Figure 1 Kelly Island - Photo by Gretchen Watkins

20XX

Central Clark Fork Watershed Restoration Plan

Prepared By

Clark Fork Coalition
140 South 4th St W, Suite 1
Missoula, MT 59801

With Support From

DEQ Montana 319
1520 6th Avenue
Helena, MT 59601

Montana EPA
10 West 16th St, Suite 3200
Helena, MT 59626

Acronyms

BDA- Beaver Dam Analog

BLM- Bureau of Land Management

BMP- Best Management Practices

BRAT- Beaver Restoration Assessment Tool

CD- Conservation District

CCF- Central Clark Fork

CFC- Clark Fork Coalition

CFS- Cubic Feet per Second

CWA- Clean Water Act

DEQ- Montana Department of Environmental Quality

DNRC- Montana Department of Natural Resources and Conservation

US EPA- Environmental Protection Agency

FWP- Montana Fish, Wildlife, and Parks

HUC- Hydrologic Unit Code

IR- Integrated Report

LTPBR- Low-tech Process Based Restoration

LWD – Large Woody Debris

NHP- Montana Natural Heritage Program

NPS- Nonpoint source

TMDL- Total Maximum Daily Load

TN- Total Nitrogen

TP- Total Phosphorous

TU- Trout Unlimited

USFS- United States Forest Service

USFWS- United States Fish and Wildlife Service

WRP- Watershed Restoration Plan

WQ- Water Quality

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Acknowledgments

Many individuals and organizations helped support and guide the development of this Watershed Restoration Plan.

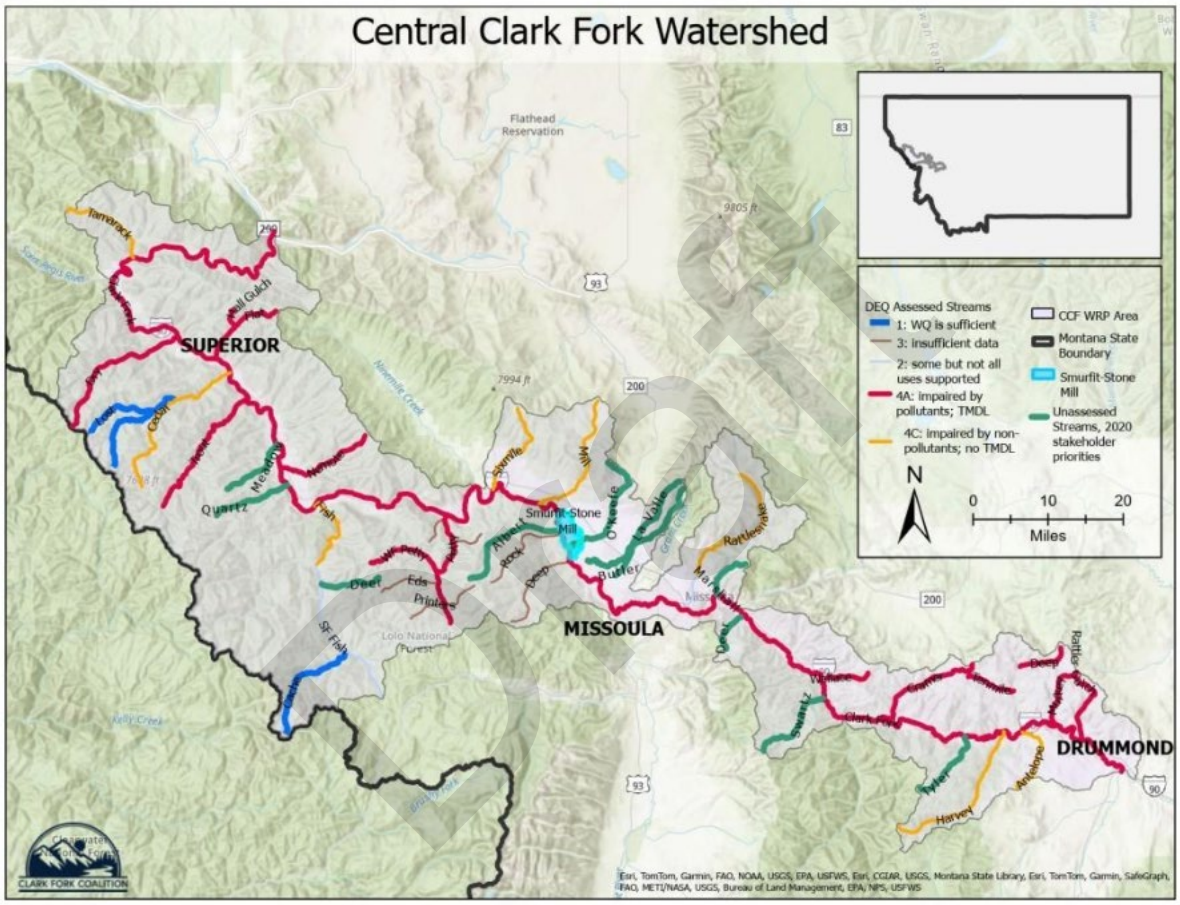
Dr. Vicki Watson spent many hours compiling data, convening stakeholders, and writing the first draft of this document. Much of the text in this document was originally written by Dr. Watson.

Many stakeholders, ranging from non-government organizations, government staff (state, federal, tribal), and concerned community members gave their time and expertise to the creation of this document.

The diverse and vibrant communities living in the Central Clark Fork Watershed are deeply committed to the protection and restoration of their home waters- this WRP is dedicated to those communities and their commitment.

Section 1: Introduction

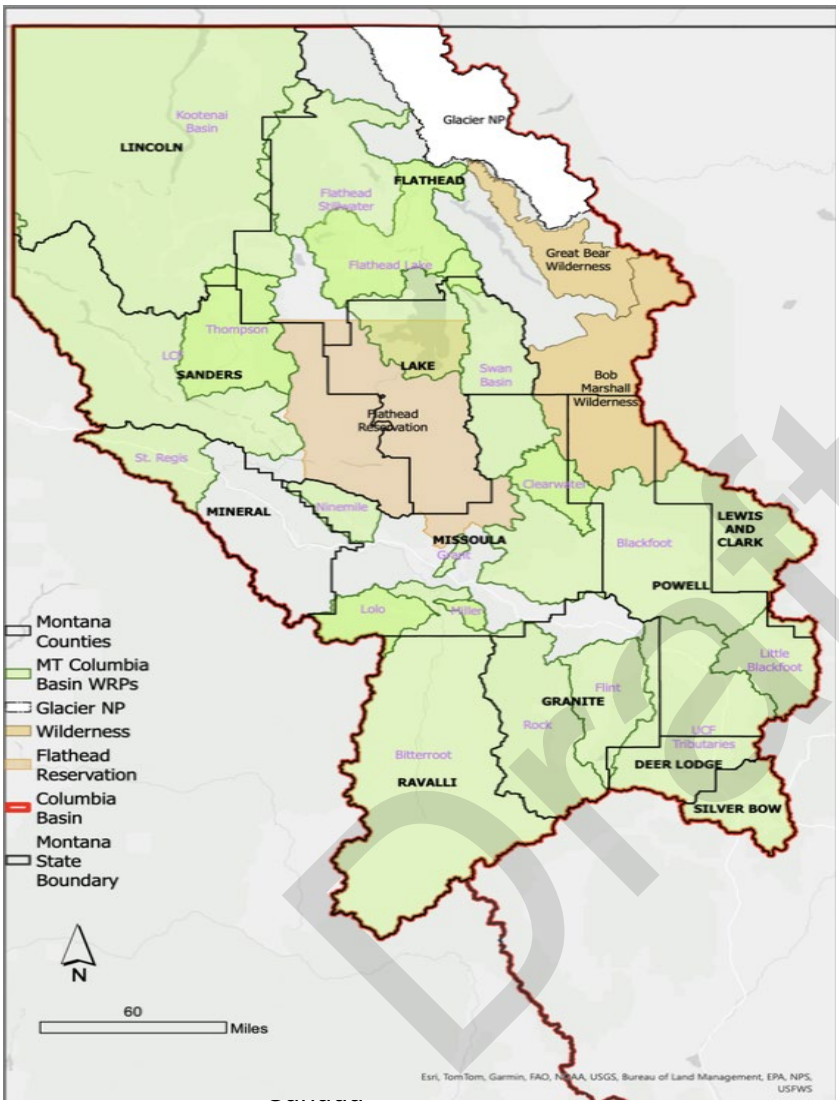
The Central Clark Fork (CCF) Watershed, defined as the section of the Clark Fork River between its confluence with Flint Creek near Drummond, to its confluence with the Flathead River, encompasses a large portion of Montana west of the continental divide (Map 1). It is a stretch of river containing wilderness, iconic landscapes, working lands, Superfund sites, and some of Montana's fastest growing communities.



Map 1: The CCF Planning Area, with DEQ assessed streams and unassessed streams of concern from 2020 stakeholder groups. *Map by: Cloe Sliva, University of Montana*

The purpose of this Watershed Restoration Plan (WRP) is to provide a strategic framework and coordination for the restoration of water quality, aquatic ecosystems, and watershed health in the Central Clark Fork Basin, focusing on how to meet the watershed health goals proposed in key documents described below and collected from watershed stakeholders during the Education and Outreach part of this planning process. This WRP defines and addresses current and future water quality problems within this sub-basin and serves as a tool to restore and protect those waters from both point source and nonpoint source (NPS) pollution.

While WRPs have been completed for the Upper (2012) and Lower (2019) portions of the Clark Fork Basin, this will be the first for the CCF Basin. There were planning efforts for the CCF WRP between 2017 and 2020, but global events caused disruptions to the planning process. This 2026 version incorporates many pieces from the 2020 draft, in deference to the large amount of work put in by the 2020 draft organizers and the many stakeholders involved. The overarching goal of the WRP is to improve (or maintain) water quality in the CCF Watersheds by prioritizing key waters in need of restoration and addressing pollution in impaired streams. A WRP allows community members to increase their knowledge of existing local water quality conditions and opens opportunities for community members and organizations to work together to improve and maintain water quality in this important portion of the Clark Fork River. Finally, the WRP serves as an educational tool for local communities interested in protecting and improving the health of their local waterways.



Map 2: The CCF is one of the last major WRPs needed in the Columbia Basin of Montana. The large gap in Granite, Missoula, Mineral, and a small portion of Sanders County is the CCF planning area. *Map by: Cloe Sliva, University of Montana*

1.1 Watershed Restoration Plan (WRP) Design

A WRP is a watershed-scale assessment that identifies nonpoint source (NPS) pollution identified by MT DEQ in 2020, some of its sources, and effects on water quality, fisheries, and aquatic habitat. Although nowhere near complete, this document provides a starting point for discussion and projects related to water quality and other aquatic values in the basin. WRPs outline strategies to reduce pollutant loading, restore impaired waters, and protect overall watershed health. They provide a framework for communities to work collaboratively to improve local water quality and to pursue funding opportunities that would otherwise be unavailable, including the U.S. Environmental Protection Agency (EPA) Section

319 Nonpoint Source Grant Program, administered in Montana by the Montana Department of Environmental Quality (DEQ). A WRP does not impose regulatory requirements on landowners.

Watershed-scale planning is a primary tool for organizing water quality and habitat improvement efforts. Rather than focusing on isolated projects or short stream reaches, this approach considers how land use, hydrology, water quality, habitat conditions, and aquatic populations interact across an entire drainage basin. This is particularly important for addressing the diversity of nonpoint source pollution, which originates from sources such as roads, grazing, irrigation, forestry, and historical mining rather than from a single, regulated discharge.

The United States Environmental Protection Agency (EPA) provides funding to states for NPS and point source pollution mitigation under section 319 of the Clean Water Act (CWA). A large amount of work that has already been done on the Central Clark Fork was used to inform and develop this WRP. In the ten years since the newest of these documents were developed, more waters in the CCF were listed as impaired. The documents used in this WRP are as follows:

Total Maximum Daily Load (TMDL) documents from MT DEQ are compiled for impaired waterbodies (as defined by the CWA) to identify sources of pollution in impaired waterbodies and determine how much pollution these bodies can take while still supporting beneficial uses. The TMDLs listed below informed this WRP:

- The Clark Fork River Voluntary Nutrient Plan (TriState Implementation Council, 1998).
- Bonita-Superior Metals TMDLs (DEQ 2013)
- The Silver Bow Creek & Clark Fork River Metals TMDLs (DEQ 2014a)
- The Central Clark Fork Basin Tributaries TMDLs and Water Quality Improvement Plan (DEQ 2014b)

The integrated report (IR) lists all Montana waterbodies that DEQ has found to be impaired (not fully supporting their beneficial uses) and describes the causes and sources of impairment.

- The Final 2020 Integrated Water Quality Report (DEQ, 2021)

Additionally, the DEQ's Clean Water Act Information Center provides a handy mapping tool for easy viewing of the most up-to-date WQ information the DEQ has made publicly available.

- Montana DEQ Clean Water Act Information Center data search tool (DEQ, 2020)

Relevant reports from the United States Forest Service (USFS) and Montana Fish, Wildlife, and Parks (FWP) provided information about tributary risk factors, watershed characterization, ownership patterns, and other pertinent information. Overlap between this WRP and other published water-resource plans or management strategies have also been included:

- Conservation Strategy for Bull Trout on USFS Lands in Western Montana (USFS, 2013)
- Alberton and Superior Growth Policy. (Mineral County, 2015)
- Lolo National Forest Watershed Climate Change Vulnerability Assessment (USFS, Wade et. al. 2016)
- MT FWP 2018 Aquatic Prioritization Plan (FWP, 2018)
- *2016 Missoula County Growth Policy, Amended 2019*
- 2020 Montana Forest Action Plan (DNRC, 2020)
- Montana Beaver Restoration Assessment (BRAT, 2020)
- Missoula County Channel Migration Mapping Study (Montana State Library, 2021)
- Granite County Long Range Plan (NRCS, 2022)
- 2023 Montana Drought Management Plan (DNRC, 2023)
- MT FWP Statewide Fisheries Management Plan 2023-2026 (FWP, 2023)
- *National Wildlife Federation. (2023). Montana Beaver Action Plan.*
- 2024 Clark Fork Face Forest Health and Fuels Reduction Plan (BLM, 2024)
- MT FWP 2024 Fish Creek Recreation Strategy (FWP, 2024)
- *Missoula County Floodplain Regulations (Missoula County, 2024)*
- The City of Missoula 2025 Stormwater Quality Plan (City of Missoula, 2025)

This WRP provides an overview and timeline for some of the people, places, and projects that will address water quality concerns in the CCF and its tributaries. In an effort to be as approachable as possible, the document's structure is modelled after other WRPs in Montana, especially the *Grant Creek Watershed* ***Restoration Plan*** and the *Bitterroot Watershed Restoration Plan*.

EPA lists nine key elements critical for achieving water quality improvements and that must be included in all WRPs supported with Section 319 funding. For each priority stream, the following information is listed out in Section 3:

1. A description of the waterbody and its impairments, causes and sources of pollution, and impairment information per TMDL reports (EPA element 1).
2. Necessary reduction loads per TMDL reports (EPA element 2)
3. Management measures to achieve load reductions, potential restoration projects and their benefits (EPA element 3).
4. Descriptions of completed, ongoing, and planned restoration projects.

Following Section 3,

1. Restoration milestones and project schedule for coming years (EPA elements 6 and 7).
2. The technical and financial assistant required to accomplish these goals (EPA element 4).
3. Education and outreach activities complementing the projects and encouraging participation (EPA element 5).
4. Evaluation criteria and monitoring components (EPA elements 8 and 9).

1.2 Collaborative Efforts

Watershed restoration works best when the people who live and work in the basin help the effort—and choose to participate. The role of Clark Fork Coalition is to facilitate information exchange and identification of restoration opportunities that are prioritized by natural resource managers, CFC, Trout Unlimited, and other groups also assist public and private landowners in developing projects and pursue funding and technical support. The WRP is not a regulatory document; it is a guiding tool to support coordinated and landowner-driven voluntary efforts that protect and improve water quality, aquatic habitat and the long-term resilience of the Central Calrk Fork River watershed.

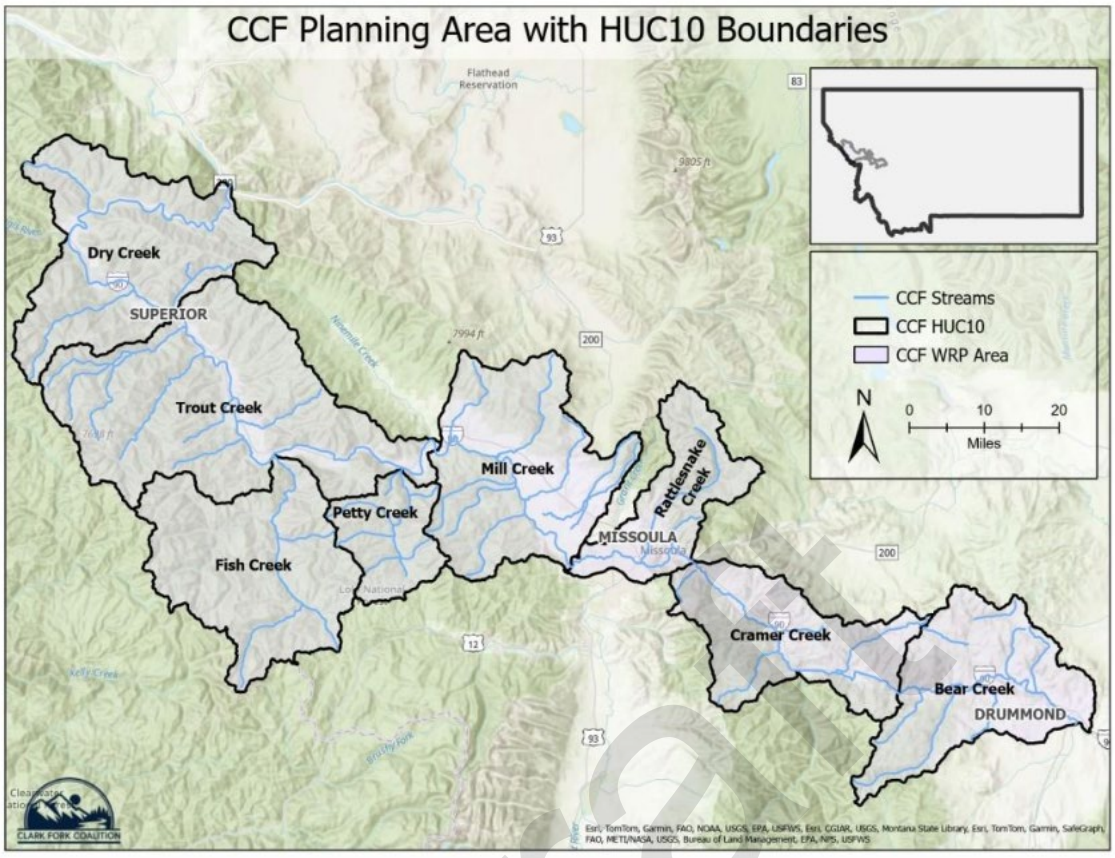
These restoration efforts were planned by engaging local stakeholders in several ways. Waterbodies of concern were identified and prioritized at a series of stakeholder meetings and in consultation with local aquatic resource and land managers. Some of the highest priority waterbodies and projects are described in section 3.

Section 2: Characterization of the Central Clark Fork Watershed and Goals

2.1 Watershed Characteristics

Draining a large portion of the Rocky Mountains of western Montana, the CCF Watershed is defined here as the mainstem of the Clark Fork River from its confluence with Flint Creek at Drummond in Granite County, to its confluence with the Flathead River in Sanders County. The CCF Watershed covers 2,021 square miles (MT DEQ 2014b) and includes parts of four counties: Granite, Missoula, Mineral, and Sanders Counties. This plan includes the watersheds of the small tributaries that join the mainstem in the reach, but larger tributaries that already have water quality based WRPs are not detailed in this WRP. Those include the Blackfoot, Bitterroot, Flathead and St. Regis Rivers, and Rock, Grant, and Ninemile Creeks.

The CCF river valley is bordered on all sides by the Rocky Mountains and is characterized as a gravel-bed river that drains highly glaciated mountains west of the Continental Divide. The river is highly dynamic and is subject to constant changes in surface topography, characteristics, and migrating channels. The CCF and its tributaries house extraordinary biodiversity, critical habitats (cite), and one of the most urbanized areas in Montana. The river has experienced high levels of industrial development over the last century and a half. Environmental degradation from mining, milling, and smelting was compounded by a historic flood in 1908, flooding 120 miles of the Upper and Central Clark Fork River and creating one of largest Superfund designations in history. Other Superfund features in the CCF include the Smurfit-Stone Mill and the Flat Creek Iron Mountain Mine and Mill sites.



Maps 3: CCF planning area with HUC-10s delineated. Maps by: Cloe Sliva

Population and demographics

From 2001 to 2023, the population of the four counties grew by 23% to a total population of 141,565 and is predicted to grow another 11% in the next 5 years. That population tends to be concentrated in the valleys near water courses (DEQ, 2014a). While not everyone in the four counties live in the Central Clark Fork basin, they likely work, play or otherwise draw other resources from the area.

