibility for high total dissolved solids, sulfate, fluoride, manganese, and iron levels in groundwater. A few wells have mineral contents that exceed safe standards for domestic use but were okay for livestock use. Examined water quality reports included both shallow and deep wells (<2,300-feet-deep). Aforementioned minerals are mostly byproducts from shale and phosphate rocks.

303(d) listed in streams and their impairments for Broadwater County in 2018 are as follows:

- Canyon Ferry Reservoir (algae, arsenic, ammonia, thallium);
- Beaver Creek (cadmium, chromium, lead, silver, zinc, nitrate/nitrite/ phosphorus, flow alteration);
- Confederate Gulch (phosphorus, nitrate/nitrite, physical substrate alteration, flow modification);
- White Gulch (sediment, low-flow, streamside),
- Hellgate Gulch (Mercury, physical substrate alteration, streamside alteration, other anthropogenic substrate alteration);
- Deep Creek (flow modification, temperature); Dry Creek (phosphorus, sediment/siltation, temperature, flow modification, streamside alteration);
- Crow Creek (sediment/siltation, nitrogen, phosphorus, physical substate alteration, flow modification; streamside alteration);
- Missouri River - Toston Dam to Canyon Ferry Res (Cadmium, copper, lead, sediment/siltation, flow modification, streamside alteration.

Most of the private land receives 10 to14 inches of annual precipitation with an area of land in the southern portion receiving 8 to10 inches of annual precipitation. Soils throughout the county are influenced by the prevailing winds depositing calcium carbonate from the Elkhorn Mountains making much of the county's soils function as droughty limey. Private forest land has an average precipitation range of 14 to 22 inches. Higher elevation mountainous areas receive precipitation above 22 inches, however most of these lands are national forests. Data from long term weather records indicate that any single year may vary up to 5 inches from the long-term average precipitation.

The county covers 7 sub-basins (10-Digit Hydrologic Unit Codes (HUC's) These 10-Digit HUC basin are: Missouri River- Lower Canyon Ferry Lake (72,600 ac.); Missouri River-Middle Canyon Ferry Lake (166,144 ac.); Missouri River-Upper Canyon Ferry Lake (94,833 ac.); Missouri River – Dry River (94,905 ac.); Deep Creek (68,829 ac.);Missouri River-Crow Creek (84,686 ac.); Rattle Snake Creek (101,853 ac.); and portions of 3 additional sub-basins: Sixteen Mile Creek (13,642 ac.); Missouri Headwaters (58,777 ac.); and Lower Jefferson River (35,620 ac.), all of which drain to the Missouri River above Canyon Ferry Dam.
The Deep Creek Watershed was the Broadwater Local Working Group's priority one watershed 2014-2017. Due in part to this priority and partner support the watershed received National Water Quality Initiative (NWQI) funding. NWQI provided a way for the Townsend NRCS field office, Broadwater Conservation District, MT-FWP, MT-DEQ and MT-DNRC and other partners to accelerate voluntary, on farm conservation investments and focused water quality monitoring. This effort focused conservation activities to the Deep Creek watershed from 2013-2017 resulting in improved late season flows, riparian function, and a significant reduction in sediment. This collaboration ultimately resulted in sediment being delisted as an impairment from the total maximum daily load (TMDL) for Deep Creek.

The Missouri River Basin above Canyon Ferry Reservoir is a snowmelt-driven hydrologic system that peaks in spring and reaches base flow through summer and fall. The tributaries originate in the mountains and provide cold water that drains in to three rivers (Gallatin River, Madison River, and Jefferson River) which make up the Headwaters of the Missouri. These three river systems merge near Headwaters State Park in the southern portion of the county downstream from Three Forks, MT.

About 53,250 acres of land in Broadwater County is irrigable. The majority of which receives water by ditch systems form the Missouri River. The most important of these irrigations systems are: Crow Creek Pump Unit (aka Toston Irrigation District), Broadwater Missouri Canal, Montana Ditch Company, and the Big Springs Ditch. All the ditch systems are diversions from the Missouri River except the Big Springs Ditch, which diverts water from a large spring on the east bank of the Missouri, just downstream of the Toston Reservoir.

Crow Creek Pump Unit (Toston Irrigation District (TID))
Developed in 1955 to offset the acres of irrigable land flooded by the creation of Canyon Ferry Reservoir. The project was initially set at 5,000 acres. Water is supplied pumping water 176 feet in elevation from the Missouri river through a 1,175-foot pipeline where it enters a 2,044-foot tunnel prior to entering the 6.1-mile TID canal and lateral system. Maximum capacity of the canal was designed at 100 cfs. In 1955 there were 1,456 acres irrigated by the project with another 3,989 acres considered irrigable. The current acres of the TID service area is estimated to be 6,500 acres with much of the acreage using irrigation center pivots or wheel lines.

Montana Ditch Company (MDC)
The MDC filed articles of incorporation October 16, 1900 with the first water use being diverted either in 1900 or 1901. The MDC was originally comprised of 44 shares. The constructed length of the delivery canal was 11 miles with a capacity of 10,000 miners' inches (250 cfs). The original 44 shares were divided among 28 waters users since the construction of Canyon Ferry Dam. In 1955, during the first year of operation at Canyon Ferry Dam, 6 additional shares became inactive due to flooding and seepage from the lake. In 1955 there were 2,117 acres irrigated in the Montana Ditch service area.

Broadwater Missouri Diversion Project (Broadwater Missouri Water Users' Association "BMWUA") The Broadwater-Missouri Diversion Project consists of an overflow gravity type concrete diversion dam across the Missouri River (Toston Dam) and a main canal, which divides into East and West Side distribution canals to originally irrigate an estimated 15,000 acres of land near Toston, and Townsend with the east canal stretching beyond Duck Creek terminating in Confederate Gulch. The original articles of incorporation show the BMWUA was incorporated on November 10, 1938, for a period of 40 years. The project operated for the first time in 1941. One of the most important structures in the West Side Canal, is an inverted syphon, 1,442 feet long and 54 inches in diameter, built through a narrow section of the river canyon. The East Side Canal crosses the Missouri River by a steel pipeline 84 inches in diameter and 667 feet long, supported by concrete piers at a height of 25 feet above the river bottom. The main canal had an original capacity of 342 cfs. The West Side Canal extends 12.4 miles to the lower end of the Crow Creek Valley and had an initial capacity of 90 cfs. The East Side Canal is 38.4 miles in length and had an initial capacity of 262 cfs terminating at Confederate Gulch with a capacity of 42 cfs. In 1955, 87 water users purchased water in the project area totaling 27,080-acre feet of water being sold to cover approximately 11,478 irrigated acres. An additional 979 acres were considered irrigable below the two canals. With the addition of on farm pumping plants along the canals and the additional of sprinkler irrigation the service area of the BMWUA has extended above the East and West Canal. This increased the acres in the service area to an estimated 21,000 acres by 2017 with 2-acre feet per acre, allocated to shareholders.

Hanson (Big) Springs Water Users:
Big Springs is located on the east bank of the Missouri River approximately ¾ mile downstream of the Toston Reservoir. In 2016 the water users with assistance from Montana Rail Link converted approximately 3,000 feet of open ditch to closed pipe. This eliminated 10 cfs of ditch loss in this reach. The spring flows bottle quality water at a consistent flow of about 52 cubic feet per second. Prior to the installation of the pipe, the project was not able to meet the user's irrigation needs. After the ditch conversion the water users are now able to meet their service area demand. The water users have an agreement with MT-FWP to ensure adequate flows are available for the constructed spawning channel at Big Springs or at down gradient streams such as Dry Creek. The service area for the Big Springs Water Users is approximately 1,775 acres and is made up of 7 shareholders. According to the Water Resources Survey book for Broadwater County dated June 1956 the maximum irrigable acres of the project was 2,056. These water users also own shares in the Broadwater Missouri Canal as well as decreed water rights from the Missouri River and various perennial streams.