Table 1: past, current, and projected population of counties in the Central Clark Fork Basin. Projected data is indexed to the 2020 data. (MT Department of Commerce, 2025)

County	2001 Population	2023 population	2030 Projected Population
Granite	2,905	3,485	3,505
Mineral	3,839	5,090	5,252
Missoula	97,435	120,949	134,961
Sanders	10,489	12,041	13,888
Total	114,668	141,565	157,606

Topography ranges from 9,000 feet in the headwaters of Grant Creek to 2,480 feet at the confluence with the Flathead River (DEQ, 2014a).

Climate- the average annual precipitation along the CCF varies from 12-17 inches; mean annual temperatures vary from 32˚-34˚ F in the headwaters to 45˚-46˚ F near confluence with the Flathead River. The highest precipitation occurs in the mountains along the Idaho border (DEQ, 2014a).

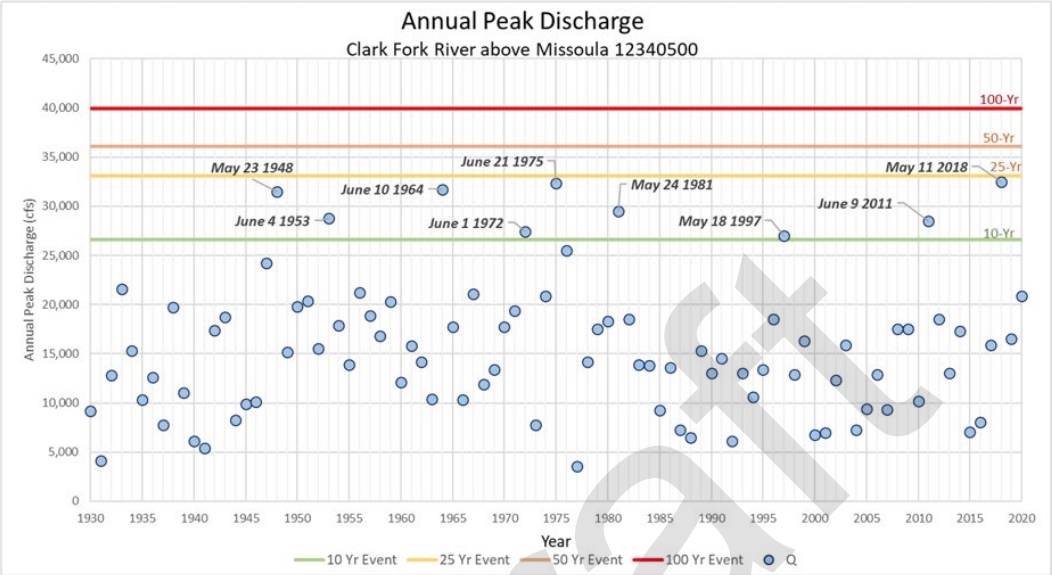


Figure 15. Annual peak floods for USGS 12340500 Clark Fork River Above Missoula (below Blackfoot confluence) with floods over an estimated 10-year event labeled.

Figure 2 Data adapted from Missoula County Channel Migration Zone mapping (Montana State Library, 2021).

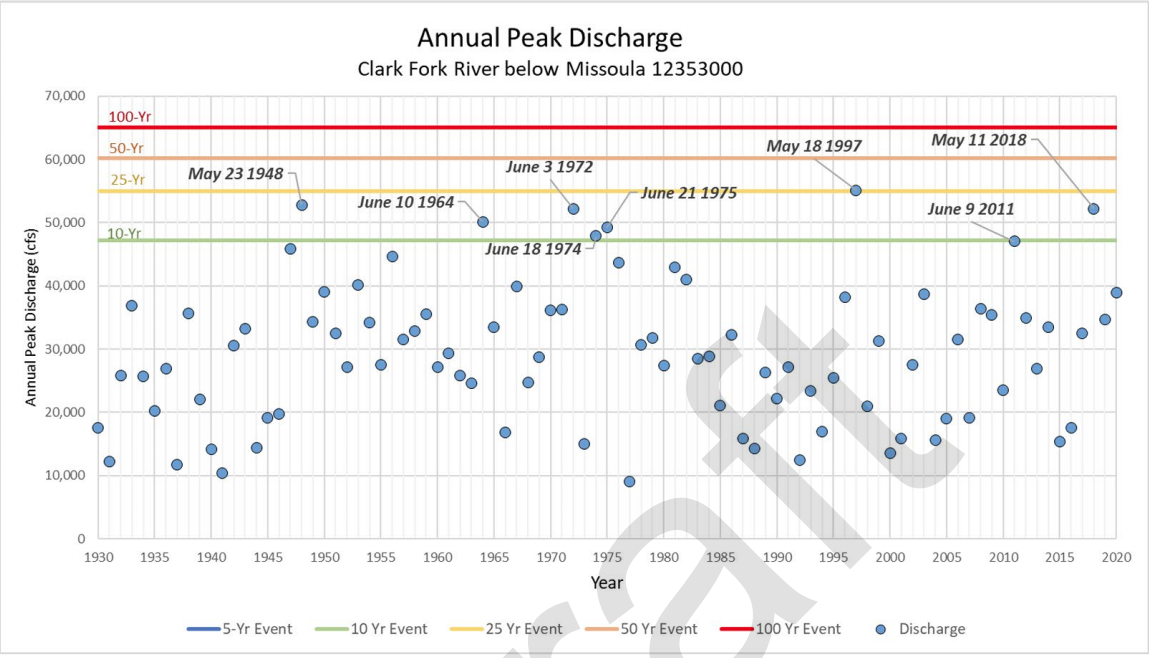
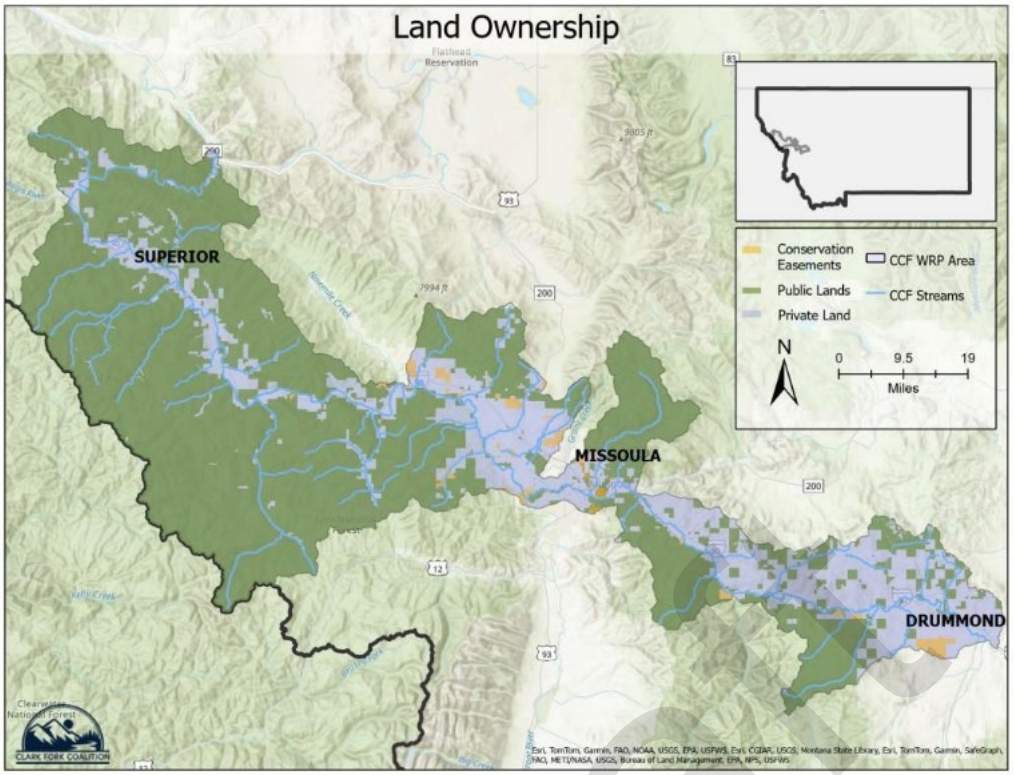


Figure 16. Annual peak floods for USGS 12353000 Clark Fork River Below Missoula with floods over an estimated 10-year event labeled.

Figure 3 Data adapted from Missoula County Channel Migration Zone mapping (Montana State Library, 2021).

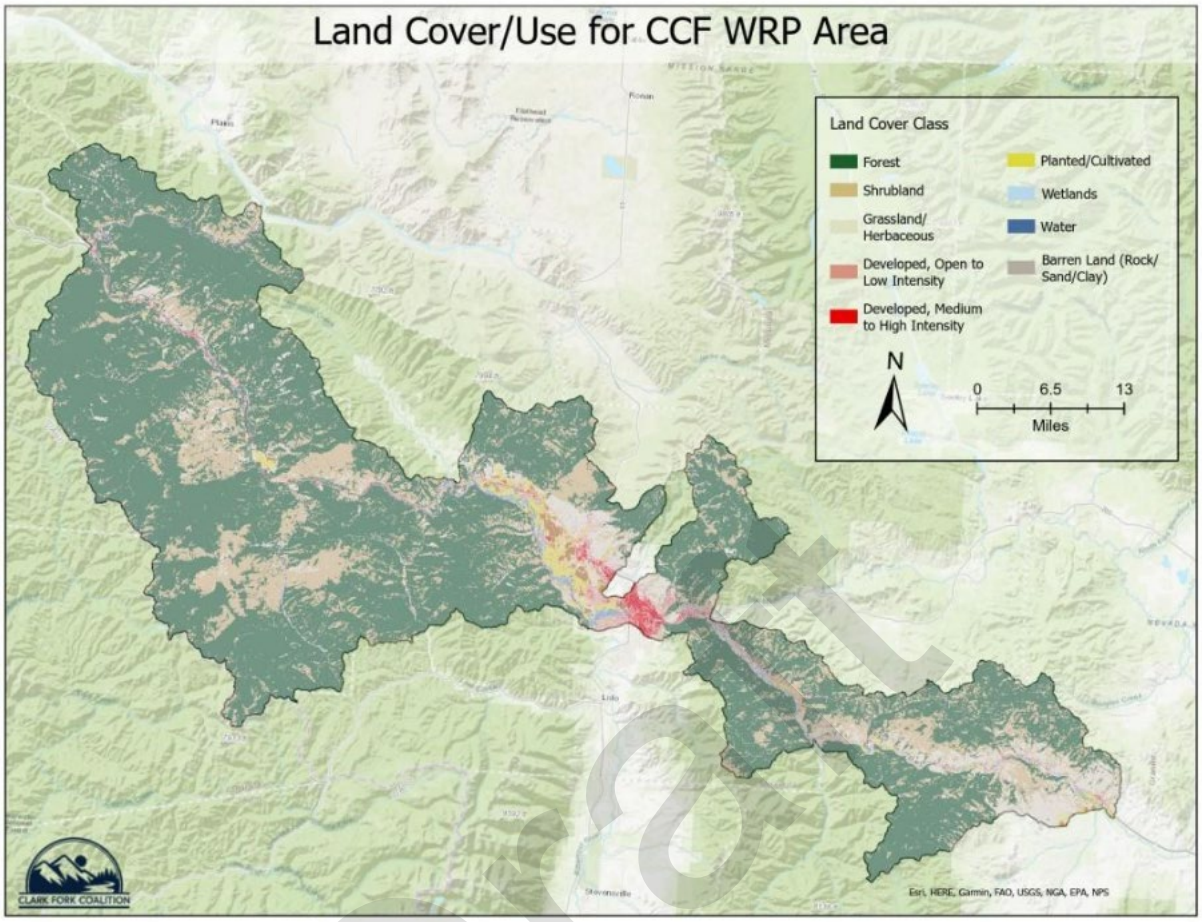
Hydrology- The Clark Fork is a 7th order stream at the confluence with Rock Creek, and the mainstem tributaries are typically 3rd & 4th order (DEQ, 2014a). The highest flows occur during spring runoff in May and June. The Clark Fork mainstem's average monthly flows vary from 700-3,200 cfs at Turah, to 3,000-11,000 cfs at St. Regis (USGS, May 2020).

Geology and Soils- The CCF basin's bedrock is primarily Precambrian Belt Series metasedimentary rocks; Paleozoic and Metazoic sedimentary rocks are present in the eastern side of the basin. Isolated Cambrian sedimentary rocks and volcanics are present in small areas of the basin. Despite the rugged terrain, the majority of the area's soils are rated as having low to moderately low erodibility. Some areas in the Clark Fork River canyon, and Ninemile and Missoula valleys are rated as moderately high erodibility (DEQ, 2014a).



Map 4: CCF WRP area with land ownership. Map by: Zoe Transtrum

Ecoregions, Land Cover, and Management- The watershed is part of the Middle & Northern Rockies ecoregions. Land cover is evergreen forest in the uplands, shrub/scrub and herbaceous cover in the lowlands. Large areas of forest have burned in the last 10-15 years. Pasture and cultivated croplands are mostly in the Missoula Valley, as are most of the urban developed areas. The largest landowner is the USFS, especially in the uplands, while valley bottoms are mostly in private ownership (DEQ, 2014a).



Map 5: CCF WRP area with land cover/use from the MRLC Annual NLCD, Collection 1.0: 2024 Land Cover. Map by: Zoe Transtrum

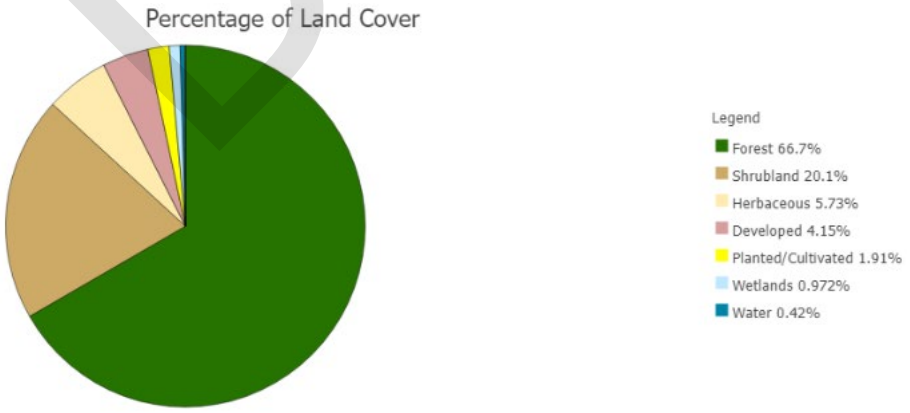


Chart 1: Percentage of Land Cover referencing Map 5. Chart by: Zoe Transtrum

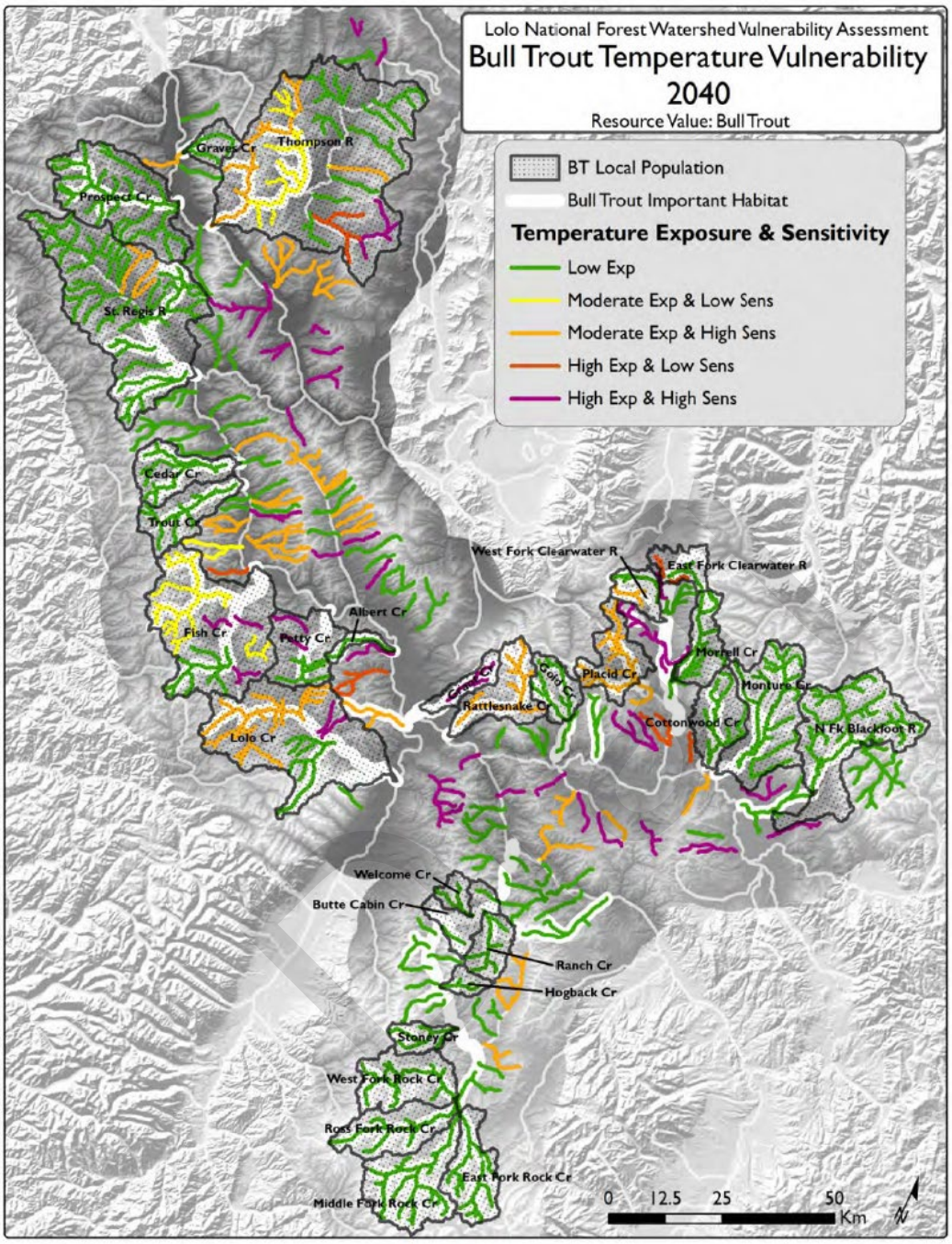


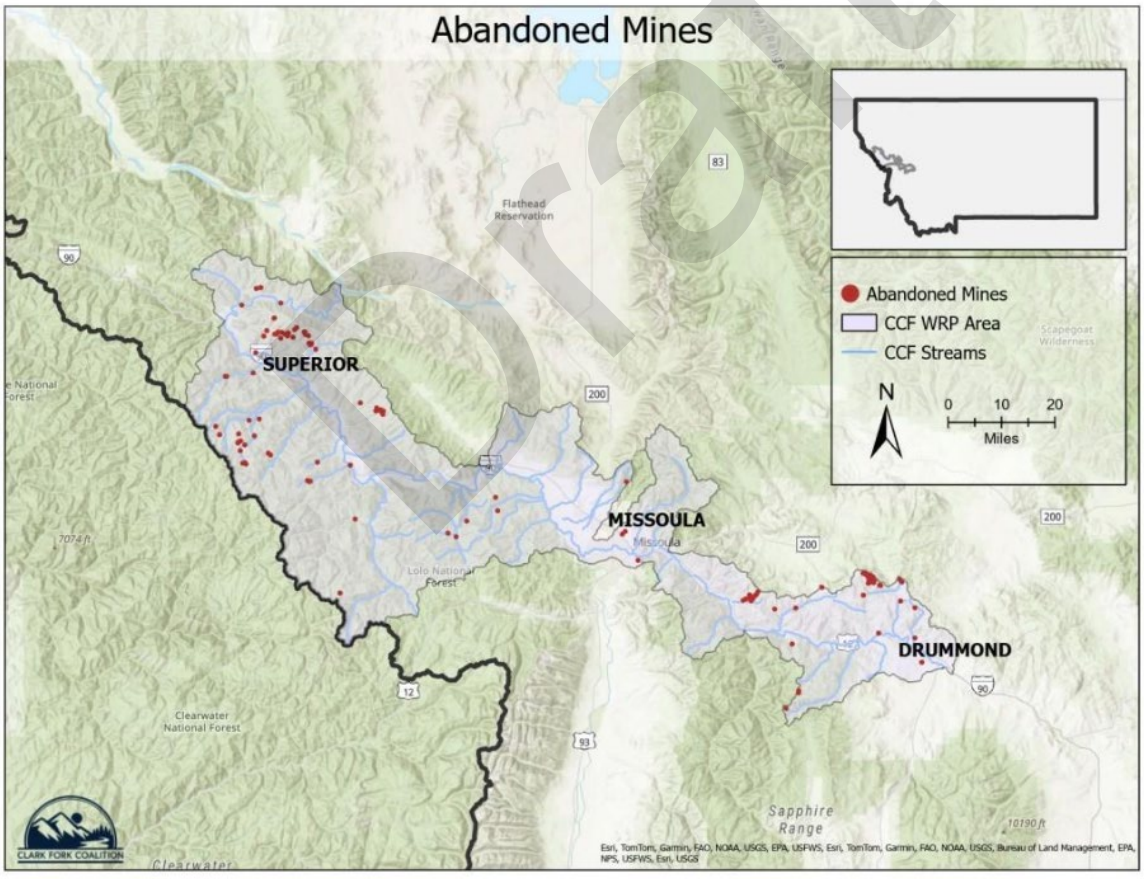
Figure ES.8. *Estimated vulnerability of bull trout to projected temperature changes, by patch, by the 2040s. Streams listed as having common or abundant bull trout by MFISH or as being critical habitat by FWS are shown in white ("Important Habitat") for reference.*

Figure 4 Bull trout temperature vulnerability across the Lolo National Forest (adapted from Wade et al., 2016).

Fisheries- There are many cold-water trout streams and mainstem cool water fisheries within the CCF watershed that collectively support high conservation value and more than 100,000 angler-days annually (FWP Cite). The watershed supports core areas for Federally Threatened Bull Trout (Salvelinus

confluents) and includes many conservation populations of Westslope cutthroat trout (Oncorhynchus lewisi) - Montana's state fish and a State Species of Greatest Conservation Need (cite). The stream and river network also support world-renown wild trout fisheries comprised of non-native salmonid species and growing populations of introduced cool water species. All of these depend on high water quality and intact habitat conditions facilitated by the WRP.

Mining has long shaped the Middle Clark Fork corridor, with clusters of abandoned and inactive sites in Mineral County, lower Granite County, and middle Missoula County. A total of 129 abandoned mines documented in the Central Clark Fork Watershed. Gold discoveries in Cedar Creek and nearby tributaries in the 1860s–70s created short-lived but intense placer camps, followed by small hard-rock operations in the late 1800s and early 1900s in Flat Creek, Hall Gulch, Cedar Creek, Wallace Creek, and Cramer Creek. Though modest in scale, these districts left tailings, waste rock, and eroding adits that continue to contribute sediment and metals during high flows. This pattern mirrors frontier-era mining across western Montana, where rapid settlement and limited regulation produced long-term environmental impacts. Upstream restoration successes—most notably the Bonner and Milltown Dam removals demonstrate how coordinated cleanup can re-establish natural river processes and reduce legacy mining impacts.



Maps 6: CCF WRP area with abandoned mines. Map by: Zoe Transtrum

Forestry- Logging followed early mining activity, supplying timber for shafts, mills, energy, and growing settlements before expanding into the largest major regional industry. Today, forest conditions in the Central Clark Fork reflect a mix of altered disturbance regimes, insect and disease pressures, dense fuels, and expanding road networks. These factors contribute to direct and indirect impacts to watersheds, including sedimentation and habitat degradation. The Montana Forest Action Plan identifies opportunities to reduce fuels in higher elevation watersheds, improve stand conditions, and increase large-wood recruitment in riparian corridors to strengthen channel stability and aquatic habitat. Historic reductions in beaver populations and widespread valley-bottom modification have further reduced natural water storage, wood recruitment, and riparian resilience. Restoration efforts—including process-based approaches—offer promising ways to rebuild hydrologic connectivity, support long-term watershed health, and provide resilient fisheries.

Ranching- As mining camps developed, settlers established hay fields and cattle operations in valley bottoms to supply local food needs. With the arrival of the Northern Pacific Railroad in the 1890s, railroads turned local subsistence ranching into a commercial livestock industry, linking the Clark Fork valley to distant markets such as Chicago. Ranching remains a defining land use along the mainstem and tributary mouths, where fertile soils and reliable water support long-standing family operations. These working lands provide open space and enhanced wildlife habitat for some species, but also influence water storage, ground water levels, instream flows, riparian conditions through irrigation, grazing, and floodplain hay production. Ranching continues to anchor rural communities even as the regional economy has shifted toward timber and, more recently, recreation.

Figure 19. Main transportation corridor elements including (from left)—Milwaukee Line, BNSF Line, abandoned rail line, I-90, and Frontage Road on right.

Figure 5 Transportation corridor adjacent to the Clark Fork River (adapted from Montana State Library, 2021).

Recreation – is now one of the most significant land uses and economic drivers in the Central Clark Fork Basin (Brewer, 2012), supported in part by historic logging roads that provide access for hunting, fishing, camping, and trail use across Mineral, Granite, and Missoula counties. These routes connect

people to high-quality habitat and backcountry settings, but many older roads and stream crossings now contribute to sediment delivery and block fish passage, underscoring the need for strategic upgrades or decommissioning to restore natural hydrologic function. Outdoor recreation is a major economic driver in Montana, contributing $2.9 billion annually and supporting more than 29,000 jobs (Bureau of Economic Analysis. (2023). As traditional resource industries have declined, recreation has become a stable and growing sector that depends on healthy forests, intact watersheds and accessible public lands.

Figure 6 Sharon Fishing Access Site along the Clark Fork River (photo by Clark Fork Coalition).

Housing- Development has increased across the Central Clark Fork as people are drawn to its open landscapes and proximity to Missoula. Former agricultural lands and forested lands are being subdivided, shifting land-use patterns and placing new pressures on water resources, riparian corridors, and floodplains. Growth also intersects with wildfire risk, emergency access, and the long-term

stewardship of working lands. Balancing housing demand with watershed health, agricultural viability, and forest resilience is an emerging challenge for communities throughout the Clark Fork corridor.

Across the Central Clark Fork, historic mining, logging, ranching, recreation, and increasing residential development have all shaped current watershed conditions. Legacy mine waste altered forest structure, long-established agricultural use, expanding recreation access, and growing housing pressure each influence sediment delivery, riparian health, water quality, and habitat resilience. Because these land uses overlap across county boundaries and watershed divides, restoring and protecting the Central Clark Fork Basin requires coordinated strategies that address both historic impacts and emerging challenges. The watershed goals that follow build on this understanding—focusing on reducing sediment and metals, improving riparian and floodplain function, strengthening forest and upland resilience, supporting working lands, and guiding growth in ways that protect clean water and healthy habitat while sustaining the Montana way of life and the long-term economic stability of the communities that depend on this landscape.

2.2 Watershed Health Goals

All Watershed Restoration Plans share certain basic watershed health goals that were reindorsed in the 2020 public meetings with Dr. Vicky Watson. These include:

- All waterbodies in planning area fully support their beneficial uses & meet Montana water quality standards.
- Build drought resilience in local communities, industries, the main stem, and its tributaries.
- Wetlands, floodplains, and the intersection between them and drought resilience prioritized within this WRP (DEQ/DNRC)
- Habitat supports self-sustaining populations of wild and native fish and other species that depend on intact aquatic environments.
- Watershed functions to keep flows and water temperatures within the historic range of observations or within the range of measurements exhibited by reference waterbodies in that ecoregion.
- Aquatic invasive species are excluded and/or eliminated.
- High-quality waters are protected from degradation.
- Actions are taken to avoid future threats or to manage for resilience.

2.3 Watershed-Scale Management Measures

Some of the broad-scope management measures for CCF Watershed include:

Forest Health

The 2020 Montana Forest Action Plan (DNRC, 2020) prescribes the following measures to improve watershed conditions and water quality across forested landscapes:

- Support projects that maintain or improve intact and connect forested landscapes and watersheds.
- Explore opportunities to expand funding for streamside/instream restorations as well as actions to improve impaired waterbodies.
- Maintain and strengthen the level of compliance of Forestry BMPs across all ownerships.
- Promote/maintain landscape conditions that restore and sustain fish populations through planning and implementing habitat management plans.

- Support projects that maintain and improve conditions and functions of riparian zones and associated aquatic habitats/hydrologic systems.
- Support projects to remove unnecessary roads and upgrade low-standard roads to reduce stream sediment loads and improve passage and connectivity for native aquatic species.
- Improve baseline data and information on riparian zones and aquatic habitats and hydrologic systems in order to better understand conditions and trends.
- Prioritize management and restoration projects in Priority Areas for Focused Attention that support municipal watersheds and other beneficial water uses.
- Develop, implement, and fund an adaptive management strategy for the Montana Forest Action Plan.

Drought Management and State Water Planning

The Montana Drought Management Plan (DNRC, 2023) identified vulnerabilities across Montana based on several different water use sectors, several of which are within the purview of this WRP:

Table 2 Information adapted from Montana Drought Management Plan (DNRC, 2023)

County	Water-Use Sector	Drought Vulnerability	Adaptive Management Strategies
Sanders County	Conservation and Land Management	Medium-Low	• Restore floodplains to increase water storage and boost low flows. • Vegetation management to increase flows. • Better coordination between stakeholders to mitigate low flows.
Missoula County	Energy and Industry	Medium-High	• Improve long-term forecasting and monitoring.
	Planning, Community Development, and Municipal Water Supply	Medium-High	• Consider limiting non-essential water uses via community governance. • Educate the public on water use, location, and development impacts. • Promote aquifer recharge.
	Recreation and Tourism	High	• Monitor water flows and streamline information
General	All	All	• Evaluate managed aquifer recharge to mitigate low surface-water flows. • Use floodplains, wetlands, beavers, and riparian areas to maximize water capture and retention.

In addition, the Plan includes a wide range of recommendations to build drought resilience, many of which are complementary to improving and maintaining water quality. These include:

- Use and incentivize nature-based solutions to maximize water capture and retention.
- Explore a new paradigm of integrated floodplain management.
- Create dedicated, sustainable funding to build local watershed management capacity.
- Provide funding for real-time stream gage networks (USGS and DNRC).

- Incorporate drought resilience into existing state programs.

The State Water Plan (DNRC, 2025) also endorses a range of recommendations that would improve water management, including natural water storage, floodplain connectivity, and expanded support for watershed planning.

Integrating Wetland Restoration Goals and Measures into WRPs

As watersheds are significantly influenced by wetlands, and the relationship between wetland health, healthy water quality, and watershed function (robust fish and wildlife habitat, drought resilience, pollution mitigation), it is important to incorporate wetlands into watershed plans (Center for Watershed Protection, 2006). The Montana Wetland Council outlined goals for wetland health in their 2020-2030 Strategic Framework for Wetland and Riparian Area Conservation and Restoration. In the purview of this WRP are:

- Communication and education: Montanans of all ages understand the importance of wetlands and riparian areas and the economic, communal, and environmental benefits they provide.

Granite County 2020 Long Range Plan

In the Granite County Long Range Plan, the Natural Resource Conservation Service outlines several water resource conservation measures that would be applicable to the upriver segment of the CCF WRP. These include:

- Increase Irrigation efficiency where possible to promote in-stream flows.
- Reduce fish entrainment and improve connectivity between tributaries and mainstems.
- Continue to systematically identify high-priority clusters of projects with the end goal of updating efficiencies throughout major irrigation areas in Granite County.
- Address fisheries concern where these overlap with irrigation, riparian health, or other natural resource projects (NRCS, 2022)

Missoula County 2019 Growth Policy – Goal #1: Conserve Vital Natural Resources

Missoula County sits at the **center of the Central Clark Fork watershed**, functioning as both the region's **urban hub** and the primary area experiencing **sprawling growth and land-use pressure**. The county's Growth Policy identifies conservation of surface and groundwater, fisheries, wildlife habitat, native plant communities, and iconic landscapes as core priorities. Several objectives and actions directly support watershed-scale goals for the CCF WRP, including:

- **Identify priority resource areas** based on agricultural soils, wildlife habitat, water resources, scenic viewsheds, and natural environmental functions to guide conservation and land-use decisions.
- **Update land-use designations, area plans, and zoning** to reflect priority resource areas and support long-term protection of natural resources, particularly in areas facing rapid development.
- **Conserve high-priority lands and waters** using open space bond funding, public funding sources, and voluntary conservation projects with private land trusts and landowners.

- **Minimize and mitigate impacts to natural resources** through updated subdivision regulations and development standards that address growth pressure in the Missoula Valley and surrounding foothills.
- **Improve air and water quality** through dust abatement, wood-stove change-outs, energy efficiency measures, and expansion of public or community water and wastewater systems.

As the watershed's population center, Missoula County plays a critical role in maintaining water quality, protecting riparian corridors, reducing habitat fragmentation, and ensuring that urban growth does not compromise the ecological function of the Clark Fork River and its tributaries. These actions reinforce long-term resilience across the middle portion of the watershed and align closely with the goals of the CCF WRP.

Mineral County Growth Policy – Goal #11: Protect Natural Resources, Clean Air and Water, and Wildlife Habitat

Mineral County occupies the **downstream portion of the Central Clark Fork watershed**, where narrow valleys, extensive public lands, and river-dependent communities make natural-resource protection central to long-term watershed health. The Growth Policy outlines several environment-focused objectives and actions that directly support the goals of the CCFWRP:

- **Protect riparian areas adjacent to surface waters** by establishing site-appropriate buffers and requiring 310 permits for work in or near streams.
- **Promote wise use and development of surface and groundwater rights** to balance water-user needs with instream flows in public waters.
- **Discourage development in important wildlife habitat**, including federal and state-identified priority areas.
- **Support restoration and protection of wild fisheries** and the habitats that sustain them, including cold-water tributaries and mainstem reaches of the Clark Fork and St. Regis Rivers.

These actions reinforce watershed-scale goals by safeguarding riparian corridors, maintaining water quality, protecting instream flows, reducing habitat fragmentation, and supporting resilient fish populations in the lower Clark Fork basin.

Section 3 provides the detailed, sub-watershed-specific management measures derived from each of these county plans.

2.4 Restoration Success Stories in the CCF Watershed

Despite the large amount of work left to be done in the CCF watershed, we would be remiss to not acknowledge the restoration successes that have been accomplished. These include:

Figure 7 The former site of Milltown Dam. Photo from Clark Fork Coalition (clarkfork.org)

The removal of Milltown Dam at the confluence of the Clark Fork and Blackfoot rivers near Missoula is one of the West's greatest success stories. The EPA, State of Montana and a multitude of public and private partners spearheaded the multi-decades-long, collaborative effort to list the Clark Fork River as a Superfund site, clean up a century's worth of mine waste, remove Milltown (and Bonner) Dams, and reunite two great rivers. *Results:* The former dam and reservoir area is now a restored river and floodplain complex, and the confluence of the Clark Fork and Blackfoot is open for fish to migrate and for people to enjoy

Cedar Creek Road limits floodplain connection—2018

Cedar Creek Road removed and Large Wood Structures Constructed with floodplain connection—2020

Figure 8 Image courtesy of Paul Parson, Trout Unlimited.

Cedar Creek, an important cold-water fishery and tributary of the CCF, is impaired by a road system that encroaches on the riparian corridor and disconnects the creek from its floodplain in many reaches. Trout Unlimited, Lolo NF, and a local contractor in Superior completed a series of award-winning restoration and forest mitigation projects in the watershed that included relocating road segments, reconnecting the creek to tis floodplain, and installing large woody debris to enhance instream complexity and fish carrying capacity - all of which helped rehabilitate the impaired native trout fishery.

Several reaches where the aforementioned projects were implemented were within the scope of the large-scale public lands acquisition project completed in 2006, where 5.5 miles of mainstem stream and riparian corridor were purchased and converted to public (USFS) ownership by private and agency partners including Five Valleys Land Trust, MT FWP, and the Lolo National Forest.

Figure 9 Flat Creek, near Superior, MT. In the "before" picture (left), note the tailing pile next to the creek. In the "after" photo (right), the tailings were removed, the flood plain was reconnected, and woody debris and a robust riparian area were.

Flat Creek, a tributary of the CCF that runs through Superior, MT, is a designated Superfund site due to the large amount of mining tailings that washed downstream from upstream hard rock mining operations. Huge amounts of mining waste have been removed and placed into a repository from restorations by TU, Lolo NF, and DEQ. Despite the incredible improvements to Flat Creek's ecological health and water quality, there is still more work that needs to be done.

The Central Clark Fork watershed has benefited from decades of collaborative restoration led by federal, state, Tribal, local, and nonprofit partners. In addition to the projects highlighted above, the watershed includes major successes such as the Rattlesnake Creek Dam removal and associated fish-passage and habitat work (City of Missoula, FWP, TU), the comprehensive restoration efforts throughout the Fish Creek watershed (FWP, TU, The Nature Conservancy), and extensive watershed improvements completed by the Lolo National Forest, including the removal of more than 350 aquatic organism passage barriers, the decommissioning of over 700 miles of erosive roads near streams, and roughly 400 miles of riparian-corridor improvements. More than ten large-scale projects have also been implemented in the Marshall Creek drainage by FWP, TU, and Missoula City and County. These efforts, along with numerous smaller projects across public and private lands, demonstrate long-term commitment to improving water quality, restoring floodplain and riparian function, and recovering native fish populations throughout the CCF watershed.

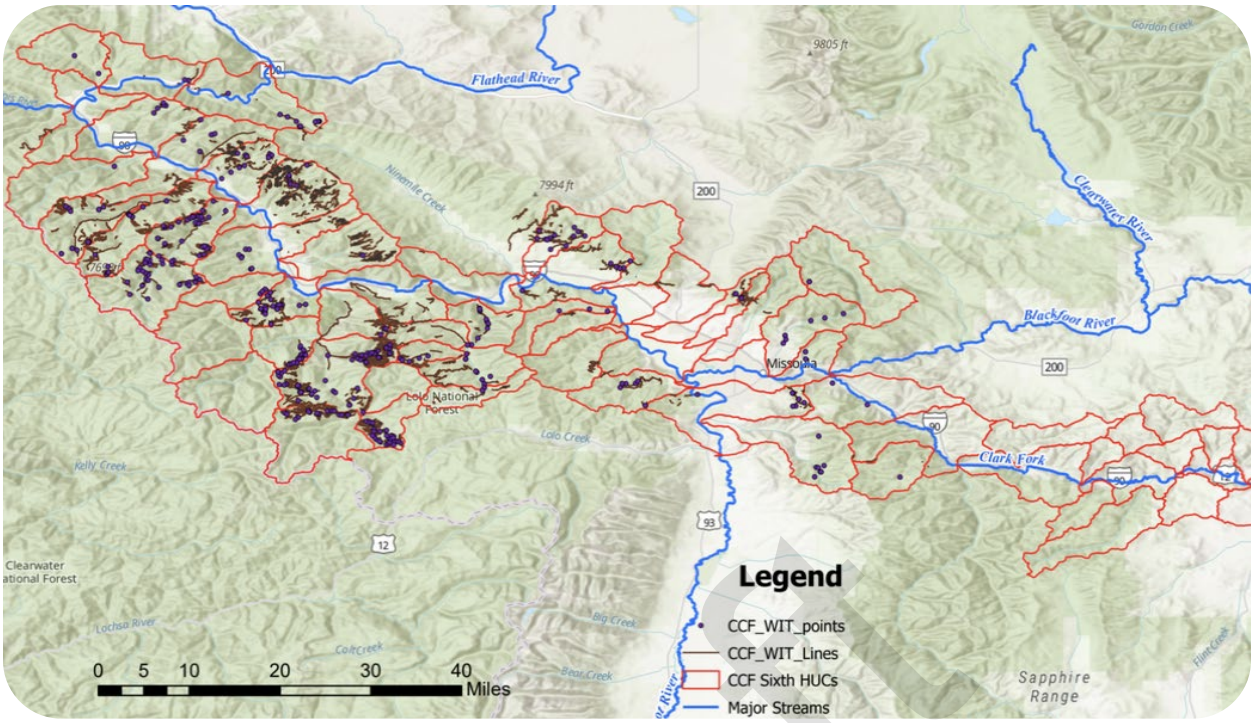


Figure 10 Restoration sites completed by the Lolo National Forest within the Central Clark Fork watershed boundary (map provided by Tracy Sylte, U.S. Forest Service).

These restoration successes highlight what is possible when partners work together across jurisdictions and landownerships. Yet, despite this progress, substantial impairments persist throughout the watershed. Section 3 describes the pollutants and management challenges that still demand focused, long-term attention.

Section 3: Impairment Causes, Pollutant Sources, Management Measures, and Load Reductions in Priority Streams (EPA elements 1, 2, 3)

Under the federal Clean Water Act (CWA), states are required to identify waters that do not meet their designated beneficiary uses (e.g., cold-water fisheries, recreation, or drinking water) and place them on the Section 303(d) List of impaired waters. For listed waters, Total Maximum Daily Loads (TMDLs) are developed to identify sources of pollutants and the reductions needed to meet water quality standards. The EPA encourages development of WRPs that build on TMDL findings and local priorities to guide implementation of effective, on-the-ground restoration projects. DEQ uses WRPs to help prioritize and direct investment of Section 319 funds and other state, federal, and private funding sources.

There are 25 stream segments within the CCF that are listed as impaired waters in the Montana 2020 Final Water Quality Integrated Report (Map x, table x).