There is currently no major groundwater or drinking water quality issues in Broadwater County.

Plants and Animals There are multiple plants and animals listed as species of concern or threatened and endangered found in Broadwater county. These can be found in the Natural Heritage Program data base at the following link http://mtnhp.org/ .

Native range makes up approximately 65% of the private land in the county. Historically much of the counties range land was dominated by blue bunch wheatgrass, green needlegrass, blue gramma, Idaho fescue and rough fescue (found in higher elevations and moist sites). The rangelands are now becoming invaded by annual grasses and noxious weeds (spotted & diffuse knapweed, dalmatian toadflax, leafy spurge, houndstongue, musk thistle & Canada thistle) . Rocky mountain juniper, although native to rocky outcrops, have expanded outside their original area and are now considered invasive on historic rangeland.

Much of the private land forested areas are ponderosa pine and douglas fir communities with higher elevation forests having douglas fir, lodgepole pine, Engelmann spruce, and sub-alpine fir. Most private forestland is utilized throughout the summer for cattle grazing.

Broadwater county potato growers are nationally recognized for their premier certified seed potatoes. According to Farm Service Agency 2021 crop reports over 2,000 acres of seed potatoes were harvested in the county. The majority of these seed potatoes are sold to out of state commercial growers.

Irrigated or wet meadow pastures are dominated by timothy, creeping meadow foxtail and meadow brome, especially those that are flood irrigated. Alfalfa hay is predominately grown throughout the county on lands under sprinkler irrigation. According to the 2021 Montana Ag. Statistics there were 25,000 acres of alfalfa hay harvest in 2021 averaging 4.5 tons / acre or 112,500 tons produced. Much of this hay is marketed and sold to out of state interest.

Wildlife

Overall populations of upland species within Broadwater County have been stable.

Big Game:

Pronghorns continue to expand into suitable habitat but overall have shown no significant population increase. Antelope habitat and distribution in the county has believed to have been negatively impacted over the last 20+ years by the increasing levels of conifer colonization (primarily juniper) in the county much of which has occurred on private land.

The Elkhorn bighorn sheep herd was established in 1996 when 25 sheep were transplanted there from Rock Creek near Phillipsburg. Numbers had increased to approximately 200 until the population experienced substantial die off due to an exposure to pneumonia in 2007. An aerial survey conducted Jan. 2008 found only 35 bighorn sheep. MT FWP has an objective for this herd to be 250 animals. Rocky Mountain Elk were increasing in numbers throughout the county until around 2016. At that time MT-FWP liberalized elk hunting seasons with the addition of shoulder seasons for many of the hunting districts in the county. This resulted in elk numbers stabilizing with some hunting districts showing a downward trend. Large herds of 100-200+ are still routinely found in the valley bottoms late summer through early spring. Elk inhabit the forests, the open rangelands, and the irrigated grounds of the county. Elk damage to hay and pastures deferred for winter grazing is occurring on a more regular basis. Mule deer numbers in the county have been increasing in areas of private agricultural land in recent years resulting in attempts by FWP to reduce numbers through hunting in those areas. Mule deer numbers on national forest land are believed to have been somewhat steady the last few years, but well down from what numbers were in the late 1990s and early 2000s. Mule deer numbers declined considerably around 2010-11 and have been slow to comeback on national forest land. White-tailed deer numbers overall in the county seem to be generally holding steady. Given that white-tailed deer are often associated with agricultural land in the county, FWP's management direction regarding local white-tailed deer numbers is to have liberal seasons and to manage for lower numbers given landowner tolerance concerns.

Mountain goats are found in the Big Belt Mountains and the Elkhorn Mountains in Broadwater County. Numbers in the Big Belts have been increasing slightly over the last 5-10 years. The Elkhorns population is at very low numbers and will likely require a population augmentation in the future to be maintained. Moose numbers in the county are believed to be holding steady to possibly even increasing slightly. Moose are found along the Missouri River and in most of the major creek drainages (mostly on national forest land) in the county.

Upland Game Birds:

Wild turkeys have increased dramatically over the last 10 years particularly along the Big Belt foothills. MT FW&P opened a general wild turkey season for most of western Montana for the first time in 2018. Pheasant numbers are believed to have declined overall in the county over the last 20+ years as farming practices have become more intensive and the amount of quality pheasant habitat in the county has declined. Populations also fluctuate annually based on environmental conditions. Sharp-tailed grouse numbers in the county have also likely steadily declined over the years as native grassland habitat has been lost. Grey partridge numbers in the county have likely held steady or increased to some degree over time, again with annual fluctuations. The southern portion of the county near Loan Mountain and south west to the Jefferson County is mapped as unoccupied historical range for sage grouse. While an occasional rare report of a sage grouse south of the Elkhorns is received, sage grouse were not known to occur in Broadwater County, as they died out over the years with the

loss of big sagebrush habitat in the county. In the summer of 2019, a retired biologist photographed and reported a band of sage grouse in this location to the MT-Fish Wildlife and Parks for documentation. Forest grouse populations in the county typically fluctuate based on yearly environmental conditions.

Currently conflicts with wolves are rare in the county with occasional sightings in the Big Belt and Elkhorn Mountain ranges. Dispersing wolves continue to pass through the county and it is expected that over time the resident wolf population will increase. Mountain lion numbers in the county seem to have generally held steady if not increased over the last decade. FWP has developed a draft statewide mountain lion management plan which hopefully will be finalized in 2019. Black bear numbers in the county are believed to be holding steady. Most of the bears are found on national forest land. Issues involving nuisance/depredating bears generally spike when there is some sort of issue with natural food supplies, i.e. poor berry years, drought years, etc.

Federally Listed Species:

There have been a few reports of grizzly bears in Broadwater County the last couple of years, and there was a confirmed grizzly bear in the Elkhorn Mountains a couple of years ago. As grizzly bear populations in the Greater Yellowstone and Northern Continental Divide Ecosystems increase in numbers and distribution, it's expected that sightings of individual bears in Montana's island mountain ranges will increase. However, no grizzly bear population exists in Broadwater County at this time nor is there expected to be one in the future.

Wildlife information from contributions by Adam Grove (MT FW&P Biologist), 2018.

Lynx Status and Habitat Improvement in the Elkhorns and Big Belts

Lynx Presence

The U.S. Fish and Wildlife Service includes on the species list Broadwater County which includes the Helena-Lewis and Clark National Forest). Historically, there were periodic reports of lynx in the Elkhorns and Big Belts although these observations were unconfirmed. Recent survey efforts have also failed to confirm lynx presence in either mountain range. However, radio-collared lynx that were translocated from Canada to Colorado were detected in the Big Belts en route back to Canada (circa 2006). The U.S. Fish and Wildlife Service based their determination of 'may be present' in part due to these 'Canadian' lynx moving through the Big Belts and in part due to the fact that lynx will range far and wide particularly during periods of food shortage.

Lynx Habitat

Lynx habitat has been mapped in the Elkhorns and Big Belts. Habitat comprises subalpine fir/spruce habitat types. Within these habitat types, disturbances that create early successional stages such as fire, insect infestations, and timber harvest, provide foraging habitat for lynx by creating forage and cover for snowshoe hares, although older multi-storied forests with dense understory also provide habitat for snowshoe hares and lynx for longer periods of time than disturbance-created habitats (Ruediger et al. 2000).