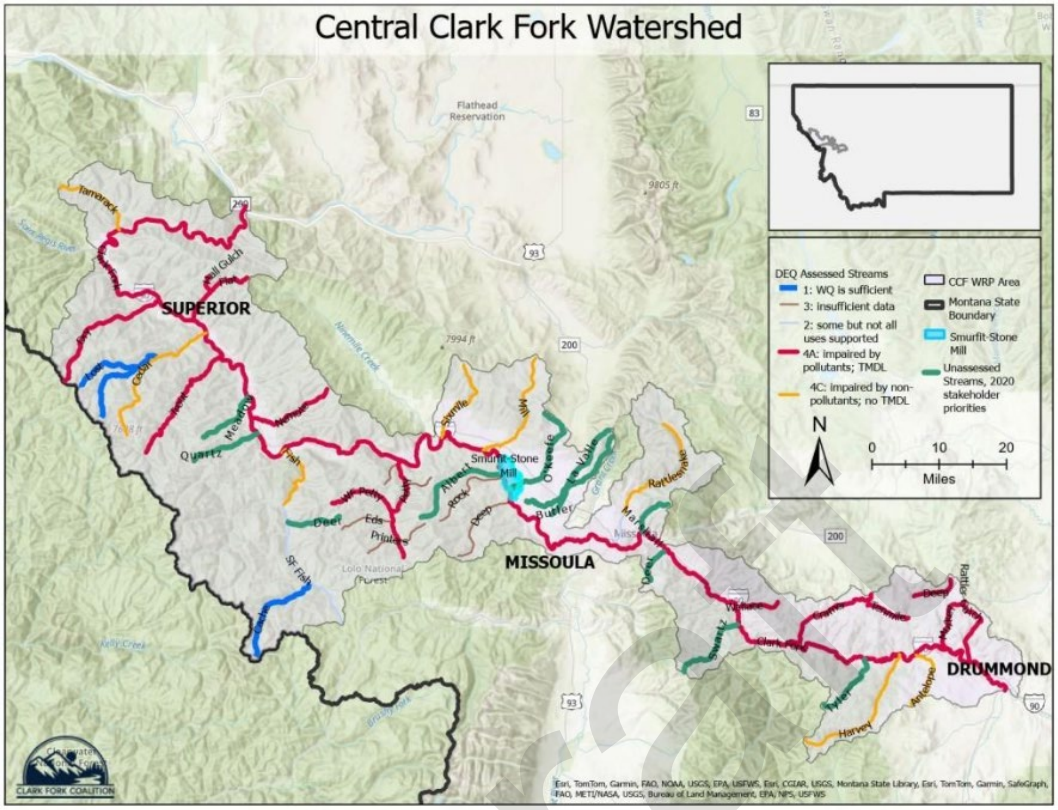


Figure 11 Map 1: The CCF Planning Area, with DEQ assessed streams and unassessed streams of concern from 2020 stakeholder groups. Map by: Cloe Sliva, University of Montana

3.1 Section Guide

The following streams listed after this guide are the priority streams in the CCF. Each stream is organized by 10-digit Hydrologic Unit Code (HUC10) and goes from upstream to downstream. Each stream has the following in Section 3:

Description

A brief background of the stream is provided.

Stream Impairments

The "Stream Impairments" sections of the WRP lists specific problems and contributing factors for each priority subwatershed. Also included is a chart highlighting the pollutant category, affected beneficial uses, and status of the TMDL.

Table 3 Example table of Impairments

Causes of Impairment	TMDL created; pollutant category	Impaired beneficial use	Sources of impairment
The problem with the stream that interferes with its beneficial uses; may be a pollutant, such as "sedimentation/siltation" or a non-pollutant, such as "alterations in stream-side or littoral vegetative cover"	Whether a TMDL report has been published for specific pollutants, and TMDL pollutant category.	Desirable uses that water quality is impaired by WQ issues: aquatic life, agriculture, drinking water, and primary contact recreation	List of activities that may have caused or worsened problems in this stream; sources of pollutants

TMDLs and/or Pollutant Load Reduction Goals

The amount of pollutant removal/remediation necessary to restore water quality to support all applicable beneficial uses. For water bodies with TMDLs for pollutants, this will be an actual number or percentage of pollutant reduction necessary to meet WQ standards. For example:

Table 4 Example table of pollutant and percent reduction from TMDL's

Pollutant: *Sediments* **Source of pollutant:**	Current Load (tons/yr)	Allowable Load (tons/year)	% Reduction Required
Roads	0.2	<0.1	79%
Streambank erosion	1060	570.7	46%
Total	1060.2	570.7	***54% overall rdx***

Management Measures

The projects—whether real, conceptual, or hypothetical—that can achieve the pollutant reductions needed to restore water quality.

3.2 Stream Summary

Click on link for a shortcut to each section.

Table 5 WQ information compiled from the DEQ Clean Water Act Information Center (CWAIC) 2020 map and the 2020 Integrated Report

Impaired Reach	Impairment		Impairment Sources	Impaired Beneficial Use	Completed TMDLs
	Pollutant	Non-Pollutant			
Clark Fork River, Flint Creek to Blackfoot River	Arsenic, Cadmium, Copper, Iron, Lead, Mercury, Zinc, Nitrogen, Phosphorus		Mine Tailings, Channelization, Grazing in Riparian or Shoreline Zones, Municipal Point Source Discharges	Aquatic Life Drinking Water Primary Contact Recreation Agriculture	Metals, Nitrogen, Phosphorus
Rattler Gulch headwaters to mouth (Clark Fork River)	Sedimentation Phosphorus	alteration in streamside vegetative covers; flow regime modification; chlorophyll-a	Forest Roads (construction or use); grazing in riparian zones; silviculture harvesting	Aquatic Life Primary Contact Recreation	Sedimentation Phosphorus
Mulkey Creek headwaters to mouth (Clark Fork River)	Sedimentation		low water crossing; source unknown	Aquatic Life Primary Contact Recreation	Sedimentation
Deep Creek headwaters to mouth (Bear Creek)	Nitrate/nitrite; Sedimentation /siltation	chlorophyll-a; Low Flow alterations	silviculture harvesting; placer mining, subsurface (hard rock) mining	Aquatic Life Primary Contact Recreation	Nitrate; Sedimentation
Tenmile Creek headwaters to mouth (Bear Creek)	Sedimentation /siltation; Phosphorous, total	alteration in stream-side vegetative covers	grazing in riparian zones; silviculture activities	Aquatic Life Primary Contact Recreation	Sedimentation
Antelope Creek headwaters to mouth (Clark Fork River)	NA	alteration in streamside vegetative covers; physical substrate habitat alterations	grazing in riparian zones; loss of riparian habitat; streambank modifications	Aquatic Life	
Harvey Creek headwaters to mouth (Clark Fork River)	NA	physical substrate habitat alterations; flow	streambank modifications/destabilization; agriculture	Agriculture	

Impaired Reach	Impairment		Impairment Sources	Impaired Beneficial Use	Completed TMDLs
	Pollutant	Non-Pollutant			
		regime modification			
Cramer Creek headwaters to mouth (Clark Fork River)	Aluminum, Lead; Sedimentation	Physical substrate alterations	Impacts from abandoned mining lands (inactive); highway/road/bridge runoff (non-construction related); source unknown	Aquatic Life Drinking Water Primary Contact Recreation Agriculture	Metals Sedimentation
Wallace Creek headwaters to mouth (Clark Fork River)	Copper		Impacts of abandoned mining lands	Aquatic Life Agriculture	Metals
Clark Fork River, Blackfoot River to Rattlesnake Creek	Copper, Iron, Lead		Mill Tailings, Industrial Point Source Discharge, Dam or Impoundment	Aquatic Life Drinking Water Primary Contact Recreation Agriculture	Metals, Nutrients, Biological Indicators
Rattlesnake Creek headwaters to mouth (Clark Fork River)	NA	Flow regime modification	dam construction (other than upstream flood control projects); water diversions	Aquatic Life	
Clark Fork River, Rattlesnake Creek to Fish Creek	Copper, Iron, Lead		Mill Tailings, Industrial Point Source Discharge, Dam or Impoundment	Aquatic Life	Metals, Nutrients, Biological Indicators
Mill Creek headwaters to mouth (Clark Fork River)	NA	Alteration in streamside vegetative covers	Golf courses, grazing in riparian zones, agriculture	Aquatic Life	
Sixmile Creek headwaters to mouth (Clark Fork River)	NA	Alteration in streamside vegetative covers	Rangeland grazing, silviculture activities	Aquatic Life	

Impaired Reach	Impairment		Impairment Sources	Impaired Beneficial Use	Completed TMDLs
	Pollutant	Non-Pollutant			
West Fork Petty Creek headwaters to mouth (Petty Creek)	Sedimentation; Phosphorous	chlorophyll-a	Silviculture harvesting, forest roads (road construction and use)	Aquatic Life Primary Contact Recreation	Sedimentation
Petty Creek headwaters to mouth (Clark Fork River)	Temperature; Sedimentation	alteration in streamside vegetative covers; flow regime modification	agriculture, highways, roads, bridges, infrastructure (new construction)	Aquatic Life Agriculture	Temperature; Sedimentation
Fish Creek Lower portion to mouth (Clark Fork River)	NA	physical substrate habitat alterations	highways, roads, bridges, infrastructure (new construction)	Aquatic Life	
Clark Fork River Fish Creek to Flathead River	Copper, Iron, Lead, Nitrogen, Phosphorus		Mine Tailings, Mill Tailings, Municipal Point Source Discharges	Aquatic Life Drinking Water, Agriculture, Primary Contact Recreation	Metals, Phosphorus
Nemote Creek headwaters to mouth (Clark Fork River)	Nitrogen, total; Phosphorous, total; Temperature	chlorophyll-a; flow regime modification	unknown nutrient sources; dredge mining; diversions	Aquatic Life Primary Contact Recreation	Nitrogen, Phosphorous, Temperature
Trout Creek headwaters to mouth (Clark Fork River)	Turbidity	alteration in streamside vegetative covers; physical substrate habitat alterations	silviculture activities; highways, roads bridges, infrastructure (new construction); wet weather discharges (NPS)	Aquatic Life	Turbidity
Cedar Creek headwaters to mouth (Clark Fork River)	NA	flow regime modification	water diversions	Aquatic Life	
Hall Gulch, headwaters to Flat Creek	Sb, Fe, Pb, Zn, As		impacts from abandoned mining lands (inactive)	Aquatic Life Drinking Water	Metals

Impaired Reach	Impairment		Impairment Sources	Impaired Beneficial Use	Completed TMDLs
	Pollutant	Non-Pollutant			
Flat Creek headwaters to mouth (Clark Fork River)	Sb, Fe, Pb, Zn, As, Cd, Hg; Sedimentation	physical substrate habitat alterations	impacts from abandoned mining lands; unspecified unpaved road of trail	Aquatic Life Drinking Water	Metals Sedimentation
Dry Creek headwaters to mouth (Clark Fork River)	Nitrogen, total	alteration in streamside vegetative covers; flow regime modification	unknown and/or natural sources of nutrients; grazing in riparian zones; diversions	Aquatic Life Primary Contact Recreation	Nitrogen
Tamarack Creek headwaters to mouth (Clark Fork River)	NA	fish passage barrier	dam or impoundment	Aquatic Life	

3.2 Mainstem Central Clark Fork River (4A - Impaired by pollutants)

Description

The CCF mainstem flows for 170 river miles from the river's confluence with Flint Creek (near Drummond) to the confluence with the Flathead River near Paradise. The valley along the main stem is home to Missoula, the rapidly expanding and 2nd largest city in Montana, and several other smaller communities. Areas upstream and downstream of Missoula are developing more quickly than ever before, exacerbating old and introducing new challenges and pressures for landowners, irrigators, fish and wildlife, natural resource managers, and recreationists. Although the watershed is primarily publicly owned in the uplands, lands along the mainstem and valley floor are predominately in private ownership, with scattered FWP, DNRC, and USFS parcels (FWP, 2023).

The CCF channel between the confluence of the Blackfoot River and the Flathead River is generally entrenched and stable, but a 25-mile stretch between Kelly Island and Ninemile Creek has a wide, accessible floodplain. The river alternates between narrow rock canyons and broader agrarian valleys as it flows downstream (FWP, 2023). Within these wider valley segments, recent channel migration zone (CMZ) mapping has helped identify areas where the river is most likely to shift course, erode banks, or access its floodplain. This information is increasingly important for land-use planning, habitat protection, and infrastructure decisions, ensuring that development, restoration, and recreation projects account for natural channel movement and long-term river dynamics.

The CCF has three major Superfund sites: the 120-mile-long Upper Clark Fork (including Milltown) site flows through the entirety of reach 1 of the main stem Clark Fork River. The Smurfit-Stone mill is located in reach 3 and is a significant source of PS pollution. See **Appendix A** for more information on Smurfit Stone. Flat Creek, the mouth of which flows into reach 4 of the mainstem, is the location of the Flat

Creek Iron Mountain Mine site, a significant contributor of metal pollution to the mainstem of the Clark Fork. Municipal wastewater treatment plant is a permitted point source of nitrogen and phosphorus.

Although its fishery is not as renowned as some of its tributaries (Blue Ribbon' Rock Creek, Blackfoot River, etc.), the CCF does support a popular trout fishery and numerous native trout conservation populations. Native bull trout and Westslope cutthroat trout are present throughout all reaches and most tributaries, but the mainstem cold-water fishery is dominated by non-native sport species like rainbow trout, rainbow x cutthroat trout hybrids, and brown trout (FWP, 2023).

We will break the main stem into 4 reaches for this WRP, in line with the DEQ's structure.

- **Reach 1 = Flint Creek to Blackfoot River (51 river miles)**
- **Reach 2 = Blackfoot River to Rattlesnake Creek (6.2 river miles)**
- **Reach 3 = Rattlesnake Creek to Fish Creek (53 river miles)**
- **Reach 4 = Fish Creek to Flathead River (60 river miles)**

Table 6 Designated beneficial uses for the Clark Fork River (adapted from Montana Department of Environmental Quality Water Quality Standards).

Clark Fork River Classification: B-1	**B-1 Intended Suitable Uses**
	- Drinking, culinary, and food processing (after conventional treatment)
	- Bathing, swimming, and recreation
	- Growth and propagation of salmonid fishes and associated aquatic life
	- Habitat for waterfowl and furbearers
	- Agricultural and industrial water supply

Stream Impairments and Causes

Table 7 Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

Reach	Causes of Impairment	TMDLs present	Impaired beneficial use	Sources of impairment
1 Flint Creek to Blackfoot River	nutrients	Metals (2014). TN, TP (1998)	Aquatic life, drinking water, primary contact recreation	Mining/milling tailings, grazing in riparian zones, channelization, municipal PS discharge
2 Blackfoot River to	Cu, Fe, Pb, As, Cd, Zn; eutrophication	Metals (2014); nutrients (1998)	Aquatic life, drinking water	Mill tailings, industrial PS

Rattlesnake Creek				discharge, dam or impoundment
3 Rattlesnake Creek to Fish Creek	Cu, Fe, Pb, nutrients, organic enrichment, chlorophyll	Metals (2014); nutrients (1998)	Aquatic life, primary contact recreation	Mill tailings, industrial PS discharge, municipal PS discharge,
4 Fish Creek to Flathead River	Cu, Fe, Pb, nutrients	Metals (2014); nutrients (1998)	Aquatic Life, primary contact recreation	Mine/mill tailings, municipal PS discharge

TMDLs and Pollutant Load Reduction Goals

Management Measures

Fishery Health Measures

FWP's management direction for water quality in regard to fish on the main stem are:

- Ensuring adequate connectivity with tributaries.
- Enhance salmonid natural recruitment and population viability, emphasizing those areas acting as native trout strongholds.
- Improve habitat quality in tributary spawning and rearing areas to enhance wild trout recruitment.
- **Reach 3:** Assess Smurfit-Stone contamination and facilitate remediation/restoration (FWP, 2023)
- Identify and address fish species and sizes with human consumption advisories related to elevated contaminant levels.

FWP Future Fisheries Projects and Local Collaboration

- In the 1990s-2025, FWP cooperated on numerous restoration activities on the Clark Fork River mainstem, including riparian fencing, fish screens and water efficiency on major irrigation diversions, channel and streambank mitigations, etc. (FWP, 2017).

Stormwater Quality Management Reach 2 and 3

In the City of Missoula 2025 Stormwater Quality Plan, the city outlines several improvement projects for stormwater drainage basins within the city. The proposed projects that would mitigate NPS pollution on the mainstem include:

- Installation of bioretention planters at curb outlets and basin upgradient of south 4th St outfall, to be co-implemented with Higgins Master Plan.
- Installation of landscaped bioretention area and low flow channel in Bess Reed Park.
- Installation of living roof on the 13,000 sq ft public library roof, for pre-treatment of storm runoff and public education of the importance of stormwater quality management.

- Repair of Fox Site Orange St outfall and stabilization of eroded areas (City of Missoula, 2025).

Floodplain Management

The Clark Fork is a naturally dynamic, alluvial river whose geomorphic function depends on continual erosion, sediment transport, and channel migration. Although the entire river has a legacy of contamination, the active Superfund designation applies primarily to the Smurfit-Stone mill site. Much of the river corridor—especially through the Missoula's Hellgate corridor—is hardened with levees, riprap, and infrastructure protection, constraining channel migration and reducing floodplain access. In this context, effective restoration must focus on adjacent tributaries, confluence zones, and unarmored reaches where natural floodplain processes can still occur. From Cramer Creek to Sixmile, assessments of armoring and channel-migration zones highlight opportunities to enhance depositional areas that support willow and cottonwood recruitment and help dissipate high-energy flows before and after hardened segments. Management measures in these areas should emphasize riparian revegetation, livestock exclusion fencing, 310 permitting compliance, floodplain-development education, large

Figure 12 Large wood structures, willow plantings, and cottonwood recruitment at the Bonner Dam restoration site (photo by Gretchen Watkins, 2026, Clark Fork Coalition).

woody bank structures, and working with landowners to maintain or restore natural floodplain function. These actions align with county growth-policy goals to protect riparian corridors, conserve high-quality natural resources, and support wild fisheries. By strengthening tributary floodplains and unconfined valley bottoms, the watershed can reduce erosive forces, improve sediment attenuation, and maintain ecological resilience even where mainstem armoring is necessary to protect critical infrastructure.

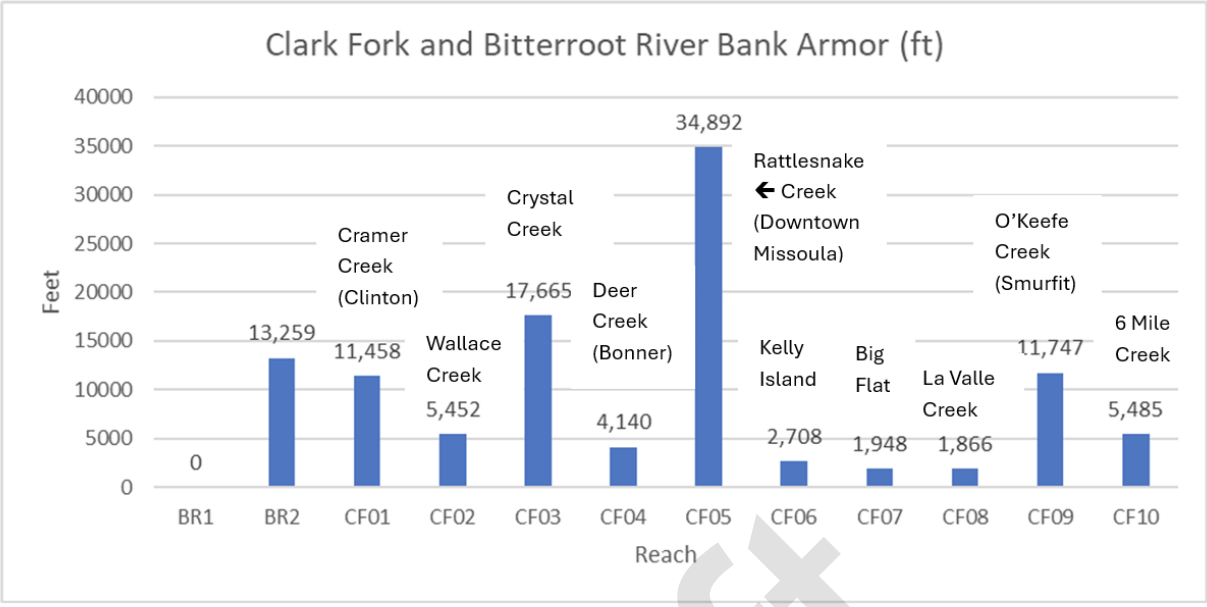


Figure 40. Total length of mapped bank armor on the Clark Fork and Bitterroot Rivers.

Figure 13 Bar chart showing mapped bank armor along the Clark Fork River (adapted from Montana State Library, 2021).

Reach 2 and 3 had a bank-armor assessment during the Chennel Migration Zone development (Figure 40) and shows that several mainstem reaches— Wallace Creek confluence area along the Clinton Valley, Deer Creek in the Bonner restoration area, Kelly Island, and Big Flat, Lavali Creek, Sixmile Creek confluence in the Grass Vally area —remain comparatively unarmored and could have active floodplain and wetland functions restored. These less armored segments provide some of the best opportunities along the Clark Fork for wetland restoration, floodplain reconnection, and regenerative agricultural practices, particularly in the broad valley bottoms around Grass Valley and the Clinton Valley ranchlands. Because these reaches still support natural depositional processes, side-channel formation, and riparian recruitment, they are ideal locations for riparian revegetation, livestock exclusion fencing, 310 permitting education, and floodplain-development education with landowners. Focusing restoration in these unconfined areas helps slow water, store sediment, and reduce erosive energy before and after hardened sections of the river, while supporting county planning goals to conserve riparian corridors, maintain agricultural viability, and protect high-quality natural resources. These reaches represent critical "process refugia" where the Clark Fork can still function as an alluvial river, making them priority zones for collaborative restoration and stewardship.

Upstream of the Smurfit-Stone Superfund site, several publicly owned parcels—including Missoula County lands, FWP riverfront properties, and Forest Service holdings along the lower Clark Fork corridor—provide critical opportunities to reintroduce large woody material and restore roughness elements that slow water, increase floodplain residence time, reduce trampling from foot traffic, and enhance sediment and nutrient storage. These reaches function as natural "energy dissipators" where flow can spread out, soak in, and recharge wetlands before the river becomes confined and high-energy again as it passes the Smurfit facility. Strategic roughening and floodplain reconnection in

these publicly accessible areas would create effective pilot projects for mainstem restoration, improving hydrologic function and resilience in advance of the hardened Superfund reach.

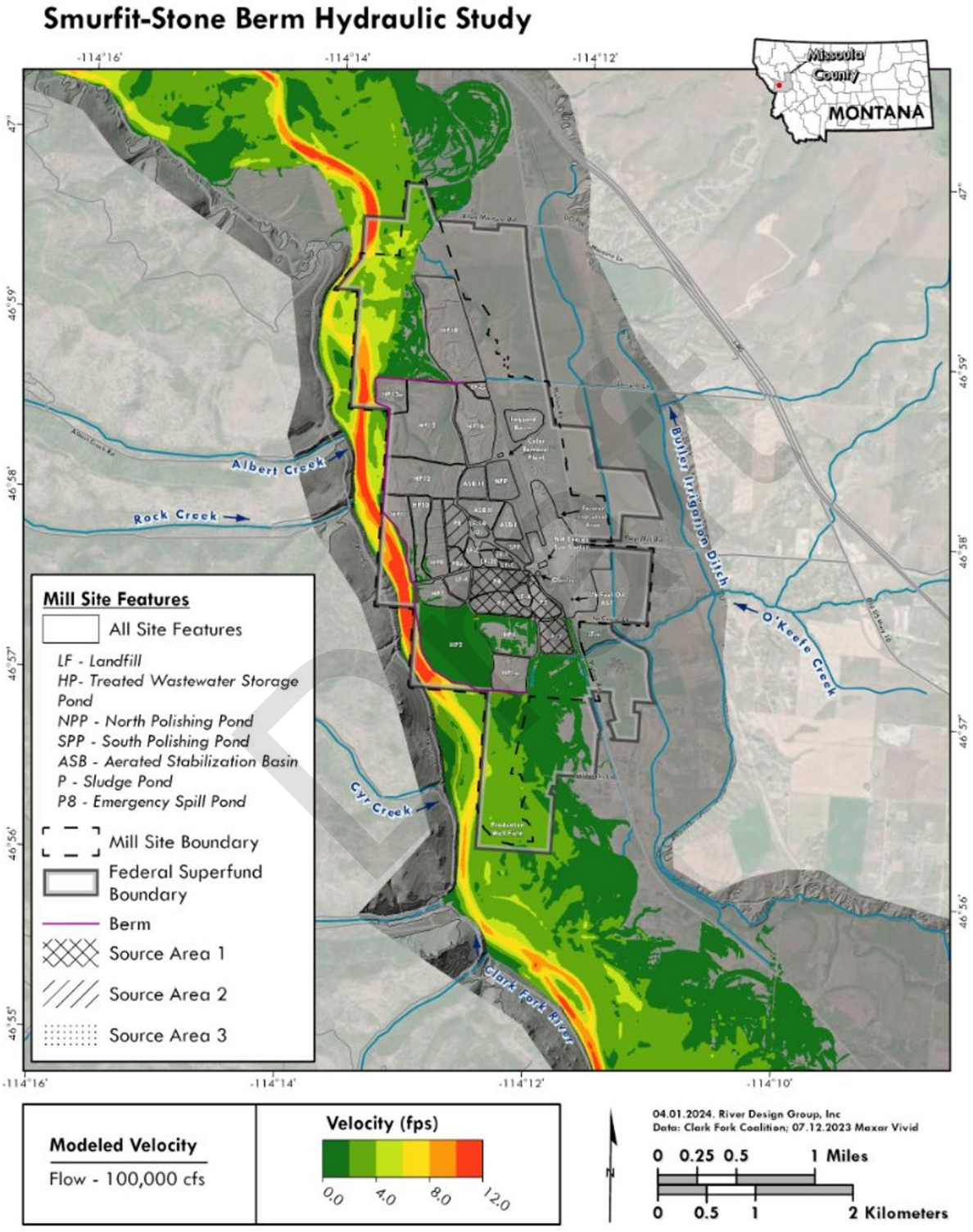


Figure 14 Hydraulic modeling map of flood extents and berm conditions at the Smurfit-Stone site (adapted from River Design Group, 2024).

Reach 4 in Mineral County is naturally armored by the steep bedrock walls and confined canyon morphology characteristic of the Alberton Gorge, with additional hardening from highway infrastructure and transportation corridors that closely parallel the river. Because the Clark Fork in this reach is already constrained by geology and infrastructure, large-scale floodplain restoration is limited. However, several small valley pockets and tributary confluence areas—such as the benches and low-gradient floodplain remnants upstream and downstream of the gorge—still retain functional wetland soils, side-channel potential, and riparian recruitment capacity. These areas represent important opportunities for education and voluntary stewardship, including outreach on floodplain connectivity, wetland habitat protection, riparian revegetation, livestock exclusion fencing, and 310 permitting compliances.

Stakeholder Goals

The 2020 WRP draft includes stakeholder goals for the mainstem of the CCF. These goals are:

- There is no net-increase in paving on floodplains.
- Adequate setbacks for development along riverbanks to protect aesthetics and ecosystem.
- Prevention of stream bank erosion by recreation management.
- Mitigation of toxins to remove fish consumption advisories.

Stakeholder Meetings Recommendations

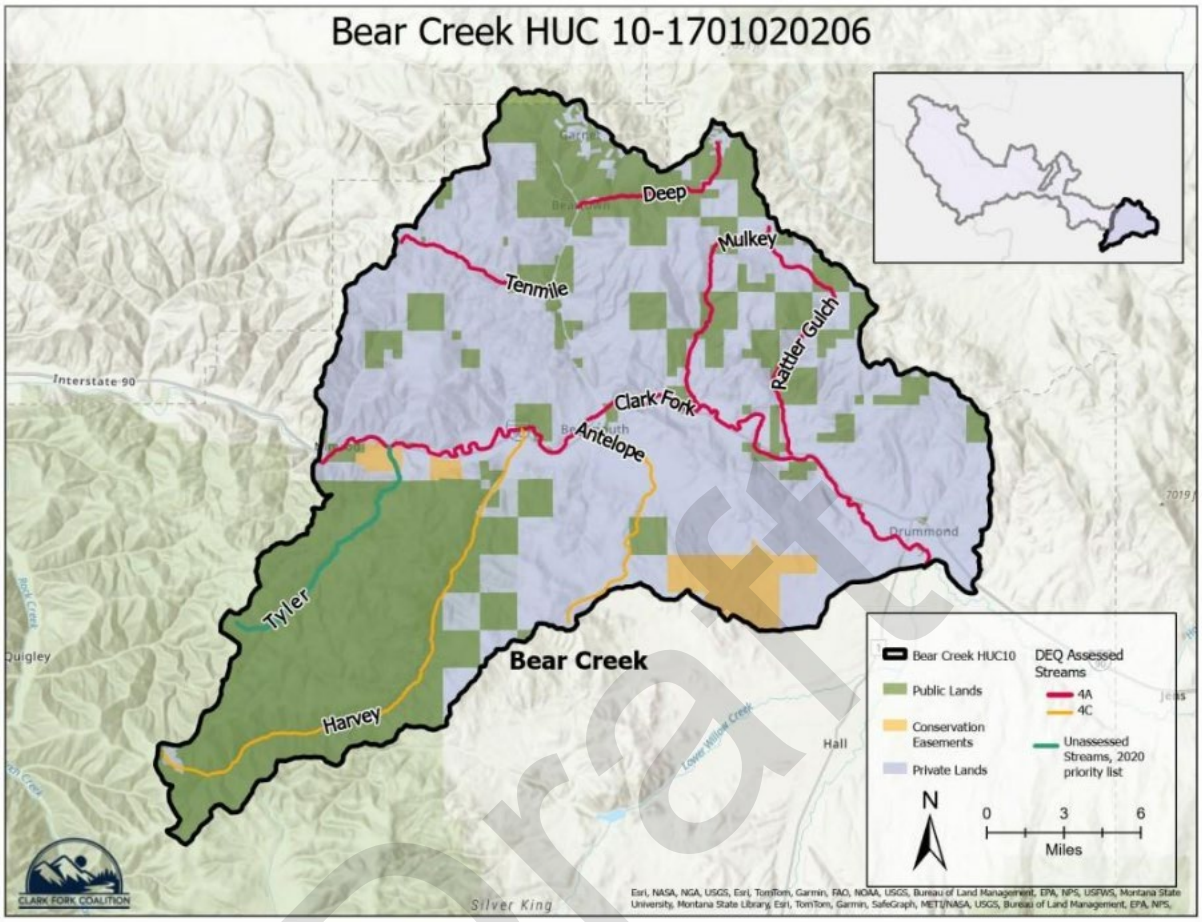
At the 2025 Missoula stakeholder meeting for the CCF WRP, some comments regarding the mainstem involved riparian vegetation removal, illegal roads and boat ramps, and the importance of the wide floodplain as a migration corridor for terrestrial wildlife, including the potential for Grizzley bear migration.

At the 2026 Mineral County stakeholder meeting 310 education was a primary concern with maintaining riparian function.

Summary

Across all mainstem reaches of the Central Clark Fork, priority projects center on improving regulatory compliance, restoring floodplain function, and coordinating land use planning with watershed health. Key actions include 310 permitting education and compliance through each Conservation District; engineering based mainstem restoration using large wood, bank roughening, and floodplain reconnection on public lands managed by counties, FWP, and federal recreation agencies; and collaboration with Missoula County stormwater, planning, and Conservation District staff to maintain agricultural lands, reduce impervious surfaces in the floodway, and protect riparian corridors. These integrated efforts support long term channel stability, water quality improvement, and resilience across the Central Clark Fork. Specific project locations, timelines, and measurable milestones are provided in the Watershed Priorities and Project Implementation Schedule sections.

3.3 BEAR CREEK HUC 10-1701020206



Map 4: Bear Creek HUC map showing land ownership and hydrography. Note Drummond on the eastern edge of map. Map by: Cloe Sliva

3.3A Rattler Gulch (4A - Impaired by pollutants)

Description

Rattler Gulch, from its headwaters to mouth, is an intermittent stream (BLM, 2024) running through a watershed encompassing 15 square miles. Its headwater originates in the Garnet Mountain Range and flows for 8 miles to its confluence with the CCF, four miles west of Drummond. Roughly 36% of the watershed is publicly owned- the BLM has 32%, and the remaining 4% is Montana State Trust Lands. The remaining 64% is privately owned (DEQ, 2014a).

The Rattler Gulch Limestone Cliffs was designated an Area of Critical Concern (ACEC) by the BLM due to the unique limestone outcropping popular among climbers and the local schools for geologic study.

Stream Impairments

Table 8 Rattler Gulch, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

RATTLER GULTCH **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside/littoral vegetative covers	NA; non-pollutant	Aquatic life	Forest roads, riparian grazing, silviculture harvesting
Chlorophyll-a	NA; non-pollutant	Primary contact recreation	Erosive volcanic geology, intermittent dewatering, riparian grazing, logging road sediment, timber harvest site runoff
Low flow alterations	NA; non-pollutant	Aquatic life	Forest roads, silviculture harvesting
Phosphorous (total)	Yes, nutrients	Aquatic life	Erosive volcanic geology, intermittent dewatering, riparian grazing, logging road sediment, timber harvest site runoff
Sedimentation/Siltation	Yes, sediment	Aquatic life	Past timber harvesting, active grazing, road encroachment, erosive volcanic geology

TMDLs and Pollutant Load Reduction Goals

RATTLER GULCH **Pollutant: *Phosphorous*** **Source of pollutant:**	*Current Load (lbs./day) **	*Allowable Load (lbs./day) **	*% Reduction Required** **Based on a growing season flow of 0.02 cfs*
Natural Background	*0.001*	*0.001*	*NA*
Silviculture/agriculture	*0.012*	*0.002*	*81.7%*
Total	*0.013*	*TMDL= 0.003*	***74.8% overall rdx***

RATTLER GULCH **Pollutant: *Sediments***	Current Load (tons/yr)	Allowable Load (tons/year)	% Reduction Required

Source of pollutant:			
Roads	0.2	<0.1	79%
Streambank erosion	1060	570.7	46%
Upland sources	624.6	271.7	56%
Total	1684.8	842.4	***50% overall rdx***

Management Measures

BLM Clark Fork Face Forest Health and Fuels Reduction Plan

In the Clark Fork Face Forest Health and Fuels Reduction Plan (BLM, 2024), the BLM identified 4.57 stream miles of Rattler Gulch on BLM lands with the following Riparian Management Objectives:

- Reduce stream and sedimentation; restore channel geomorphology through road management.
- Pull culvert in the headwaters of W.F. Rattler Gulch to improve hydraulic function.
- Improve road drainage on Rattler Gulch Rd, in coordination with Granite County and MT state.

The road maintenance projects are planned for 2025 and 2026.

2025 Stakeholder Meeting Recommendations

At the 2025 stakeholder meeting for the CCF WRP, some comments suggested that a wildlife crossing could be incorporated near the mouth of Rattler Gulch, and that a key crossing would be between on the I-90 between Rattler and Mulkey Creek.

3.3B Mulkey Creek/Gulch (4A - Impaired by pollutants)

Description

Mulkey Creek, from its headwaters to its mouth (CCF), flows for 6 miles. It has both perineal and ephemeral sections (BLM, 2024). A DEQ assessment describes much of Mulkey Gulch as severely impaired; this is primarily from the gulch channel either being heavily silted by the road, or the channel being the road itself. Although Mulkey Gulch likely never maintained a fishery due to its ephemeral nature, the DEQ contends that major improvements could be made to the area, which would also improve the mainstem's water quality (DEQ, 2020)

Stream Impairments

Table 9 Mulkey Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

MULKEY CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**

Sedimentation/siltation	Yes, sediment	Aquatic life, primary contact recreation	Road encroachment, erosive volcanic geology

TMDLs and Pollutant Load Reduction Goals

MULKEY CREEK **Pollutant: *Sediments*** **Source of pollutant:**	*Current Load (tons/yr)*	*Allowable Load (tons/year)*	*% Reduction Required*
Roads	*0.5*	*0.1*	*80%*
Streambank erosion	*512.6*	*305.6*	*40%*
Upland sources	*560.51*	*217.1*	*61%*
Total	*1073.6*	*522.8*	***51% overall rdx***

Management Measures

BLM Clark Fork Face Forest Health and Fuels Reduction Plan

In the Clark Fork Face Forest Health and Fuels Reduction Plan (BLM, 2024) the BLM identified 6.58 stream miles of Mulkey Creek (titled gulch in plan document) on BLM lands with the following baseline Riparian Management Objectives:

- Maintain and/or improve riparian shade through management of canopy cover. May include improvement of streamside vegetation through plantings and forest structure improvements.
- Avoid sedimentation of creeks from project activities.
- Maintain or improve LWD to improve aquatic habitat.
- Further, it assesses opportunities to improve riparian areas.

The road maintenance projects are planned for 2025 and 2026.

DEQ Recommendations

- Make improvements to SMZ where the road passes along (or through) the channel.

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments suggested that a key wildlife crossing would be between on the I-90 between Rattler and Mulkey Creek.

3.3C Deep Creek (4A - Impaired by pollutants)

Description

Deep Creek, from its headwater to mouth, runs through a sub-watershed encompassing 10.5 square miles. Its headwater originates in the Garnet Mountain Range and flows for 5 miles to its confluence

where it joins Bear Creek approximately 3 miles from Bear Creek's headwaters. Roughly 81% of the watershed is publicly owned the BLM has 75%, and the remaining 6% is Montana State Trust Lands. The remaining 19% is privately owned (DEQ, 2014a)

Stream Impairments

Table 10 Deep Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

DEEP CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Chlorophyll-a	NA; non-pollutant		
Low flow alterations	NA; non-pollutant		
Nitrate/Nitrite (Nitrite + Nitrate as N)	Yes, nutrients	Aquatic Life	intermittent dewatering, logging road sediments, timber harvest site runoff, past and current mining activities, septic effluent
Sedimentation/Siltation	Yes, sediment	Aquatic Life	Unknown- no sediment/habitat assessment done. Likely road encroachment, extensive mine related disturbances, past timber harvesting

TMDLs and Pollutant Load Reduction Goals

DEEP CREEK **Pollutant: *Nitrate+ Nitrite*** **Source of pollutant:**	*Current Load (lbs./day) **	*Allowable Load (lbs./day) **	*% Reduction Required** **Based on growing season flow of 0.11 cfs*
Natural Background	*0.01*	*0.01*	*NA*
Silviculture/mining	*0.09*	*0.05*	*44.4%*
Total	*0.10*	*TMDL= 0.06*	***40.0% overall rdx***

DEEP CREEK **Pollutant: *Sediments*** **Source of pollutant:**	*Current Load (tons/yr)*	*Allowable Load (tons/year)*	*% Reduction Required*
Roads	*0.9*	*0.2*	*76%*
Streambank erosion	*622*	*358.9*	*42%*
Upland sources	*353.9*	*190.1*	*46%*
Total	*976.8*	*549.2*	***44% overall rdx***

Management Measures

BLM Clark Fork Face Forest Health and Fuels Reduction Plan

In the Clark Fork Face Forest Health and Fuels Reduction Plan (BLM, 2024) the BLM identified 5.71 stream miles of Deep Creek on BLM lands with the following baseline Riparian Management Objectives:

- Assess opportunities to improve sedimentation and nutrient impairments.
- Replace culverts; address drainage issues on Cave Gulch Rd (BLM, 2024b)

Beavers Restoration Potential

- The BRAT map identified one small section along Deep Creek as having "straight-forward-quick return" restoration or conservation opportunities (BRAT, 2020).

3.3D Tenmile Creek (4A - Impaired by pollutants)

Description

Tenmile Creek, from its headwaters to mouth, runs through a watershed encompassing 10.5 sq mi. It is a perineal creek (BLM, 2024). Its headwater originates in the Garnet Mountain Range, and flows for 5 miles to its confluence, where it joins with Bear Creek approximately midsegment. Roughly 11% of the watershed is publicly owned -the BLM has 10%, and the remaining 1% is Montana State Trust Lands. The remaining 89% is privately owned (DEQ, 2014a)

Stream Impairments

Table 11 Tenmile Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

TENMILE CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside/littoral vegetative covers	NA; non-pollutant		

Phosphorous (Total)	Yes, nutrients	Aquatic Life, Primary Contact Recreation	Erosive volcanic geology, riparian grazing, logging road sediment, timber harvest site runoff, intermittent dewatering
Sedimentation/Siltation	Yes, sediment	Aquatic Life	Historic logging, grazing, road encroachment, channelization, erosive volcanic geology

TMDLs and Pollutant Load Reduction Goals

TENMILE CREEK **Pollutant:** ***Phosphorous*** **Source of pollutant:**	*Current Load (lbs./day) **	*Allowable Load (lbs./day) **	*% Reduction Required** **Based on growing season flow of 0.90 cfs*
Natural Background	*0.05*	*0.05*	*NA*
Silviculture/agriculture	*0.84*	*0.10*	*88.1%*
Total	*0.89*	*TMDL=0.15*	***83.1% overall rdx***

TENMILE CREEK **Pollutant:** ***Sediments*** **Source of pollutant:**	*Current Load (tons/yr)*	*Allowable Load (tons/year)*	*% Reduction Required*
Roads	*0.4*	*0.1*	*80%*
Streambank erosion	*582.9*	*381.9*	*34%*
Upland sources	*398.1*	*133.2*	*67%*
Total	*981.4*	*515.2*	***48% rdx overall***

Management Measures

BLM Clark Fork Face Forest Health and Fuels Reduction Plan

In the Clark Fork Face Forest Health and Fuels Reduction Plan (BLM, 2024) the BLM identified 1.99 stream miles of Tenmile Creek on BLM lands with the following baseline Riparian Management Objectives:

- Reduce sediment from road undercutting on BLM lands.