Lynx Habitat Enhancement in the Elkhorns and Big Belts

Cabin Gulch Project (Big Belts)

The Cabin Gulch project included treatments within 155 acres of mapped lynx habitat. Of those, about 140 acres comprised regeneration harvest (clearcuts) which should provide snowshoe hare habitat (forage for lynx) for at least the next 30 to 40 years.

1988 Habitat Enhancement Project (Elkhorns)

The *1988 Habitat Enhancement Project* resulted in the treatment of 276 acres of lynx habitat. Effects to mapped lynx habitat should create a mosaic of landscape conditions favorable to lynx as they move across the landscape (Revised Lynx Conservation and Assessment Strategy, Interagency Lynx Biology Team, 2013, page 83).

Johnny Crow Habitat Enhancement (Elkhorns)

The *Johnny Crow Habitat Enhancement Project* will result in approximately 250 acres of treatment that would improve lynx habitat primarily by creating a mosaic of landscape conditions favorable to lynx (Interagency Lynx Biology Team 2013 page 83). Mature forest stands that have openings created through prescribed fire treatments associated with this project can provide snowshoe hare habitat and over time (greater than 15 years) as the understory develops, winter foraging habitat would be created within these openings. Also, due to the recruitment of dead wood from fire-related mortality, potential denning habitat could be improved within these openings within 5 to 10 years of treatment.

Fish

Management History

Since Montana Fish, Wildlife & Parks (FWP) discontinued stocking hatchery trout in rivers and streams throughout Montana in the 1970's, habitat protection and enhancement became a management priority to encourage wild trout fisheries to become self-sustaining. Two major fisheries habitat activities are stream permitting conducted with the Broadwater Conservation District and widespread attempts to maintain or enhance streamflow in the Jefferson and Missouri Rivers (including associated tributaries). FWP and the Broadwater Conservation District monitors tributary streamflow in 18 streams (Figure 1).

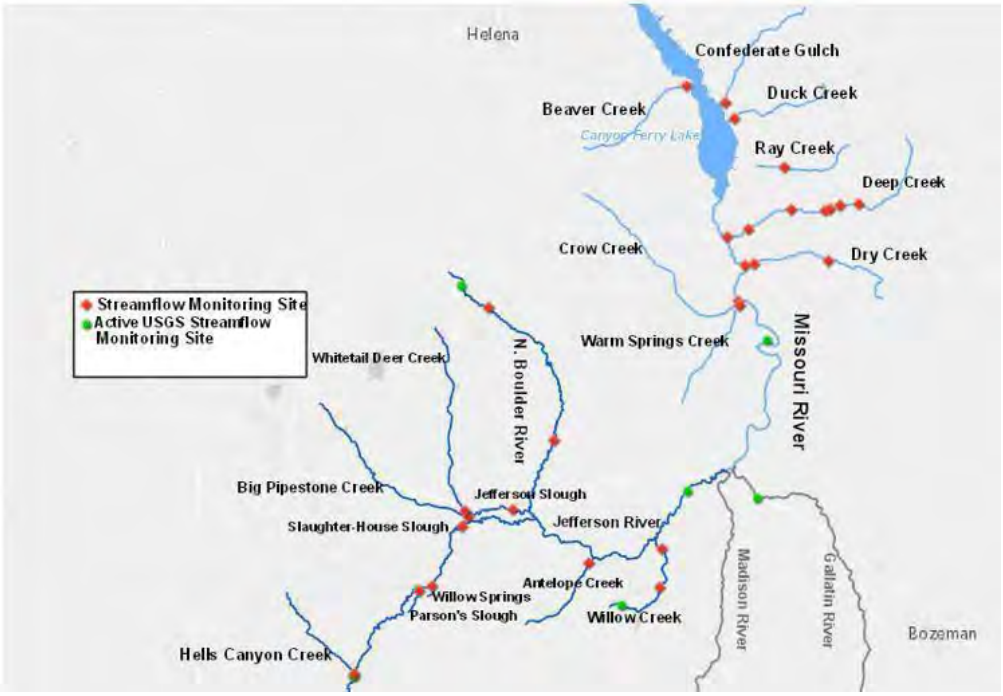


Figure 1. Tributary streamflow monitoring stations with recent data collection by Jim Beck (Broadwater Conservation District) and FWP.

Recent management efforts since 1991 have focused on rehabilitating degraded spawning and rearing habitat in tributaries entering both the river and Canyon Ferry Reservoir. Project funding has come from Broadwater Power Plant fisheries mitigation (Toston Dam), FWP Future Fisheries Improvement Program, NRCS, DEQ, DNRC, and the Broadwater Conservation District. These efforts have targeted both rainbow and brown trout populations. Monitoring of these tributaries for spawning use includes redd counts, juvenile fish trapping, and electrofishing. Fish management trends in the mainstem Missouri River are monitored through spring and fall electrofishing. Long term electrofishing results indicate that brown trout abundance was influenced by summer streamflow trends, native mountain whitefish were declining, and introduced walleye are expanding their range in the Missouri River.

Management Goals and Limiting Factors

The goal for managing the Missouri River between Toston Dam and Canyon Ferry Reservoir is to provide naturally reproducing brown and rainbow trout populations in the Missouri River and associated tributaries for recreational fishing opportunities, and to provide important spawning and rearing conditions for the Missouri River/Canyon Ferry system.

Quality spawning and rearing habitat is limited for sustaining a high-density brown trout or rainbow trout fishery in the Missouri River. In addition, high water temperatures (approaching 80 degrees) and low stream flow occasionally impact trout fisheries and the food base during drought years. High sediment loading also impacts the quality of habitat for trout and invertebrates. Although improvements to habitat and stream flow have been made on several tributaries in the system since 1991, the overall quality of available spawning and rearing streams remains relatively poor. Extreme drought conditions from 2000-2007, 2013, and 2015-2016 have further deteriorated habitat conditions in the river and tributaries.

Whirling disease has been documented in the system, and although rates of infections appear to be relatively steady now, increased mortality of young rainbow trout rearing in tributaries can be expected as this disease persists.

Increasing observations of physical deformities due to whirling disease at the Deep Creek fish trap are cause for concern for adult fish that were infected by the disease as juveniles. Long-term impacts will likely result in decreased numbers of juvenile rainbow trout and reduced recruitment of adults that were infected as juveniles.

Quality habitat for rearing trout, particularly along shoreline areas, is limited in this reach of river resulting in poor juvenile rearing for brown trout, particularly during drought years. This lack of structural habitat, including good cover and holding areas for protection, results in increased predation by birds and fish.

Tributary enhancement efforts to improve habitat for aquatic life in Broadwater County were best demonstrated by an intensive effort at Deep Creek. Landowners participated with several projects to reduce sediment supply, improve riparian habitat, and improve streamflow with technical assistance and funding support from a variety of agencies (NRCS, FWP, Broadwater CD, DEQ 319 Grant, and DNRC 223 grant). This work has potential to expand to other tributaries in the county.

Fish information from contributions by Ron Spoon (MT FW&P Biologist), 2018.