Tenmile Creek is on the BLM's priority list for LTPBR project on BLM parcels. There is project planned.

Beavers Restoration Potential

- The BRAT map identified one small section along Deep Creek as having "straight-forward- quick return" restoration or conservation opportunities (BRAT, 2020).

3.3E Antelope Creek (4C - Impaired by non-pollutants)

Description

Antelope Creek, from headwaters to its mouth with the CCF, runs for 8.5 miles. It was assessed by DEQ in 2000 and was found to be in moderately impaired condition, and thus not fully supporting aquatic life within the creek. Despite severe bank erosion from historic overgrazing, down cutting, and woody vegetation removal, Antelope Creek supports a genetically pure Westslope cutthroat trout fishery (DEQ, 2020).

Stream Impairments

Table 12 Antelope Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

ANTELOPE CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside/littoral vegetative covers	NA; non-pollutant	Aquatic Life	Grazing in Riparian zones, loss of riparian habitat, bank downcutting
Physical substrate habitat alterations	NA; non-pollutant	Aquatic Life	Streambanks modifications, channel destabilization from historic grazing, removal of LWD

Management Measures

Fishery Health Measures

In the FWP's 2018 Aquatic Prioritization Plan, the agency prioritized Antelope Creek's fishery to:

- Restore the mainstem trout fishery in the mainstem by improving recruitment of trout from tributaries.
- Replace lost angling in the mainstem via the above goals (FWP, 2018).

FWP Future Fisheries Projects

- 4.8 miles of riparian fencing installed and site revegetation in 2001 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified several spots along Antelope Creek as having “easy-low hanging fruit” restoration or conservation opportunities (BRAT, 2020).

3.3F Harvey Creek (4C - Impaired by non-pollutants)

Description

Harvey Creek flows for 16 miles from its headwaters to its mouth at the CCF. In an older DEQ assessment, habitat impairments were found near the headwaters of Harvey Creek. Despite the historic Argo Mine operations above Harvey Creek, Harvey Creek is not impaired by any metal contaminants FWP has listed Harvey Creek as chronically dewatered near its mouth (DEQ, 2020).

Stream Impairments

Table 13 Harvey Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

HARVEY CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Physical substrate habitat alterations	NA; non-pollutant	Aquatic Life	Streambanks modifications, channel destabilization from historic grazing, removal of LWD

Management Measures

Fishery Health Measures

In the FWP’s 2018 Aquatic Prioritization Plan, the agency highly prioritized Harvey Creek’s native trout populations and the geographic distribution and isolation of the fishery to:

- Maintain or improve native fish populations in the Upper Clark Fork River drainage (FWP, 2018).

FWP Future Fisheries Projects

- Riparian fencing and channel restoration in 2002.
- Additional fencing in 2010.
- Additional fencing, diversion modifications, and a fish screen in 2013 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified several spots along Harvey Creek as having “easy-low hanging fruit” restoration or conservation opportunities (BRAT, 2020).

3.3G Tyler Creek (No WQ category)

Management Measures

FWP Future Fisheries Projects

- Riparian fencing installed in 2004, but apparently this did not benefit the fishery due to continued overgrazing (FWP, 2017).

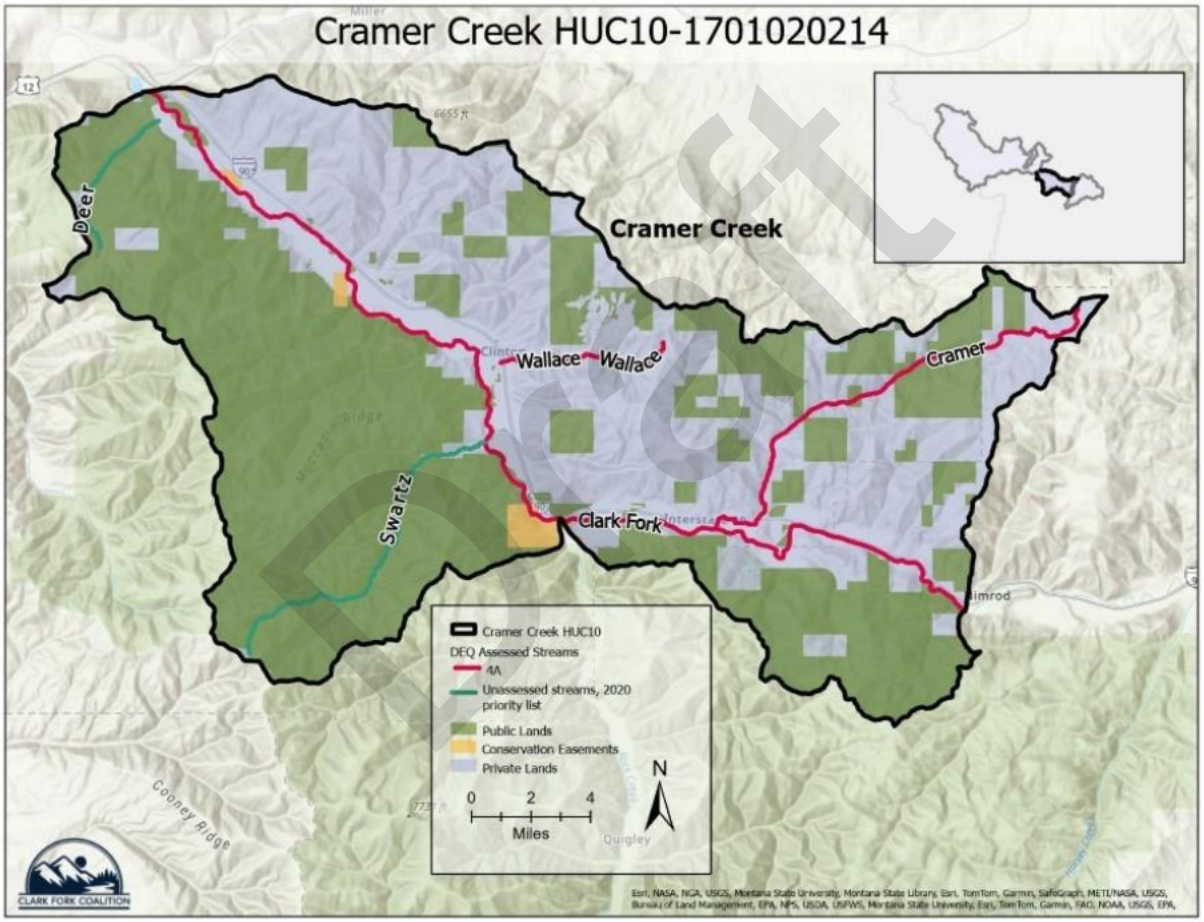
Beavers Restoration Potential

- The BRAT map identified several spots along Tyler Creek as having “easy-low hanging fruit” restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments suggested that a wildlife crossing would be suitable near the mouth of Tyler Creek.

3.4 CRAMER CREEK HUC 10-1701020214



Map 5: Cramer Creek HUC map showing land ownership and hydrography. Note Clinton near the mouth of Wallace Creek. Map by: Cloe Sliva

3.4A Cramer Creek (4A - Impaired by pollutants)

Description

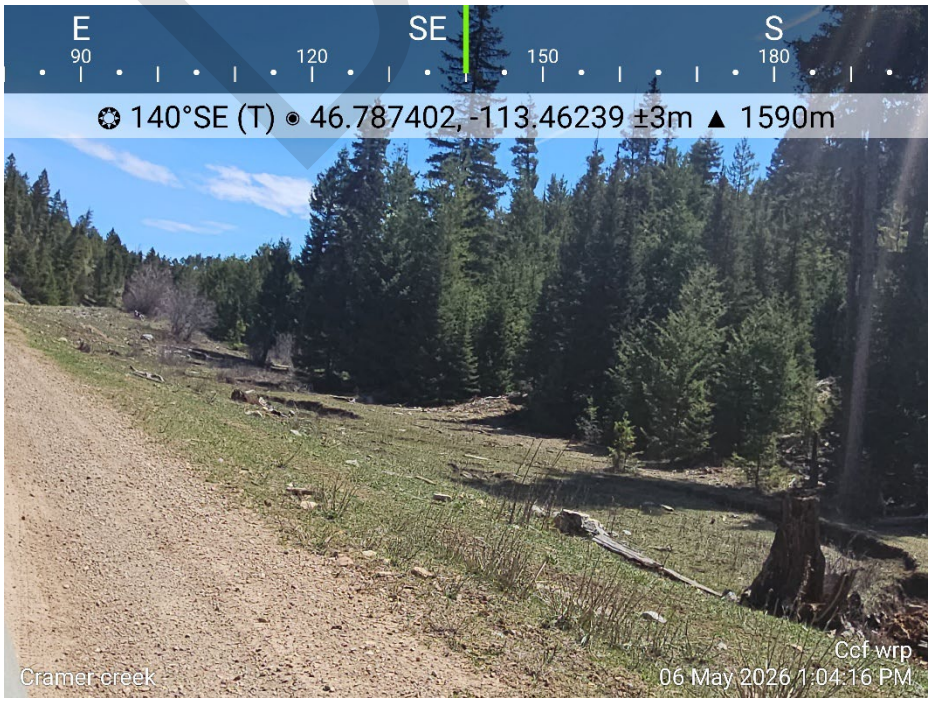
Cramer Creek, from its headwaters to mouth, flows through a watershed encompassing 26 square miles. It has both perineal and intermittent reaches. Its headwater originates from the southern flank of

the Garnet Mountains. It flows for 12 miles to the confluence with the CCF (DEQ, 2014a) TNC currently dominates ownership in the Cramer and Wallace watersheds, owning 15 sq mi (44%) of the total area, but intends to convert these properties to public ownership. Stimson Lumber owns 4 sq mi (11%), the State of Montana owns 3 sq mi (9%), and public and private. Many former Stimson lands have been sold into private ownership, resulting in relatively dense subdivision and road system development in the Cramer Creek drainage (BLM 2024). Subdivided private lands in the lower drainage include obvious riparian and water quality impacts associated with livestock management.

Stream Impairments

Table 14 Cramer Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

CRAMER CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Cause unknown impairment	NA; non-pollutant		Sediment-related from past logging practices
Physical substrate habitat alterations	NA; non-pollutant		
Sedimentation/Siltation	Yes, sediment	Aquatic Life	Heavy grazing, historic logging and mining in the headwaters, sheet and gully erosion, channelization



Aluminum	Yes, metals	Aquatic Life	Abandoned Linton mine/mill site, sediment-bound aluminosilicate minerals during high flow
Lead	Yes, metals	Aquatic Life, Drinking Water	Abandoned Linton mill/mine site

TMDLs and/or Pollutant Load Reduction Goals

CRAMER CREEK **Pollutant:** ***Sediments*** **Source of pollutant:**	***Current Load (tons/yr)***	***Allowable Load (tons/year)***	***% Reduction Required***
Roads	*0.8*	*0.2*	*80%*
Streambank erosion	*1869*	*905.6*	*52%*
Upland sources	*947.5*	*299.7*	*68%*
Total	*2817.3*	*1205.5*	***57% overall rdx***

CRAMER CREEK: **Pollutant:** ***Metals***	*Current Load (µg/L)*		*Target Load (µg/L)*		*TMDL (lbs./day)*		*% Reduction Required*	
	High flow	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***
Aluminum	*490*	*<30*	*87*	*87*	*0.338*	*0.047*	***82%***	***0%***
Lead	*8.5*	*15.4*	*5.6*	*8.38*	*0.578*	*0.353*	***34%***	***46%***

Management Measures

Fishery Health Measures

In the FWP's 2018 Aquatic Prioritization Plan, the agency prioritized Cramer Creek's fishery to:

- Restore the mainstem trout fishery by improving recruitment of trout from tributaries.
- Protect and enhance native westslope cutthroat trout conservation populations. Cramer Creek supports a non-hybridized W. cutthroat trout population isolated above the barrier at mouth.
- Replace lost angling in the mainstem via the above goals (FWP, 2018).
- Address riparian and instream habitat impairments.

BLM Clark Fork Face Forest Health and Fuels Reduction Plan

In the Clark Fork Face Forest Health and Fuels Reduction Plan (BLM, 2024) the BLM identified 2.05 stream miles of Cramer Creek on BLM lands with the following baseline Riparian Management Objectives:

- Maintain/improve riparian shade through canopy management. Potential for improvements to streamside vegetation of forest structure improvements.
- Avoid sedimentation from project; BLM has implemented restoration projects to mitigate existing sediment impairment.
- Maintain or improve large woody debris.
- Further assess opportunities to improve impairments.

The BLM implemented stream restorations and road repairs on upper Cramer Creek in 2006 and 2017.

Beavers Restoration Potential

- The BRAT map identified several sections along Cramer Creek as having "straight-forward- quick return" and "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020).

Figure 15 Lower Cramer Creek diversion for flood irrigation.

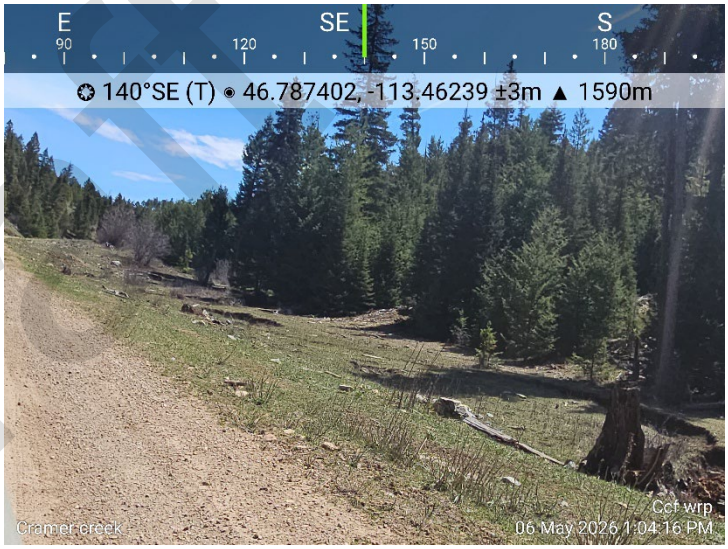


Figure 16 Upper Cramer Creek Road and adjacent Creek.

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments suggested that a wildlife crossing could be suitable on Cramer Creek where it crosses the I-90.

3.4B Swartz Creek (No WQ category)

Swartz Creek drains a large tributary basin into the Clark Fork River from the Bitterroot side. It is now more than 95% USFS-owned following recent public land acquisitions that converted former checkerboard industrial timberlands into consolidated federal ownership. The creek supports both perennial and intermittent reaches and contributes important wild trout production to the Clark Fork

River fishery, making it a key cold-water source and ecological anchor within the middle Clark Fork watershed. It has not been assessed as impaired by MT DEQ.

Management Measures

Fishery Health Measures

- In the FWP's 2018 Aquatic Prioritization Plan, the agency prioritized Swartz Creek to enhance connectivity, trout spawning and juvenile rearing habitat, and instream flows:
- Restore the mainstem trout fishery by improving recruitment of trout from tributaries.
- Replace lost angling in the mainstem via the above goals (FWP, 2018).
- Impacts of road construction and channel encroachment by roads should also be addressed through improved BMPs, upgrades to infrastructure, and where possible, road re-alignment.
- Address dewatering and livestock management issues on lower mainstem and water quality impacts associated with headwater road network.

Beavers Restoration Potential

- The BRAT map identified several sections along Swartz Creek as having "strategic- long-term investment" and "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020).

3.4C Wallace Creek (4A - Impaired by pollutants)

Description

Wallace Creek, from its headwater to mouth, flows through a watershed encompassing 8 square miles. Its headwater originates from the southern flank of the Garnet Mountains. It flows for 12 miles its confluence with the CCF, although it is in intercepted by ditches near Clinton, MT. Roughly 87% of the watershed is publicly owned by USFS, and the remainer is privately owned. The Nature Conservancy dominates ownership in the Cramer and Wallace watershed, owning 15 sq mi (44%) of the total area. Stimson Lumber owns 4 sq mi (11%), the State of Montana owns 3 sq mi (9%), and public and private (DEQ, 2014a). Many former Stimson lands have been subdivided and converted to residential homeowners and subdivisions, resulting in relatively dense subdivision development in the lower Wallace Creek drainage (BLM 2024).

Stream Impairments

Table 15 Wallace Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

WALLACE CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Copper	Yes, metals	Aquatic Life	Wallace Creek mill site, Hidden Treasure Mine adit discharge,

			Aladdin and Cape Nome Mines, other extensive hard rock mining

TMDLs and Pollutant Load Reduction Goals

WALLACE CREEK* Pollutant: *Copper	*Current Load (µg/L)*		*Target Load (µg/L)*		*TMDL (lbs./day)*		*% Reduction Required*	
	High flow	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***
Copper	*6*	*5*	*5.25*	*8.28*	*0.071*	*0.016*	***13%***	***0%***

Management Measures

Fishery Health Measures

In the FWP's 2018 Aquatic Prioritization Plan, the agency prioritized Wallace Creek's fishery to:

- Protect the non-hybridized WCT isolate population in the headwaters of Wallace Creek
- Provide riparian buffers and remove fish passage barriers along the middle and lower mainstem.
- Restore the mainstem trout fishery by improving recruitment of trout from tributaries.
- Replace lost angling in the mainstem via the above goals (FWP, 2018).

BLM Clark Fork Face Forest Health and Fuels Reduction Plan

- Replace 6 culverts (4 dry, 2 wet) after Wallyhood timber sale (on Wallace/Ashby divide) (BLM, pers. Comm). The BLM did two additional culvert replacements on Wallace Creek in 2025.

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments suggested that a small county park along Wallace Creek could use stream improvements.

3.4D Deer Creek (No WQ category)

Description

Deer Creek flows for 8 miles through a watershed of 8.8 sq. miles before joining with CCF one mile upstream of the confluence of the CCF and the Blackfoot rivers. The upstream portion of the watershed, which includes three upper forks, consists of a mix of public (USFS) lands and private inholdings. This watershed has been a priority for conversion of corporate timber lands to public ownership, with most lower reaches acquired by the USFS through recent land transactions (Kloetzel, TNC). The USFS is currently the predominant landowner in the watershed.

Deer Creek has been a priority for watershed restoration and fishery enhancement work over the past two decades due to its high aquatic productivity, population of cutthroat trout with high genetic integrity, importance to the Clark Fork fishery, and perennial connection to the Clark Fork River.

FWP, USFS, and TU have both identified Deer Creek as a watershed of concern and listed the following factors as limiting the fishery: excessive fine sediment inputs, elevated temperatures, channel modification, fish passage barriers, and riparian degradation. Stakeholders have also voiced concern about this tributary, primarily due to the history of extraction and development. The need for Westslope Cutthroat and bull Trout conservation and protecting the channel from further encroachment by riparian roads and future development are also critical (Watson, 2020; USFS (Wade et. al., 2016)).

Many additional issues and limiting factors have been identified by FWP, USFS, and TU in the upper basin, and work on the three upper forks will likely be the future priority. This work will include mitigating forest road encroachment, fish passage barriers (perched culverts), instream ponds, and other obvious anthropogenic issues (Knotek, FWP, 2025).

Stream Impairments

Table 16 Deer Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

DEER CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Connectivity and Fish Entrainment *(Knotek, FWP)*	No	Aquatic Life	Irrigation diversion and road crossings
Temperature *(USFS, 2013)*	No	Aquatic Life	
Sedimentation *(USFS, 2013)*	No	Aquatic Life	
Riparian degradation *(USFS, 2013)*	No	Aquatic Life	Road encroachment, substandard BMPs

Management Measures

Fishery Health Measures

Between 2015 and 2025, TNC, FWP, Missoula County, and Lolo NF have added protections and removed garbage and contaminants from the riparian corridor.

The 2013 Conservation Strategy for Bull Trout and other native species on USFS Lands in Western Montana suggests:

- Mitigation of fish passage, riparian encroachment, and other issues related to the road system is necessary in order to re-establish the potential for stream-resident and migratory native WCT stocks.
- Mitigation of passage barriers and fish entrainment at the remaining irrigation diversion are high priority. Impacts of road construction and channel encroachment by roads should also be addressed through improved BMPs, upgrades to infrastructure, and where possible, road re-alignment.
- In the upper reaches, continued habitat improvement efforts are recommended, possibly including mitigating impacts of road systems, private in-holdings, and the lack of large woody debris that enhances large pool habitat quality and stream complexity (USFS, 2013).

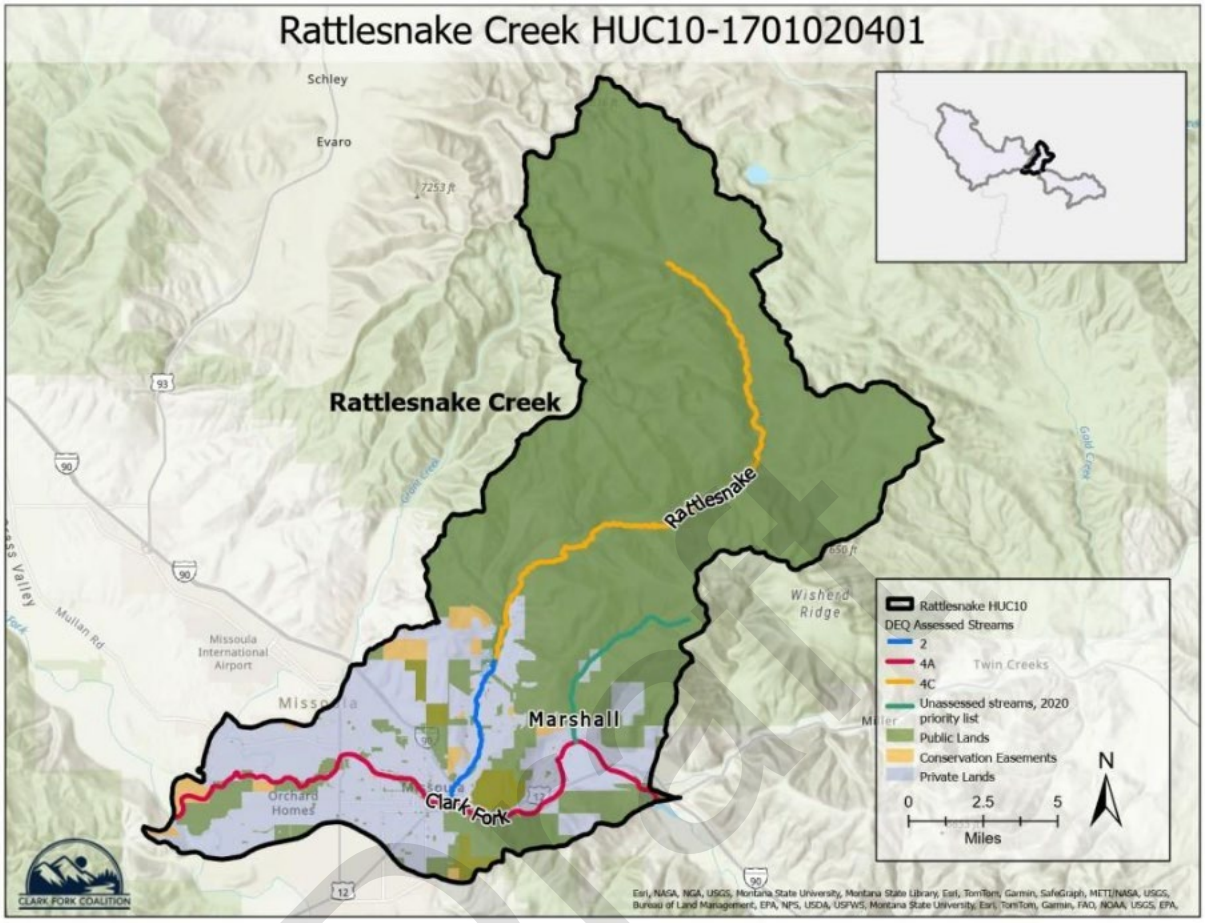
In the FWP's 2018 Aquatic Prioritization Plan, the agency prioritized Deer Creek's cutthroat trout population to:

- Maintain or improve native fish populations in the Upper Clark Fork River drainage.
- Restore the mainstem trout fishery by improving recruitment of trout from tributaries.
- Replace lost angling in the mainstem via the above goals (FWP, 2018).

Beavers Restoration Potential

- The BRAT map identified several sections in the upper forks of Deer Creek as having "straight-forward- quick return" and "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020)

3.5 RATTLESNAKE HUC 10-1701020401



Map 6: Rattlesnake Creek HUC map showing land ownership and hydrography. Note City of Missoula is near the mouth of Rattlesnake Creek. Map by: Cloe Sliva

3.5A Marshall Creek (No WQ category)

Description

Marshall Creek, just upriver from Missoula, is an important cutthroat trout and wild trout spawning stream due to its cold water and high inherent productivity .This stream originates on public lands in its headwater basin, runs through the Marshall Mountain Park acquired by Missoula County in 2024, and continues through mixed ownership to its confluence with the Clark Fork River. Due to its high native and wild trout productivity, considerable public and private investments have been made through numerous fisheries and aquatic enhancement projects in the watershed, including fish screens, riparian fencing, instream habitat enhancements, road crossing replacements, and fish passage (ladder) installation.

Management Measures

Fishery Health Measures

Between 2005 and 2025, Missoula County, FWP, TU, and private landowners on Marshall Creek have replaced/upgraded culvert crossings for fish passage, upgraded irrigation diversions, enhanced instream habitat complexity, fenced riparian corridors, and installed fish screens.

FWP has prescribed the following measures for Marshall Creek, a closed tributary system (fish barriers prevent upstream movement from CFC):

Improve habitat quality and connectivity within the drainage and maintain the fish passage barrier isolating the upper watershed to conserve genetically pure WCT (FWP, 2023).

The enhancements mentioned above were funded through the Milltown Dam Mitigation program, FWP's Future Fisheries Improvement Program, and numerous other funding sources through the work of Trout Unlimited, FWP, private landowners, and other partners.

Beavers Restoration Potential

The BRAT map identified several sections along Marshall Creek as having "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

At the 2025 stakeholder meeting for the CCF WRP, some comments suggested that parking lot improvements could be done at Marshall Mountain to improve riparian buffers and minimize nonpoint pollution inputs.

3.5B Rattlesnake Creek (4C - Impaired by non-pollutants)

Description

From its headwaters in the Rattlesnake Wilderness to its mouth at the CCF, Rattlesnake Creek flows for 20 miles through the Rattlesnake Wilderness, National Recreation Area, and a mix of private property and city/county parklands. This stream has been a focus area for fisheries and aquatic enhancements due to its importance for the CCF fishery, high inherent wild and native trout value, and proximity to Missoula and UM.

Stream Impairments

Table 17 Rattlesnake Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

RATTLESNAKE CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Flow Regime Modification	No	Aquatic Life	Dam construction (other than upstream flood control projects) Water diversions

Management Measures

Fishery Health Measures

Between 2001 and 2025, MTFWP, other state agencies, the Lolo NF, private landowners, Missoula CD, and numerous other partners installed fish screens on multiple ditches and diversions, implemented fish passage and habitat improvements, and enhanced the riparian corridor through numerous collaborative projects along Rattlesnake Creek (Knotek et al. 2004).

FWP has prescribed the following measures for the lower ~15 miles of Rattlesnake Creek downstream of the East Fork confluence, and the associated open tributary system (fish barriers absent):
Protect/enhance habitat and ensure connectivity with tributaries to enhance natural trout recruitment (FWP, 2023).
Enhance migratory westslope cutthroat trout and bull trout populations.

In the upper ~ 8 miles of the mainstem above the barrier cascades / East Fork confluence, native stream-resident westslope cutthroat trout and bull trout populations are protected within the Rattlesnake National Recreation Area corridor.

FWP Future Fisheries Projects

Between 2000 and 2023, numerous collaborative enhancement projects have been funded and implemented on Rattlesnake Creek- including fish screens, fish ladders, riparian enhancements, stream crossing upgrades, and dam removals (FWP, 2017).

NPS Pollution Measures from 2025 City of Missoula Stormwater Quality Plan

Conduct a study to assess current infrastructure needs for Lincoln Hills/Lincolnwood Drainage, which needs to be stabilized to prevent sedimentation of Rattlesnake Creek.

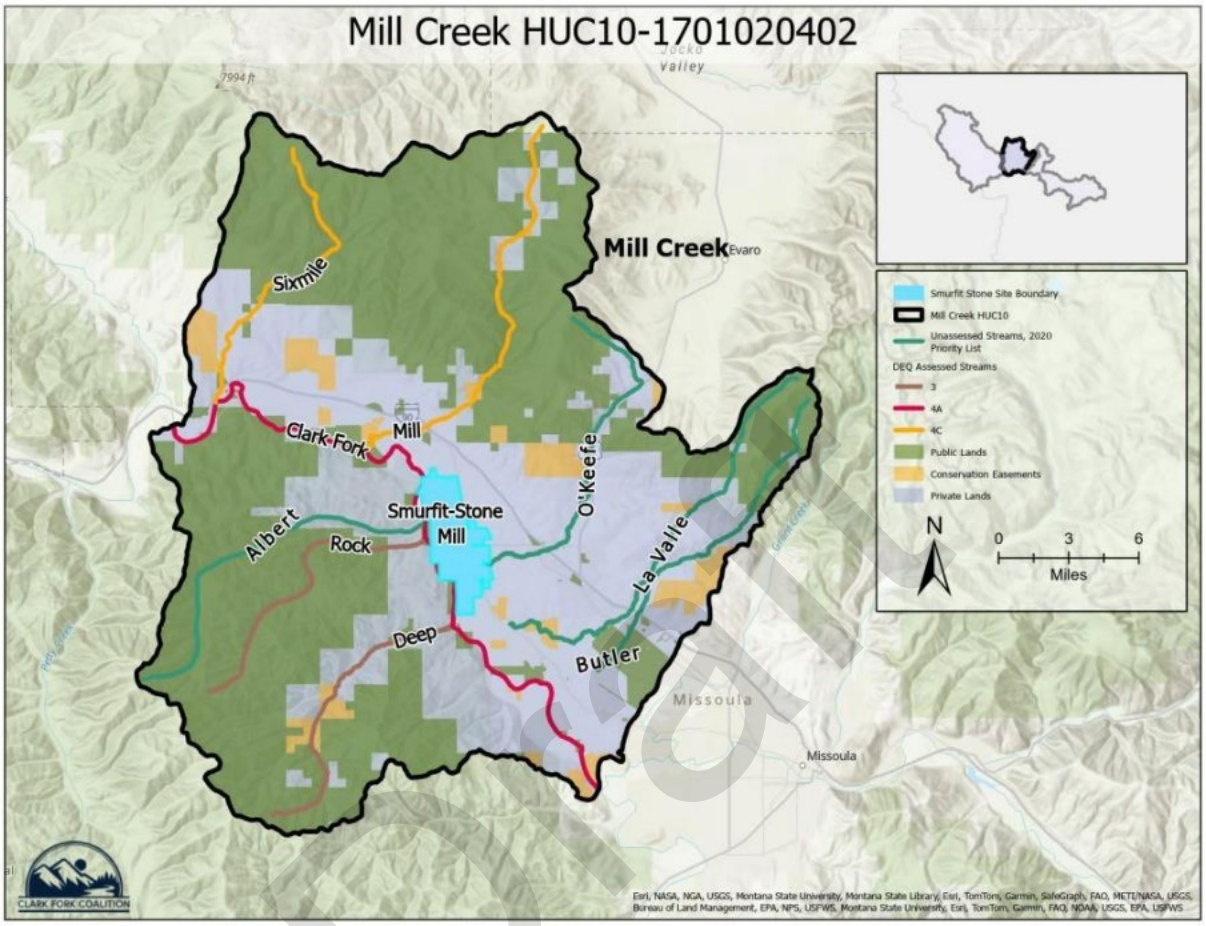
Water Management History and Potential

Rattlesnake Creek was historically the primary municipal water source for Missoula. In the late 1980s-1990s, water supply for Missoula was shifted to groundwater wells in the Missoula valley. Subsequently, efforts were begun to remediate dilapidated water supply infrastructure (e.g., Rattlesnake Dam, dams on headwater lakes). These efforts continue and could potentially incorporate instream flow enhancements for Rattlesnake Creek.

Beavers Restoration Potential

The BRAT map identified many sections along Rattlesnake Creek as having “easy-low hanging fruit” restoration or conservation opportunities (BRAT, 2020).

3.6 MILL CREEK HUC 10-1701020402



Map 7: Mill Creek HUC map showing land ownership and hydrography. Note Frenchtown near the mouth of Mill Creek.
Map by: Cloe Sliva

3.6A Butler Creek (No WQ category)

Description

Butler Creek, just downstream from Missoula, is undergoing rapid development pressure, and the effects are increasingly visible on the ground. FWP identifies portions of the creek—both above and below Interstate-90—as chronically dewatered, reflecting long-standing flow alteration and growing demand on an already stressed system. Riparian encroachment, overgrazing, and the cumulative impacts of intensive subdivision are evident throughout the lower corridor, where roads, driveways, and clearing have narrowed the stream's natural buffer and increased sediment and temperature stress.

Despite these pressures, Butler Creek supports one of the most important high-density, non-hybridized westslope cutthroat trout conservation populations in the Missoula area, with no other fish species present. This makes the creek a rare stronghold for genetically pure WCT and a critical contributor to the broader Clark Fork River fishery.

Management Measures

Fishery Health Measures

FWP has prescribed the following measures for ~10 miles of Butler Creek upstream of I-90, a closed tributary system (fish barriers prevent upstream movement from CFC):

- Improve habitat quality and connectivity within upper drainage to enhance nonhybridized W cutthroat trout conservation population (FWP, 2023).
- Mitigate riparian encroachment, point sediment sources, overgrazing, fish passage barriers, and other impacts associated with high density subdivision.

FWP Future Fisheries Projects

- FWP did riparian enhancements and fish passages on Butler Creek in 1998 and 2000 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified many sections along Butler Creek as having "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020).
- Work with Natural Resources Conservation Service Targeted Implementation Plan (TIP) partners to implement fuels-reduction and forest-health treatments in the upper Butler Creek watershed, where rapid development and dense subdivision increase wildfire risk. Where feasible, repurpose woody material generated from TIP-supported thinning projects for beaver-dam analog (BDA) construction and other low-tech process-based restoration. This approach reduces costs, enhances floodplain reconnection, and supports late-season flow and habitat complexity in a chronically dewatered system.

3.6B LaValle Creek (No WQ category)

Lavalle Creek is a small tributary with hydrologic and physical characteristics very similar to Butler Creek, including a mix of perennial and intermittent reaches and a narrow, confined lower corridor. The stream supports an important, high-density, non-hybridized westslope cutthroat trout conservation population, with no other fish species present, making it a key native trout stronghold in the lower Clark Fork basin. Residential development above I-90 is minimal compared to Butler Creek and other nearby tributaries, resulting in fewer riparian impacts and a largely intact upper-watershed condition.

Management Measures

Fishery Health Measures

FWP has prescribed the following measures for the upper ~10 miles of LaValle Creek, an isolated tributary system (fish barriers prevent upstream movement from CFC):

- Improve habitat quality and connectivity within upper drainage to enhance nonhybridized W cutthroat trout conservation population (FWP, 2023).
- Mitigate partial fish passage barriers along mainstem in perennial reach (above I-90)

FWP Future Fisheries Projects

- Private landowners installed riparian fence along LaValle Creek in 2004 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified many sections along La Valle Creek as having “easy-low hanging fruit” or “straight-forward- quick return” restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed concern over chronic dewatering in La Valle Creek, and its critical important as a connectivity zone for terrestrial wildlife.

3.6C Deep Creek (3 Not enough data)

Description

Deep Creek Deep Creek originates on the Bitterroot side of the northern Bitterroot Range, draining a steep, forested upper watershed before entering the Missoula Valley. It flows 10 miles from its headwaters and its mouth at the CCF. It is a category 3 water, meaning that the DEQ did not have enough data to properly assess the water quality of the creek (DEQ, its hydrology and channel form are similar to other west-side tributaries, with cold perennial flow in the upper basin transitioning to more alluvial, intermittently dewatered reaches as it approaches the valley floor. The creek supports a native westslope cutthroat trout population, benefiting from relatively intact headwater habitat and limited development pressure compared to tributaries closer to Missoula.

Fishery Health Measures

FWP has prescribed the following measures for the Deep Creek tributary system.

- Improve habitat quality and connectivity within upper drainage to enhance W cutthroat trout and wild trout populations (FWP, 2023).
- Mitigate riparian encroachment, point sediment sources, overgrazing, fish passage barriers, and other impacts associated with high density subdivision.

020). FWP has listed Deep Creek as chronically dewatered seasonally in middle and lower reaches.

Management Measures

Beavers Restoration Potential

- The BRAT map identified several sections along Deep Creek as having “easy-low hanging fruit” or “strategic- long term investment” restoration or conservation opportunities (BRAT, 2020).

3.6D O'Keefe Creek (No WQ category)

Description

The headwaters of O'Keefe Creek are at the top of Evaro Hill. O'Keefe follows the I-93 corridor down Evaro Hill and under I-90 before flowing south-southwest toward the former Smurfit-Stone Pulp Mill where it joins the Clark Fork River. The watershed is located between Missoula, Frenchtown, and Evaro. The channel has been relocated in several reaches and experiences seasonal dewatering, with reaches downstream of I-90 generally not recognizable due to past manipulation.

O'Keefe Creek has never had a formal WQ assessment by the DEQ; however, volunteer monitoring conducted by the Missoula Valley Water Quality District (MVWQD) demonstrates that O'Keefe Creek is likely impaired for nutrients. Chloride levels also demonstrate that there may be impacts from the highway corridors with additional contributions from septic systems.

Long term groundwater monitoring has indicated that groundwater levels in the area are closer to the surface and may be interacting with lower O'Keefe Creek. In April 2019, there were numerous issues with stormwater resulting from a large rain event on frozen ground. As a result, O'Keefe Creek may have peaked earlier than surrounding tributary streams. Outreach to the Confederated Salish and Kootenai Tribes as well as Montana Fish Wildlife and Parks has highlighted the lack of official assessment of O'Keefe Creek. FWP (L. Knotek, pers Com) considered the stream to be seasonally dewatered south of Highway 10 and work by the Water Quality District has identified flow through November. Spring (groundwater) inputs increase considerably in the lower drainage. Large volumes of groundwater used to be pumped to the nearby pulp mill but have ceased since the mill closed. Beavers have also become active closer to the Clark Fork and may be influencing groundwater to aid in creating year-round flow.

A final plan for the remediation of the Smurfit-Stone Pulp Mill superfund site is needed to finalize plans to restore or rehabilitate lower O'Keefe Creek.

Additionally, Missoula County's growth plans include drastically increasing the population density at the Wye, upwards of 30,000- 50,000 people over the next five decades.

Management Measures

Fishery Health Measures

FWP has described the following management activities necessary for O'Keefe Creek:

- Assess contamination of Smurfit-Stone and facilitate remediation/restoration of lower portions near and within Clark Fork River floodplain (FWP, 2023).
- Limit riparian encroachment and impacts of residential development – particularly in perennial upper reach above I-90.
- Protect and enhance W. cutthroat trout core population residing in upper reaches.

FWP has prescribed the following measures for O'Keefe Creek, a closed tributary system (fish barriers prevent upstream movement from CFC):

- Improve habitat quality and connectivity within drainage. s (FWP, 2023).

Beavers Restoration Potential

- The BRAT map identified several sections along O'Keefe Creek as having "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed concern over dewatering, septic tanks, and bad stormwater in the O'Keefe Creek watershed. Concern was also expressed for the watershed, given that it is a critical connectivity zone for terrestrial wildlife. Beaver habitat may be expanding near the mouth of O'Keefe Creek. Additionally, Smurfit-Stone and its contaminants were a large concern to participants, with commentary related to berm removal being given.

3.6E Rock Creek (3 - not enough data)

Description

Rock Creek flows approximately 10 miles from its headwaters on the Bitterroot side of the northern Bitterroot Range to its confluence with the Clark Fork River. The stream is classified as a Category 3 water, meaning DEQ does not have sufficient data to fully assess its water-quality condition. FWP identifies the lower reaches as seasonally and chronically dewatered, reflecting late-summer flow loss and sensitivity to hydrologic alteration in this short, low-volume tributary.

Fishery Health Measures

FWP has described the following management activities necessary for Rock Creek:

- Limit riparian encroachment and impacts of road networks and potential residential development – particularly in perennial middle and upper reaches.
- Protect and enhance W. cutthroat trout core population residing in middle and upper reaches.

FWP has prescribed the following measures for Rock Creek, a closed tributary system (fish barriers prevent upstream movement from CFC):

- Improve habitat quality and connectivity within drainage. s (FWP, 2023).

Management Measures

Beavers Restoration Potential

- The BRAT map identified several sections along Rock Creek as having "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020).

3.6F Albert Creek (No WQ category)

Description

Albert Creek runs for 15 (contested number) miles from its headwaters in the Bitterroot Mountains through a 14.3 sq miles watershed until its confluence with the CFC, three miles south of Frenchtown, MT (USFS, 2016) on the south side of the Clark Fork River. The stream is perennial in middle and upper reaches but becomes seasonally dewatered in the lower 1-2 miles of the mainstem.

Albert Creek is home to two native fish species: genetically pure Westslope cutthroat trout and bull trout. The upstream portion of the watershed is largely undeveloped public land with roadless headwater basin, while the lower reaches flow through former industrial timberlands that have been prioritized for protection and public acquisition down to the Clark Fork River confluence (FWP Unpublished Data; USFS, 2013). Lolo National Forest manages 64.4% of the watershed, and Weyerhaeuser currently owns 30.2% of the land, but the latter land is currently listed for sale. The State of Montana owns 5.4% of the watershed (USFS, 2016).