Section III. Natural Resources Analysis:

In the past 20 years, NRCS has made over $7.4 million in incentive payments through the Conservation Stewardship Program (CSP) and Environmental Quality Incentives Programs (EQIP) in Broadwater County. These payments have resulted in the substantial conservation benefits on over 245,000 acres of range, crop, pasture, and forest lands. Including: 1,175 acres of improved forest health, 77 miles of cross fencing, 1,775 acres of range and pasture seeding, 20 miles of irrigation pipeline and 64 miles of stock water pipeline installed, 45 spring developments and 25 wells. These stock water and cross fencing projects led to the improved grazing management on approximately 80,000 acres.

In 2019 Elkhorn Cooperative Management Range Health & Conifer Encroachment Targeted Implementation Plan was approved for funding by the State Leadership Team. This plan is in conjunction with work being completed by the USFS and BLM on public lands in the Elkhorn Mountains. The goal of this TIP is to remove 20,000 acres of rocky mountain juniper encroachment and douglas fir colonization for historic range land and open meadows. To-date over 17,000 acres have been treated resulting in 2.4 million dollars in financial assistance to private landowners.

In 2021 the Canyon Ferry West TIP Conifer Encroachment Removal was brought online. The goals of this TIP (Phase A) are to improve rangeland and riparian plant structure and composition, maintain wildlife habitat, and increase effective available soil moisture through removal of conifer trees on 5,000 acres in the TIP area over a four- year period. This will result in treatment of 60% of the private land acres in the TIP boundary and over 75% of the acres inventoried as being affected by conifer encroachment. To-date over 3,300 acres have been contracted providing over $250,000 in financial assistance.

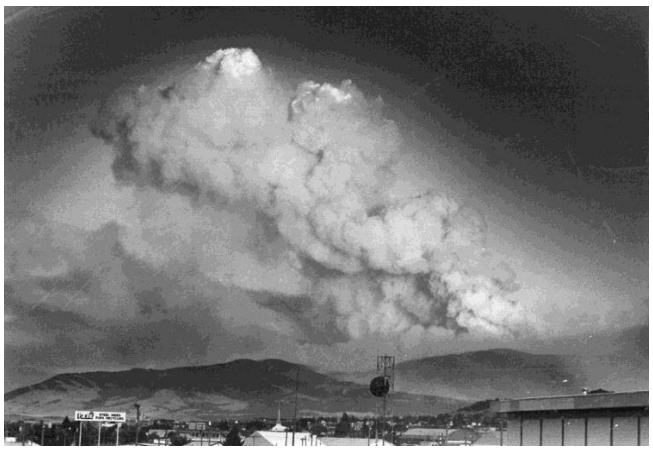
Results from conservation activities

Fish now have access to additional spawning habitat. Stream habitat is being improved by riparian improvement projects. Rangelands are being enhanced through the weed control, juniper removal, and rangeland seeding. Livestock distribution and grazing management have been improved through the additional stock water developments and cross fences. Locally, forests have been thinned and are now more resilient to fire, pests, disease and drought. Irrigation efficiency and water management has been upgraded through education and on farm infrastructure improvements. However, there are still innumerable projects remaining.

Remaining treatment needs:

- Rangeland needs: native plant enhancement, noxious weed control, upland water developments, reduced conifer encroachment, cross fencing, and improved grazing management.
    - The resource issues on rangeland include noxious weed invasion, conifer encroachment, and reduced grazing distribution away from natural water sources. These issues result in degraded wildlife habitat, increased wildfire hazard, reduced livestock and wildlife forage availability, water quality degradation, and an impaired hydrologiccycle.
    - In many cases the rangeland incurs narrow windows of use due to the Mountain – Valley grazing dynamics. Weather and grazing lease constraints accelerated repeated use or over use on both lower elevation rangelands and higher elevation grazed range and forest.
- Aquatic / Riparian Needs
    - Historical and in some remaining operations unmanaged access to riparian areas throughout the county, especially during winter months has resulted in deceased riparian function, stream heath, and increased undesired and noxious weed presence. This has led to increased sediment and nutrient loads (including ecoli) in several waterbodies in Broadwater County.

- Pastureland needs: improved forage species mix, noxious weed control, off stream water, cross fencing, improved grazing management, and reducing conifer encroachment.
    - Irrigated & sub-irrigated pastures lack infrastructure to facilitate an adequate grazing system. On these lands an increased density shorter duration grazing system would be ideal. Lack of management is leading to poor utilization of introduced grass species (timothy, brome, etc.), reduced animal performance and increased non- desirable plant species.
    - Dry pastures are typically crested wheatgrass or smooth brome which in many cases are expired Conservation Reserve Program seeding from the 1980's. Lack of species diversity is resulting in very short seasons of use (early spring / late fall) leading to increased mid-season pressure on native range and grazed forest land units. These tame pastures are often used as winter feeding areas and turn out pastures which results in high levels of manure accumulation and bare ground.
- Cropland needs: Irrigation system and delivery improvements, cropping system diversity, nutrient and pest management, soil quality improvement.
    - The resource issues on irrigated cropland result from inefficient use of water in both conveyance and on farm use. Use of wheel line and flood irrigations leads to nutrient leaching below the rooting depth and dewatering of perennial streams. The main crops grown under irrigation are alfalfa hay, spring wheat, barley (malt & hay), and potatoes with very little crop diversity outside of these main crops. This leads to increased disease and pest pressure. Lack of crop diversity also has resulted in increased weed pressure, requiring the use of more tillage, leading to greater soil erosion.
    - Dry cropland in the county is typically in a wheat-fallow rotation (both spring and winter wheat) with some spring barley and dry peas in rotation. Much of the acreage is chemical fallowed with a mulch till prior to seeding. This leads to a window of increased soil erosion via wind and decreased soil quality (soil health) resulting in decreased soil organic matter, water holding capacity and infiltration rates. The lack of crop diversity on dryland has led to increased weed and pest pressure.
- Forestland (grazed forest) needs: pre-commercial thinning, fuels reduction, insect and disease prevention & control, native grass & forb species enhancement, upland water sources, cross fencing, noxious weed control and improved grazing management.
    - The resource issues on forestland result in reduced forest resistance and resilience, risk of disease and insect susceptibility, and heavy fuel loads increasing the risk of catastrophic wildfires.
        - The Bucksnort and Cave Gulch Fire burned over 35,000 acres the summer of 2000 with most of these acres being in the Big Belt Mountains east of Canyon Ferry Reservoir.
        - The Toston-Maudlow fire burned over 81,000 acres in 2000 with only 13% of the impacted acres being on federal lands. Much of the lower elevation was heavily infested with rocky mountain juniper at the time of the fire.
        - The Warms Spring Creek Fire was started by a vehicle in the Elkhorn Mountains burned close to 47,000 acres in 1988. 14 homes and cabins were lost to the fire. Cost of fighting the fire was over $3.5Million.



Plume of smoke from the Warm Springs Fire seen from Helena MT. Photo from the Helena Independent Record archive.

- The Deep Creek Canyon Fire started June 13, 2021 burning over 4,600 acres with a home and outbuildings being destroyed. The fire burned through native range and timber stands on both federal and private land.


Deep Creek Canyon Fire June 13, 2021

- The Woods Creek Fire started June 10, 2021, burning over 55,000 acres. The fire burned through native range and timber stands on both federal and private land in Broadwater and Meagher Counties.


Photos courtesy of: Denise Thompson
Woods Creek Fire, 2021

Widescale noxious weed infestations of Dalmatian toadflax, spotted & diffuse knapweed, leafy spurge, houndstongue, and musk thistle continue to persist on public and adjacent private lands because of these and several other small-scale historic wildfires. Catastrophic wildfires and noxious weed infestations are issues resulting in degraded wildlife habitat.

- Wildlife: upland species need habitat improvements (see Rangeland and Forestland needs), aquatic species need improved habitat connectivity including riparian area improvements.
- Land protection: preserving and protecting the high value properties from subdivision, or general degradation is imperative. There are large ranches at risk of subdivision by the next generation, or future landowners.

Section IV. Natural Resource Concerns

Invasive Species and Proper Grazing Use

What is the severity of the problem?
Nearly every rangeland owner in Broadwater County has varying degrees of sustainability issues. Noxious weed invasion (including annual grasses), conifer encroachment, lack of upland water developments & fencing are just a few of the contributing factors associated with the declining rangeland health.

Who is willing to help with this resource concern?
Consistent partners in cooperation with the NRCS on the rangeland health concern are BCD, MT-DNRC, MT-DEQ, MT- FWP, MWCC, RMEF, and TU. This is an issue that is a high priority because the consequences of taking no action include, upland and aquatic wildlife habitat degradation and loss of critical winter range due in part to continued loss of native plant diversity, forage loss for livestock and wildlife, increased soil erosion and sedimentation into fish bearing streams, interrupted hydrologic cycle, reduced stream flows, and reduced economic viability of agricultural operations.
Resource Trends
This problem continues despite practices used to enhance rangeland function. These activities include: brush management (juniper removal), fencing in both riparian areas and uplands, herbaceous weed management, stock water improvements and prescribed grazing. Although conifer encroachment and noxious weed infestations have been expanding in the area for decades, there has been a significant increase in the past 30 years, according to residents and historic aerial imagery. The recent increases may be due to fire suppression, improper grazing, climate change, and increased pathways for dispersal and conveyance of plant seeds. Public lands grazing allotments have remained about the same is acreage however, several allotments have been transferred to neighboring allottees over the past several decades. Federal land managers require stricter standards to be followed, especially along riparian corridors potentially resulting in shorter grazing seasons on some allotments, which in turn will lead to increased grazing days on private lands. This increased grazing duration coupled with noxious weeds, annual grass species, and conifer encroachment are all leading to a declining resource trend.

What are the goals?

- Stop expansion of declining rangeland health trends
- Reduce the extent of the rangeland sustainability problems

To make measurable impact on rangeland in the county between 25 - 50 percent of the acreage needs to be treated. This would mean 87,000 to 175,000 acres would need to be treated for weeds, conifer encroachment and grazing management. To accomplish this, we would need to do outreach & education, brush management, herbaceous weed control, along with facilitating practices such as range planting, fencing and water developments.

How much funding is required?
To fund the improved management and facilitating practices on 87,000 – 175,000 acres approximately $5 to $10 million will be needed to cover the cost of outreach, financial assistance programs, and technical assistance.

Forest Health

What is the severity of the problem?
Insects, disease, and excessive tree density have contributed to deteriorating forest health in thousands of forestland acres in Broadwater County. Catastrophic wildfire risk has increased as rocky mountain juniper and douglas fir invades into historic range land, wide spaced ponderosa pine sites, and open meadow areas. Additionally, wide spread pine bark beetle infestations have severally impacted all low (ponderosa pine) and high elevation (lodgepole pine) forests. Spruce budworm and Douglas fir beetle are negatively impacting douglas fir stands at all elevations as well as subalpine fir and Engelman spruce in the higher elevation. This has resulted in extreme fuel loading throughout the public and private land forest. The wildlife habitat value also declines when the forest health deteriorates. This is due, in part, from a decrease in native browse and forbs that sustain a wide variety of species throughout the county as well as the physical barrier that develops as increased blow down occurs within these dead stands. This decline in forest health also leads to an increased probability of a catastrophic wildfire. Spruce budworm is also having a significant impact to ornamental Colorado Blue Spruce and Black Hills Spruce trees found throughout the county in shelterbelts and landscapes.

Who is willing to help with this resource concern?
The BCD, USFS, BLM, MT-DNRC, NWTF, RMEF, Tri County Fire Safe, and the BEDRC are all partners with the NRCS to improve forest health and fire resiliency. This group will help identify means to reduce wildfire risk, improve forest health and wildlife habitat. This may lead to an increase in timber products and economic viability.

Resource Trends
In recent years, timber harvest has declined dramatically; market prices have reduced the incentive for landowners to do any pre-commercial thinning, which is necessary to maintain a healthy overstory and remove encroaching rocky mountain juniper from the understory.

Rocky mountain juniper encroachment has led to decreased livestock and wildlife forage opportunities in the private and public forest lands while increasing the wildfire risk.

What are the goals?

- Create a buffer between the private and public forestland interface
- Reduce conifer encroachment from historic meadows and open ponderosa pine sites.
- Reduce overall fuels through precommercial thinning to decrease wildfire risk
- Sustainability of forest lands for diverse wildlife and livestock use

The NRCS will be able to treat about 1,000 acres of private land per year in the county. Progress will not be visibly evident for quite some time, but outreach will be in place and pretreatment inventories will be carried out to identify current and appropriate stocking levels and existing insect, disease, and other site-specific issues that need to be addressed. Plans will focus on removing overstocked, dying, diseased, deformed, and invading species to leave properly spaced desirable trees the best chance to return to a state of health and productivity.

How much funding is required?
The 1,000 acres a year that gets treated, at (666) Forest Stand Improvement $592.10 and (384) Woody Residue Treatment $414.24 per acre, will require $1,000,000 /year. Treating only 25 percent, or 17,330 acres, of the total 69,322 acres of private forestland in the county will take many years unless additional funding and assistance is given that would increase the acres treated per year. Treatment priority will be focused to the public-private land interface and areas adjacent to ongoing or completed forest health and brush management projects to maximize cumulative effect of conservation efforts.

Water Quality & Quantity

What is the severity of the problem?
The Missouri River and its tributaries offers valuable spawning and rearing habitat for fish and are important for wildlife; thus, the declining stream quality is of significant concern. West slope cutthroat, rainbow and brown trout are affected as movement up and down stream requires more fish-friendly passages and / or the removal of fish barriers. As mentioned earlier, several streams are listed in DEQ's TMDL plan as having temperature, E coli, bacteria and sediment issues. These issues result in degraded water quality for trout and other aquatic species.

Irrigated crops rely on steady flows from the Missouri River and its tributaries. With low rainfall in the region, irrigation is needed to support hay, grain, and seed potato production. Broadwater County has approximately 44,000 irrigated acres, located mostly along the tributaries of the Missouri River or serviced by the Broadwater Missouri Canal, Montana Ditch, Crow Creek Pump Unit (Toston Irrigation District) or the Big Springs Ditch. Nearly all the irrigated land is adjacent to the Missouri or its tributaries and is supplied by surface water diverted from perennial streams. There are also scattered groundwater irrigation wells with flow rates exceeding 2,000 gallons per minute with some of these wells experiencing drought related issues in 2022.

The upper Missouri River Basin is considered a closed basin. This means no "new" irrigation water rights are currently available. The only feasible opportunities for increasing summer stream flows is to improve and maintain upland health, improve irrigation efficiency of delivery and on farm irrigations systems, or maintain /

improve existing storage reservoirs. Upland health can increase stream flows by increasing effective precipitation, increasing infiltration rates, and improving soil water holding capacity.
Additionally, activities such as juniper removal and forest thinning have shown to increase effective precipitation and improve stream flows. Increasing organic matter content in the soil leads to an improved soil water holding capacity. Soil health is key to retaining water in the uplands of the Missouri River Basin. Small irrigation storage reservoirs have been discussed for decades however; due to environmental concerns and the basin being closed to new water rights this is not currently a viable alternative.

Off-stream livestock water is also a need. The recent drought years have resulted in land managers with pastures they can't use or can only use in the spring or early summer months. The lack of off stream late season reliable water is a significant concern, leaving land managers to rely on streams or move cattle to pastures with reliable water. Pastures with the only source of water being natural springs and streams are more prone to riparian area degradation from livestock. NRCS, Broadwater Conservation District, MT DNRC, MT-DEQ, and Ranching for Rivers have assisted landowners with fencing several miles of streams in the county. However, there are hundreds more unfenced and in need of improved riparian grazing systems and off stream water developments.

Manure and wastewater from animal feeding operations, working corrals, and winter-feeding areas have the potential to contribute pollutants such as nitrogen and phosphorus, organic matter, sediments, pathogens, hormones, and antibiotics to nearby surface and ground water. In Broadwater County many ranches were homesteaded in areas that provided reliable yearlong natural water sources. According to MT-DEQ there are high pollutant risk locations in Broadwater County that are adjacent to perennial flowing streams. Based on aerial imagery many of these locations are working corral, winter feeding operations, or water gaps. Since 2010, the Townsend NRCS field office has assisted with the relocation of 5 animal feeding operations that were considered high priority due to confined livestock having direct access to "state waters".

Who is willing to help with this resource concern?
The main agencies the NRCS is partnering with on this resource concern BCDC, MT-DEQ, Ranching for Rivers, and MWCC

Resource trends
The water quality and quantity problems continue to increase. This is due to the increased demand for the water resource, upgradient municipal treatment and septic systems ageing and increasing in number, the cost of ag. land rising, making operations utilize every possible acre for production, heard sizes increasing to offset increased operating and labor cost. Although there are several miles of riparian fence and off stream water sources constructed each year, native desirable riparian vegetation and riparian function remains a concern. This is due to livestock and wildlife concentrating in these areas during the summer and winter months and infrastructure development encroaching on stream channel migration zones.

What is the goal?

- Improve water quality of 303d listed streams and / or streams listed in the MT-DEQ TMDL plan.
- Improve upland water retention through juniper removal, forest thinning, and facilitating practices needed for improved range & soil health to effectively retain precipitation in the uplands.
- Upgrade and improve irrigation efficiency of delivery and on-farm irrigation systems.
- Identify watersheds where off-stream water sources would be beneficial to facilitate improved grazing management systems to reduce riparian area degradation.
- Improve grazing system to reduce riparian area de
- Renovate / Relocate existing corral and winter-feeding operation to minimize extended direct access to state waters.
- Relocate or modify infrastructure where feasible to allow streams room to roam and improve aquatic organism passage.

This will take cooperation from the partners and landowners involved. Education and outreach need to occur on the technical and financial cost-share assistance programs available and determine the landowners willing to participate.

How much funding is required?
Approximately $15 million is needed to cover the financial assistance to upgrade irrigation delivery, on farm irrigation, off stream water, and animal feeding operations throughout the county.

Upland improvements will continue to be addressed through the other resource priorities in the county.

Land Protection

What is the severity of the problem?
High value lands can be defined as lands with large contiguous acres with few developments, lands with unique or high value habitat for endangered species or species of concern, or lands in pristine condition. Several of the lands in the county that fall into this category are at risk of conversion by subdivision, implementing practices that would facilitate the loss of habitat, or invasion by undesirable species.

Who is willing to help with this resource concern?
The NRCS Agricultural Land Easements Program (ALE), Montana Land Reliance, Prickly Pear Land Trust, MT-FWP, and RMEF have interest and finances to apply towards conservation easements. The partners named above have invested significant resources in the area to preserve working lands, open space, scenic beauty, and wildlife habitat. Other local natural recourse entities have shown interest by sponsoring outreach events.

Resource trends
Over 3,000 lots have been subdivided in Broadwater County over the past 15 years. According to the Broadwater County planner 78% of the ownership tracts in the county are less than 100 acres with 65% being less than 20 acres. Many of these subdivisions were developed on prime farm land if irrigated or on historic winter range for pronghorn and rocky mountain elk. These developments have put added pressure on county infrastructure and are vectors for noxious weed infestations. The addition of over 3,000 wells and septic systems is also causing concern for ground water quantity (locally) and quality. Thousands of dollars every year are invested in the county for restoration and conservation of natural resources and it is imperative that these investments are protected. Properties are bought and divided and resold, reducing the economic independence of the property, and increasing the number of developments.

What is the goal?
Protect high value properties as necessary to limit conversion and preserve investments by natural resource agencies.

How much funding is required?
It is difficult to determine the amount of funding needed to secure working lands conservation easements. This cost will vary greatly on land values and the ability of the local land trusts and funding agencies to secure easements.

Section V. Prioritization of Natural Resource Problems and Desired Outcomes

In 2018 the LWG identified and prioritized the natural resource concerns in Broadwater County by seven 'major' watersheds as well as county wide issues. The 2022 LWG reviewed the resource concerns identified in the 7 watersheds and added a few the felt were not included in the original list. The following five natural resource concerns were identified as the top priorities in the county.

1) Forest & Range Land Health.
    - The LWG identified forest health as the top resource concern due to its impact on overall watershed health, negative economic impacts, increased fire hazard, and increased disease and pest susceptibility and loss of wildlife habitat.
        - This concern included all forestland in the county. Although over 186,000 acres of the county is managed by the US Forest Service, only 14% of the private land is considered nonindustrial private forest. NRCS can work on the private forestland in the county but does not have the ability to do anything on the public land forest.

        - Rocky mountain juniper is increasing in the understory on both private non-industrial forests and throughout the federal forest increasing the wildfire hazard while reducing desirable shrub components. Much of the conifer encroachment discussion was directed to the rocky mountain juniper and Douglas fir moving into what historically were meadows, open ponderosa pine grasslands and rangeland.

The highest priority areas on the private non-industrial forestlands are those that are adjacent to federal lands or other forest health precommercial thinning or brush management projects. The goal within the next 5 years would be to increase healthy forests, decrease conifer encroachment and reducefuels.

2) Invasive Species
    - Identified as the number two resource concern in Broadwater County due to the rate at which the problem grows and the negative economic impact, degradation of ecosystem function and wildlife habitats, and the risk of crossing thresholds. Invasive species will continue to spread rapidly if nothing is done to slow their impact. At this point they are found throughout all watersheds in the county. The LWG identified its 5- year goal as just being able to contain the weeds. This means that acres of weeds may not be reduced, but the expectation to simply stop increasing acres of weeds was felt to be a significant goal.
        - This concern included new and not yet identified invasive species.
            - The LWG understands the need to quickly respond to any new infestation especially those that would be new to the area (i.e. Vetenata)

3) Land Use
    - Protection of high value land. Preserving and protecting the high value properties from subdivision, or general degradation. NRCS's interest in this is to protect high value working lands from subdivision or other threats of conversion.
    - Land Ownership
        - The LWG supports keeping private lands in private hands.

4) Water Quantity
    - Irrigation is an integral part of the agricultural operations and the economic sustainability of Broadwater County. Many of the irrigation systems have been improved from flood to sprinkler over the past 50 years. Irrigation canals intercept many of the perennial flowing streams north of Toston. This prevents aquatic organisms from moving and greatly alters the hydrological function of the watershed. Over the past several years there has been an effort to remove fish barrier diversions for on farm water use. This has led to several miles of spawning habitat being made available to the Missouri River fish populations. There is a need to continue to line (pipe) irrigation canals to ensure the water that is diverted from the Missouri and its tributaries is put the best possible use. Additionally, there continues to be a need to improve on farm irrigation efficiency to limit over irrigation and the subsequent leaching of nutrients to ground water and loss to adjacent water bodies.

5) Range Health

    - Proper Grazing Use. This was identified as a priority by the LWG due to the loss of grazing for livestock, loss of income to landowners, and loss of foraging habitat for wildlife. Improper grazing was noted as also contributing to the increase in invasive species. It is as important to promote proper grazing as it is to treat the invasive species. Education and cost share for facilitating practices is needed to address the concern.
    - Conifer encroachment was identified asa major resource concern to plant productivity health & vigor on range land. The widespread encroachment in both the Elkhorn and Big Belt Mountains over the past 30 years has dramatically increased the wildfire hazard while reducing native desirable forage quantity at the mid & low elevations.
    - Offsite water is lacking on much of the range land in the county.
        - Historically ranches relied on perennial flowing streams and upland springs for year-round sources of livestock water. Over the past few decades upland springs have begun to fail (especially during drought years) forcing livestock to concentrate along riparian corridors. Reliable water sources in the uplands are needed to facilitate grazing systems and reduce summer grazing reliance on sensitive areas (riparian / wetland communities).

6) Water Quality.
    - The LWG further clarified this as a two-part resource concern; agricultural and urban
        - Ag Related
            - Winter feeding areas, confined animal feeding facilities, declining riparian health, direct access of livestock to surface water, decreased field borders along waterways, and decreased quality fish and aquatic species habitat
        - Urban Realted
            - Increase of septic systems
            - Municipal Waste Water Treatment Plants

    Progress has been made in reducing the number of access points throughout the county with the use of riparian fencing with water gaps, off stream water and relocation of winter-feeding areas and feedlot facilities. There are still several confined and unconfined winter-feeding areas adjacent to state waters and shallow ground water. Spreading manure on frozen ground is not a typical practice in Broadwater County as there is only one licensed dairy. However, annual spreading from corrals & feedlots does occur on the same fields near the facility. Improved nutrient management and crop diversity is needed on many of the ranches in the county.

    Historically riparian fences have been built immediately adjacent to the stream. Limiting the operations from incorporating the riparian area into a full ranch grazing system and prevents the streams from having room to roam. Additionally, fences in these locations become hazards to both wildlife and cattle as the banks are undercut leaving the fences hanging over the streams. Improved native vegetation including tree and shrub communities are needed to naturally stabilize creek banks and provide for emergency grazing pastures when needed. To adequately manage these sensitive areas off site watering facilities are needed to limit direct access to streams and allow for proper deferred rotational grazing of adjacent pastures.

Partner Resource Management Contributions:

Elkhorn Cooperative Management Area

- Accomplishments

  Integrated weed management, Coordinated fire management, Coordinated inventory and monitoring, Coordinated elk study (*Impact of Mountain Pine Beetle Infestations on Elk Habitat and Elk Movements in the Elkhorn Mountains*)
- Plan of Work
    - Continue integrated weed management including synthesizing weed treatment efforts and efficacy and develop next generation weed management strategy
    - Continue coordinated fire management,
    - Continue to share protocols and data collection (inventory and monitoring)
    - Continue participation with the Elkhorn Working Group and Elkhorn Restoration Committee and continue ongoing support of collaborative efforts in the Elkhorn Mountains
    - Continue revising the Forest Plan for both Forests – which will include input from the cooperators in the ECMA.

United State Forest Service

- Accomplishments
    - Implementation of wildlife habitat work via the 1988 Habitat Enhancement Project
    - Projects to improve aspen and grasslands
- Plan of Work
    - Develop agreements with private landowners adjacent to FS land to aid in fuels treatments such as conifer colonization removal and prescribed fire (Rx burning).
    - Look for opportunities to improve riparian areas through off-site water developments, pipelines, fencing where necessary and to utilize conifer colonization to put a barrier along streambanks where possible.
    - Complete Cabin Gulch Vegetation Project.
    - Continue work for Boulder Baldy timber harvest project.
    - Complete the 1988 Elkhorns Wildlife Habitat Enhancement Projects.
    - Continue the Johnny Crow Wildlife Habitat Enhancement project as outlined in the table below:

Habitat Communities	Treatment*	Estimate of Acres to be Treated**
Grassland and Shrub Enhancement	Hand slashing (conifer colonization) followed by broadcast prescribed fire where applicable	9,565
Riparian, Wetland and Aspen Habitat Enhancement	Hand slashing of conifer colonization and/or low-severity prescribed fire through indirect ignition	460
Promotion of Forest Stand Age Class and Species Diversity	Mixed severity prescribed fire	3,000
Promotion of Five-Needle Pine	Hand slashing and/or girdling of undesired conifer species	500
Total Activity acres		**13,525**
*Exact treatment applied will be determined on the existing conditions and what will best meet the purpose and need. For example, some shrubland habitats will not receive prescribed fire in order to protect sagebrush and/or prevent the spread of noxious weeds. **Acres identified reflect the total maximum treatment area; exact implementation acres may be less depending on site conditions and design elements.		

Bureau of Land Management:

- Accomplishments
  - Completed reclamation of the Iron Mask Mine
  - Implemented conifer colonization reduction treatments in the Iron Mask including applying prescribed fire
- Plan of Work
  - Continue implementation of the Iron Mask vegetation treatments (conifer colonization and prescribed fire)
  - Continue to implement travel planning via a comprehensive sign inventory and replacement were needed.

Montana Fish Wildlife and Parks

- Accomplishments
  - Completed annual big game surveys
  - Completed westslope cutthroat trout restoration
- Plan of Work
  - Continue annual big game surveys
  - Continue westslope cutthroat trout restoration monitoring
  - Evaluate partial fish barrier on Dutchman Creek
  - Continue to explore block management opportunities

Rocky Mountain Elk Foundation

- Accomplishments
  - Completed several years of support to weed treatments in the Elkhorns
  - Instrumental in acquisition of key properties in the Elkhorns (e.g. Iron Mask)
  - Provided support for ongoing (wrapping up) elk monitoring study
  - Conservation easements to permanently protect crucial wildlife habitat
- Plan of Work
  - Implementation of conifer colonization removal in the Johnny Crow/Jenkin's Gulch area (RMEF granted the FS $15,000 for this work – see FS above)
  - Conservation easements to permanently protect crucial elk winter and summer ranges, migration corridors, calving grounds and other vital areas
  - Grant opportunities for landowners, agency, and NGO's

National Wild Turkey Federation:

- Accomplishments
  - Partnered with the NRCS to create a cooperative forester position to be based out of the Bozeman NRCS Area Office.
  - Provided grant for aspen enhancement in the southeast Elkhorns.

- Plan of Work
  - Aspen fence building work day with NWTF in July

Pheasants Forever:

- Accomplishments
  - Habitat improvement projects for the past 18 years
    - Shelterbelt establishments with drip irrigation.
    - Establishing nesting cover and food plots
- Plan of Work
  - Continued partnership with MT-FWP on habitat projects on east side of WMA.

Montana Land Reliance:

- Accomplishments
  - Worked with 17 Broadwater County landowners to protect over 30,300 acres.
  - Since 1978, MLR has protected over 1,087,400 acres of Montana's open space through 876 conservation easements.
  - Recognized by the national land trust community as being among the most effective conservation organizations in the country.

- Plan of Work
  - Continue to protect Montana's open spaces by negotiating conservation easement agreements with private landowners.
    - Conservation easements not only protect Montana's ecosystems, but also keep Montana's family lands in family hands and help stabilize historical rural communities. Easements are frequently used as a succession planning tool, keeping agricultural families on the land.

2016 Local Working Group Recommendations:

1. RESOURCE CONCERNS BY WATERSHED

<u>Duck Creek/ Confederate Gulch/ Avalanche:</u>

1) Degraded Plant Condition
   a) Noxious Weeds
   b) Forest Health – Encroachment
2) Livestock Production Limitation

3) Source Water Depletion
   a) BM – Discharge
   b) BM Canal & Ditch Seepage
   c) BM Intercepting Creeks
4) Concentrated Erosion

   b) Bare Ground
5) Streambank Destabilization

<u>Gurnett Creek/ Ray Creek/ Cottonwood Creek</u>

1) Degraded Plant Condition
   a) Noxious Weeds
   b) Forest Health – Encroachment
   c) Range Health
2) Livestock Production Limitation

3) Concentrated Erosion

4) Source Water Depletion

5) Soil Quality Limitation

DEEP CREEK

1) Degraded Plant Condition
    a) Noxious Weeds
    b) Forest Health – Encroachment
    c) Range Health
2) Livestock Production Limitation
    a) Inadequate stockwater
3) Concentrated Erosion
    a) Bare Ground
    b) Streambank Destabilization
    c) Water Quality
4) Source Water Depletion
    a) Groundwater Depletion
    b) BWM Canal Intercepting Creeks
    c) Water Quality
5) Soil Quality Limitation
    a) Crop Diversity
    b) Residue Management

DRY CREEK/ 16 MILE/ GREYSON CREEK

1)Degraded Plant Condition
    a) Noxious Weeds
    b) Forest Health – Encroachment
    c) Range Health
2) Livestock Production Limitation
    a) Inadequate stockwater
3) Concentrated Erosion
    b) Streambank Destabilization
4) Source Water Depletion
    a) Groundwater Depletion
    b) BWM Canal Intercepting Creeks
    c) Dewatering late season flows
    d) Ditch Seepage
5) Big Springs Ditch

HEADWATERS/ MISSOURI RIVER

1) Eustice Fire -2015
2) Degraded Plant Condition
    Noxious Weeds
    a) Forest Health – Encroachment
    b) Range Health
3) Fire Management
4) Urban Sprawl
    a) Concentrated Erosion
        i) Related to new subdivisions
            a) building sites and roads
    b) Wind / Water on Non Irr Land.
5) Soil Quality Limitations
    a) Crop Diversity
    b) Residue Management

CROW CREEK/ **WARM** SPRINGS CREEK/ RATTLE SNAKE

1) Degraded Plant Condition
    a) Noxious Weeds

b) Forest Health – Encroachment
c) Range Health
2) Livestock Production Limitation
a) Inadequate stockwater
3) Concentrated Erosion
a) Mining Disturbance
b) Bare Ground
c) Streambank Destabilization
4) Source Water Depletion
a) BM Intercepting Creeks
b) Canal & Ditch Seepage
c) Irrigation Infrastructure & Efficiency
d) TID Pump Station
5) Flood Control
6) Wildlife Interaction
a) Elk – Deer Crop & Hay Damage
7) Soil Quality Limitations
a) Crop Diversity
b) Residue Management

BEAVER CREEK/ STAUBACH CREEK/ IRON MASK/ INDIAN CREEK/RIVER ROAD

1) Degraded Plant Condition
a) Noxious Weeds
b) Forest Health – Encroachment
c) Range Health
2) Livestock Production Limitation
a) Inadequate stockwater
3) Concentrated Erosion
a) Mining Disturbance
i) Historic & On-Going
ii) Quarry
4) Limestone Hills Firing Range
5) Streambank Destabilization
6) Source Water Depletion
a) Ditch Seepage
b) Irrigation Efficiency
c) Low stream flow – late season
6) Flood Control / Mitigation
a) Beaver Creek & Silo's Area
7) Wildlife Interaction
a) Elk – Deer Crop & Hay Damage

2. COUNTY WIDE TOP RESOURCE CONCERNS:

1. Forest Health
   a. Fire Hazard
   b. Disease issue
   c. Juniper/ Conifer Encroachment
2. Plant Productivity Health and Vigor/ Range Health
   a. Plant Productivity
   b. Rest Rotation/ Management
   c. Forest Health to Range Health
3. Water Quantity/ Water Quality
   a. Inefficient Water Use: irrigation wise
   b. Poor livestock water distribution in uplands away from riparian areas
   c. Inefficient Water Use: irrigation wise
   d. Flood control/ runoff and B-M connection and issues as well
   e. Spring runoff

f. Improved irrigation infrastructure and management
g. Winter feeding and flushing nutrients to creek
h. Riparian buffer

4. Soil Quality/ Soil Health
   a. Soil Erosion (water and wind)
   b. Crop Issues: chemical resistance weeds
   c. Streambank Erosion- destabilization issues

2022 Local Working Group New Resource Concerns:

1) Duck Creek-Confederate-Avalanche:

1) Woods Creek Fire Rehabilitation
   a) Burned tree salvage
   b) Erosion-sedimentation and water quality impacts from burned area.

2) Urban Spawl
   a) Ground water depletion from drought and increased exempt wells.
      1) Possible solution was using BM Canal to deliver water to injection wells.
3) Inefficient Irrigation
   a) Primarily in conveyance – Open Ditch / Canals.

2) Gurnett-Ray-Cottonwood:

1) Woods Creek Fire Rehabilitation
   a) Burned tree salvage
   b) Erosion-sedimentation and water quality impacts from burned area.
      a) Damage to irrigation infrastructure resulting from increased sedimentation.
   c) Streambank destabilization from increased runoff
2) Urban Spawl
   b) Ground water depletion from drought and increased exempt wells.
      2) Possible solution was using BM Canal to deliver water to injection wells.
3) Drought induced surface and ground water depletion

3) Deep Creek:

1) Deep Creek Fire Rehabilitation
   d) Burned tree salvage
   e) Erosion-sedimentation and water quality impacts from burned area.
      b) Damage to irrigation infrastructure resulting from increased sedimentation.
   f) Streambank destabilization from increased runoff
2) Urban Spawl
   c) Ground water depletion from drought and increased exempt wells.
      3) Possible solution was using BM Canal to deliver water to injection wells.
1) Drought induced surface and ground water depletion.

4) Greyson Creek – Dry Creek – 16 Mile:

1) Effects of rain on snow event and associated runoff in Boone Run
2) Big Springs Ditch seepage and Montana Rail Link line interactions
3) Broadwater Missouri – Greyson Creek Interaction
   a) Needs a siphon or flume

5) Missouri Headwater:

1) Livestock Production Limitation
   a) Inadequate Stockwater
      1) low flow and springs failing due to drought
2) Source Water Depletion
   a) Irrigation Conveyance and open ditch seepage loss.
   b) old headgates being left open causing Crow Creek to spread out in open ditches expanding wetland areas and increasing flood prone areas.

6) Crow Creek:

1) Drought induced stream low flow and springs drying up
2) Conifer regrowth / sprouting post NRCS treatment

a) large flush of noxious weeds where RMJ canopy was.

7**) Canyon Ferry West:**

1) Drought induced stream low flow and springs drying up
2) Conifer regrowth / sprouting post NRCS treatment
    a) large flush of noxious weeds where RMJ canopy was.