Road culverts and irrigation diversions likely act as partial barriers to upstream fish passage, exacerbated by extending periods of dewatering and low flow conditions. In most years, there is no surface flow within the last one mile of the stream, and no connectivity to the mainstem during low flow periods. Additionally, road systems along Albert Creek likely contribute to sediment input and increased water temperatures in the tributary. To alleviate some of these impacts, the Lolo National Forest completed a restoration project in 2010 on a heavily used series of riparian campsites and unauthorized roads/trails along the creek. According to USFS (2013), the project successfully restored stream conditions, but ORV usage and dispersed camping continue to threaten site integrity and long-term project effectiveness. (USFS, 2013)

MT FWP and Trout Unlimited have both identified Albert Creek as an area of concern (Knotek et al. 2019). Specifically, the following factors as limiting the fishery in Albert Creek: excessive fine sediment inputs, elevated temperatures, channel modification, and riparian degradation. Stakeholders have also voiced concern about this tributary, due to the acquisition of land by Weyerhaeuser and need for bull trout conservation and protecting the channel from encroachment by riparian roads and future development (Knotek et. al., 2019). Albert Creek is also on MT FWP's list of Dewatered Streams for chronic dewatering (FWP, 2005; Watson, 2020).

Stream Impairments

Table 18 Albert Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

ALBERT CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Low flow alterations	No	Aquatic Life	Chronic dewatering, channel modification, culverts and diversion dams
Temperature	No	Aquatic Life	Low elevation, dewatering
Sedimentation	No	Aquatic Life	ORV access in riparian zone, road densities
Riparian degradation	No	Aquatic Life	ORV in riparian areas, road encroachment

Aquatic habitat connectivity	No	Aquatic Life	Culvert barriers, diversion dams, dewatering

Management Measures

Fishery Health Measures

Albert Creek is a native trout stronghold and core management area within the CCF Basin. USFS and FWP made the following recommendations to improve the Albert Creek Fisher to mitigate the human activities that contribute to dewatering, low-flows, and lack of connectivity:

- Install large woody debris to enhance large pool habitat and stream complexity.
- Consider beaver habitat enhancement measures or mimicry to help restore the capacity of the riparian zone to store water.
- Mitigation of the culvert barrier (completed) s and diversion dam, as well as improved management of the irrigation ditch.
- Lolo NF address Isolated off-road vehicle and unauthorized habitat degradation incidents in the riparian zone on a case-by-case basis (USFS, 2013).

FWP also prioritized the following projects in 2019:

- Address impacts of road construction and channel encroachment through improved BMPs, upgrades to infrastructure, and road re-alignment. (Knotek et al., 2019). In the upper reaches, habitat improvement efforts are recommended.

FWP has prescribed the following measures for 11.4 miles of Albert Creek, and open tributary system (fish barriers absent):

- Protect habitat and ensure connectivity with tributaries to enhance natural recruitment in areas that are native trout strongholds (FWP, 2023).

FWP Future Fisheries Projects

- TU and Lolo National Forest replaced a culvert on the main stem of Albert Creek in 2024 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified many sections along Albert Creek as having “easy-low hanging fruit” or “straight-forward- quick return “restoration or conservation opportunities (BRAT, 2020).

3.6G Mill Creek (4C - Impaired by non-pollutants)

Description

Mill Creek flows for 14 miles from its headwaters to its mouth at the CCF. The upper reach has logged areas mixed with subalpine meadows and rangeland, where riparian grazing has impacted riparian corridors and streambanks. The middle reach is a steep, heavily forested canyon, and the lower reach runs through hayfields, pastures, residential areas, and a golf course (DEQ, 2020).

Stream Impairments

Table 19 Mill Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

MILL CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside vegetative covers	NA; non-pollutant	Aquatic Life	Golf courses, grazing in riparian zones, agriculture

Management Measures

Fishery Health Measures

FWP has prescribed the following measures for 13.4 miles of Mill Creek, and open tributary system (fish barriers absent):

- Protect habitat and ensure connectivity with tributaries to enhance natural wild trout recruitment (FWP, 2023).

Trout Unlimited, FWP, and Great West Engineering installed an improved fish ladder on Mill Creek in 2019. The new steel fish ladder replaced a failing concrete ladder that was installed in the 1990s where a check dam was historically built for the local golf course's irrigation system. Missoula County has also upgraded stream crossing structures associated with road systems as part of efforts to enhance migratory fish passage.

FWP Future Fisheries Projects

- In 2000, 2003, and 2016, FWP and partners completed restoration work along Mill Creek, including a fish ladder, culvert replacements, etc. (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified several sections along Mill Creek as having "easy-low hanging fruit" restoration or conservation opportunities (BRAT, 2020).

3.6H Sixmile Creek (4C - Impaired by non-pollutants)

Description

Sixmile Creek flows for 10 miles from its headwaters to its mouth at the CCF near Huson. This drainage exhibits a range of anthropogenic impacts but is considered a watershed with high restoration potential. Observed impacts include riparian encroachment, undersized stream crossings, channel simplification, private land subdivision, etc. that have cumulatively degraded most of the system. FWP has listed Sixmile Creek as chronically dewatered in middle and lower reaches However, recent public acquisitions in the lower drainage and progress toward fish and wildlife passage improvements at I-90 (below0 have increased interest in more comprehensive restoration from public and private partners. Sixmile Creek is considered a tributary of high potential for recruitment of trout for the Clark Fork River.

Stream Impairments

Table 20 Sixmile Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

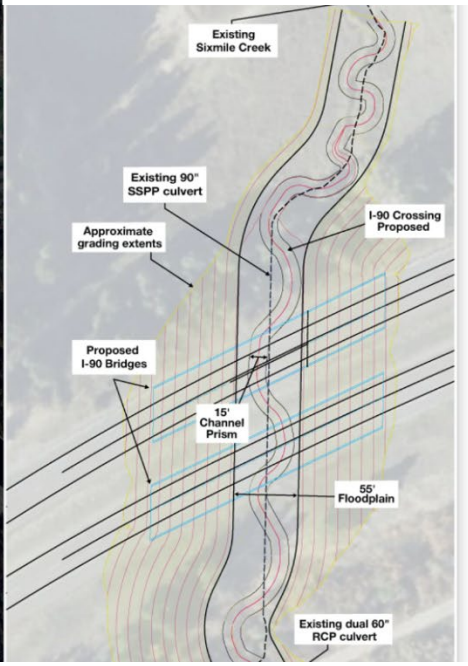
SIXMILE CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside vegetative covers	NA; non-pollutant	Aquatic Life	Rangeland grazing, silviculture activities

Management Measures

Fish and Wildlife Crossing

The Missoula Regional Connectivity Group has proposed replacing the 60-year-old Sixmile Creek culvert at Interstate-90 with two open-span bridges (for both the east and west-bound I-90 lanes). The open span bridges are intended to provide passage for a range of wildlife species in a high wildlife-vehicle

Additional aquatic enhancement projects are planned that will complement fish passage improvements at I-90, including stream crossing replacements at frontage roads and reconstruction of ~0.5 miles of Sixmile Creek upstream of the I-90 corridor.



collision zone, as well as fish passage to provide unobstructed access to Sixmile Creek (Missoula Regional Connectivity Group, 2024).

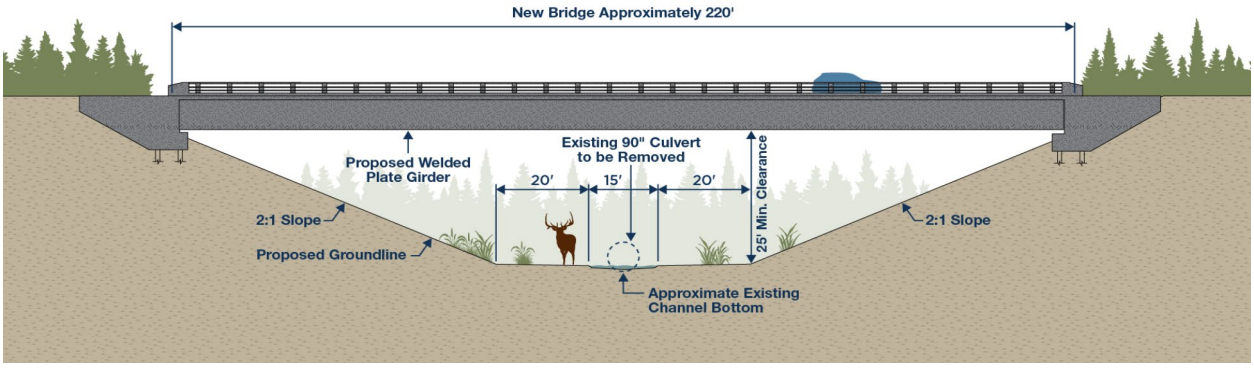


Figure 17 Proposed wetland and stream enhancement/restoration. Montana DOT 2024

Sixmile Creek Wildlife Crossing Study | Montana Department of Transportation (MDT)

Fishery Health Measures

FWP has prescribed the following measures for 8.9 miles of Sixmile Creek, and open tributary system (fish barriers absent):

- Protect habitat and ensure connectivity with tributaries to enhance natural recruitment in native and non-native trout strongholds (FWP, 2023).

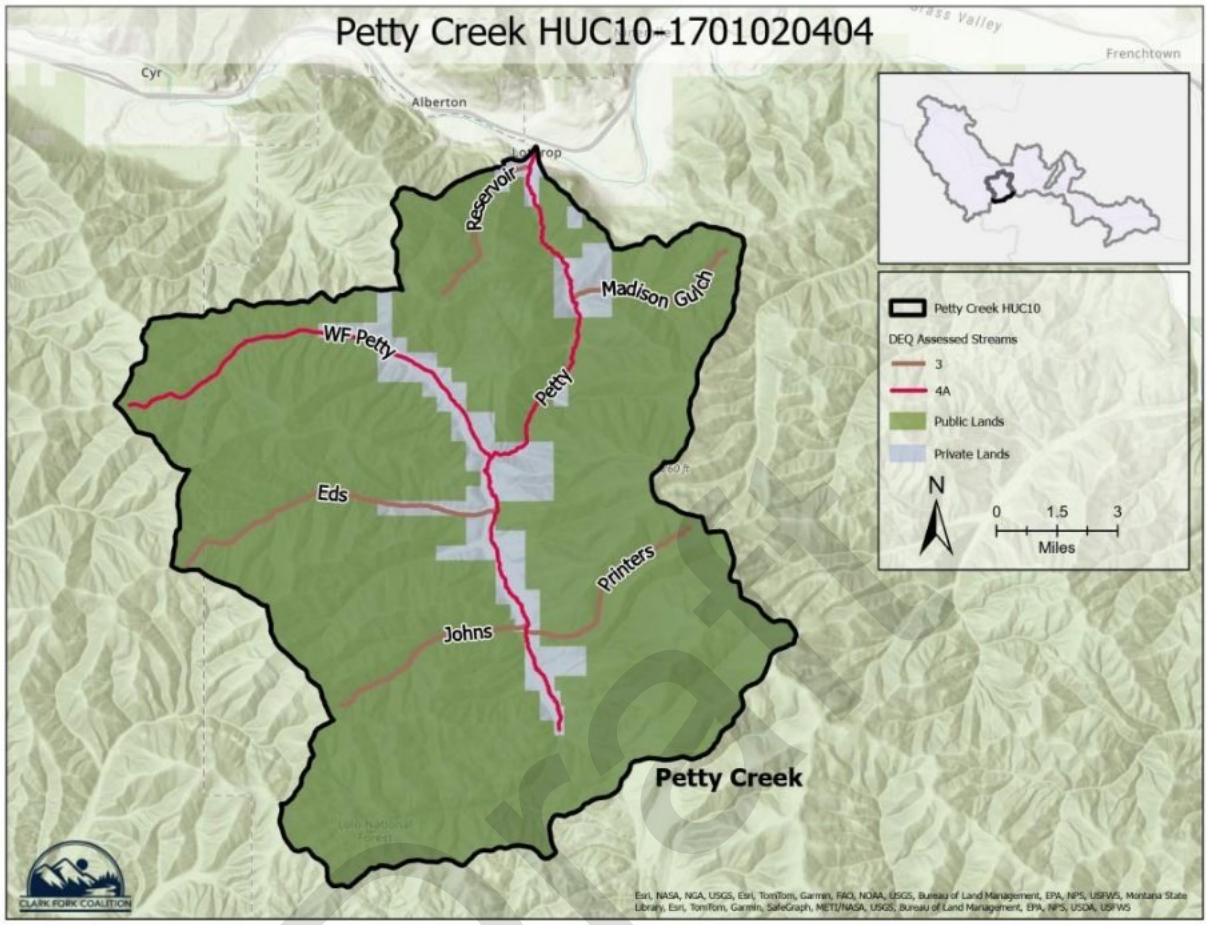
FWP Future Fisheries Projects

- Trout unlimited and the Lolo National Forest installed a fish screen on Sixmile Creek in 2011 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified several sections along Sixmile Creek as having “easy-low hanging fruit” or “straight-forward- quick return” restoration or conservation opportunities (BRAT, 2020).

3.7 PETTY CREEK HUC 10- 1701020404



Map 8: Petty Creek HUC map showing land ownership and hydrography. Note Alberton near the mouth of Petty Creek. Map by: Cloe Sliva

Petty Creek flows roughly 16 miles from its headwaters to the Clark Fork River, with several key tributaries—Johns Creek, Eds Creek, Madison Gulch, and the West Fork—entering along its middle and upper reaches. Johns, Eds, and Madison Gulch are all perennial in their upper and middle basins, and each supports high-density, non-hybridized westslope cutthroat trout, with no other fish species present. Water withdrawals for irrigation and riparian encroachment affect the lower portions of all three streams, contributing to reduced late-season flows and localized habitat degradation.

3.7A Johns Creek (3 - not enough data), Eds Creek (3), Madison Gulch (3)

Description

Johns Creek flows approximately 4 miles, **Eds Creek 6 miles**, and **Madison Gulch 3 miles** from their headwater to their confluences with Petty Creek. All three are classified as **Category 3 waters**, meaning DEQ does not have sufficient data to fully assess their water-quality condition (DEQ, 2020). The **West Fork of Petty Creek** also contributes cold, perennial flow and supports native trout habitat in the upper watershed.

Management Measures

Beavers Restoration Potential

- The BRAT map identified several sections along Johns Creek as having "easy-low hanging fruit" or "strategic- long term investment" restoration or conservation opportunities (BRAT, 2020).

3.7B West Fork, Petty Creek (4A - Impaired by pollutants)

Description

West Fork, Petty Creek, from its headwaters to confluence with mainstem Petty Creek, flows through a watershed encompassing 15 square miles. Its headwater originates at the divide between the Fish Creek and Petty Creek drainages. It flows for 8 miles to its confluence, where it joins approximately midsegment with Petty Creek. Roughly 87% of the watershed is publicly owned by USFS, and the remainer is privately owned (DEQ, 2014b).

Stream Impairments

Table 21 West Fork, Petty Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

WEST FORK, PETTY CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Chlorophyll-a	NA; non-pollutant		TP, Logging road sediment, timber harvest site runoff, septic effluent
Phosphorous (Total)	Yes, nutrients	Aquatic Life, Primary Contact Recreation	Logging road sediment, timber harvest site runoff, septic effluent
Sedimentation/siltation	Yes, sediment	Aquatic Life	Not enough data on lower portion of watershed- assuming channel incised, road encroachment, historic logging

TMDLs and Pollutant Load Reduction Goals

W.F. PETTY CREEK **Pollutant:** ***Sediments*** **Source of pollutant:**	*Current Load (tons/yr)*	*Allowable Load (tons/year)*	*% Reduction Required*
Roads	*1.6*	*0.5*	*71%*
Streambank erosion	*802.9*	*599.8*	*25%*

Upland sources	*258.4*	*201.7*	*22%*
Total	*1062.9*	*802.0*	***25% overall rdx***

W.F. PETTY CREEK **Pollutant:** ***Phosphorous*** **Source of pollutant:**	*Current Load (lbs./day) **	*Allowable Load (lbs./day) **	*% Reduction Required** **Based on growing season flow of 4.12 cfs*
Natural Background	*0.13*	*0.13*	*NA*
Silviculture/subsurface wastewater disposal	*0.74*	*0.43*	*42.4%*
Total	*0.87*	*TMDL=0.43*	***35.9% overall rdx***

Fishery Health Measures

FWP has prescribed the following measures for 8 miles of W Fork Petty Creek, and open tributary system (fish barriers absent):

- Protect habitat and ensure connectivity with tributaries to enhance natural recruitment in native and non-native trout strongholds (FWP, 2023).
- Maintain and enhance riparian corridors and fish passage through rural subdivisions.

Management Measures

Beavers Restoration Potential

- The BRAT map identified several sections along W.F Petty Creek as having “easy-low hanging fruit” or “strategic- long term investment” restoration or conservation opportunities (BRAT, 2020).

3.7C Reservoir Creek (3 – not enough data)

Description

Reservoir Creek flows for 3 miles from its headwaters to the confluence with Petty Creek. It is a category 3 water, meaning that the DEQ did not have enough data to properly assess the water quality of the creek (DEQ, 2020). This tributary is ephemeral, not fish-bearing, and likely completely captured by an irrigation system.

Management Measures

Beavers Restoration Potential

- The BRAT map identified several sections along Reservoir Creek as having “easy-low hanging fruit” or “straight-forward” restoration or conservation opportunities (BRAT, 2020).

3.7D Petty Creek (4A - Impaired by pollutants)

Description

Petty Creek, from its headwaters to mouth, flows through a watershed encompassing 88 square miles, including the West Fork sub-watershed. The mainstem flows for 12 miles to its confluence, where it joins the CCF near Alberton. Roughly 23% of the entire watershed are MT Legacy Project lands slated for USFS ownership. 31% are private lands, 22% of which is owned by Weyerhaeuser (Plum Creek Timber Co.). The remaining 69% is 2% the state of Montana, and the remainder is USFS. FWP has listed Petty Creek as chronically dewatered as a 3–4-mile middle portion is completed dry for 7-8 months every year (DEQ, 2014a; Watson, 2020) due to natura; dewatering and irrigation withdrawals.

Stream Impairments

Table 22 Petty Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

PETTY CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside/littoral vegetation covers	NA; non-pollutant		
Low flow alterations	NA; non-pollutant		Dewatering
Sedimentation/siltation	Yes, sediment	Aquatic Life	Not enough data to preclude sedimentation has been mediated- assuming road encroachment, LWD, historic timber harvesting, agriculture
Temperature, water	Yes, temperature	Aquatic Life	Historic removal of riparian vegetation, absence of shade, intermittent dewatering

TMDLs and Pollutant Load Reduction Goals

PETTY CREEK **Pollutant: *Sediments*** **Source of pollutant:**	*Current Load (tons/yr)*	*Allowable Load (tons/year)*	*% Reduction Required*
Roads	*3.7*	*1.0*	*76%*
Streambank erosion	*3016.7*	*2103.4*	*30%*
Upland sources	*2442.3*	*1607.2*	*34%*

Construction Storm Water Permit	*30.1*	*10.5*	*65%*
Industrial Storm Water Permit	*5.5*	*5.5*	*0%*
Total	*5498.3*	*TMDL= 3727.6*	***32% overall rdx***

PETTY CREEK **Pollutant:** ***Temperature*** **Source of pollutant:**	*Modeled Existing Load (kcal/sec))*	*TMDL (kcal/sec)*	*% Reduction Required** **Based on modeled naturally occurring temperature at the mouth of Petty Creek during a hot summer with low flow of 22.2 cfs*
Natural and human sources that influence temperature	*6,600*	*6,181*	***6% overall rdx***

Management Measures

Fishery Health Measures

High-priority projects for Petty Creek identified by FWP include:

- Mitigating dewatering, riparian encroachment by roads, and other road impacts (Knotek et al., 2019).

According to the DEQ (2014a), USFS (Wade et. al., 2016) and USFS (2013), the lack of aquatic connectivity, lack of pools, and flow regime modification and simplification, dewatering, and riparian degradation, as well as nutrient pollution, sedimentation, elevated temperature should be addressed in the following ways:

- Riparian restoration projects and development of cooperative riparian management plans.
- Employment of all reasonable land, soil, and water conservation practices.
- Removal of culverts and other barriers impeding fish passage, where applicable.
- Addition of large woody debris to enhance instream habitat complexity where applicable.
- Removal and/or relocation of riparian roads; address/limit new road building.
- Review of irrigation systems and practices; development of irrigation management plans to restore minimum instream flows through improving irrigation efficiency and other methods.
- Development of nutrient management plans and reduction of sedimentation and total phosphorus inputs from silviculture runoff and wastewater disposal.
- Mitigate substantial past and proposed timber management activities.

FWP has prescribed the following measures for 4.3 miles of Petty Creek, and open tributary system (fish barriers absent):

- Protect habitat and ensure connectivity with tributaries to enhance natural trout recruitment and life-history expression (FWP, 2023)

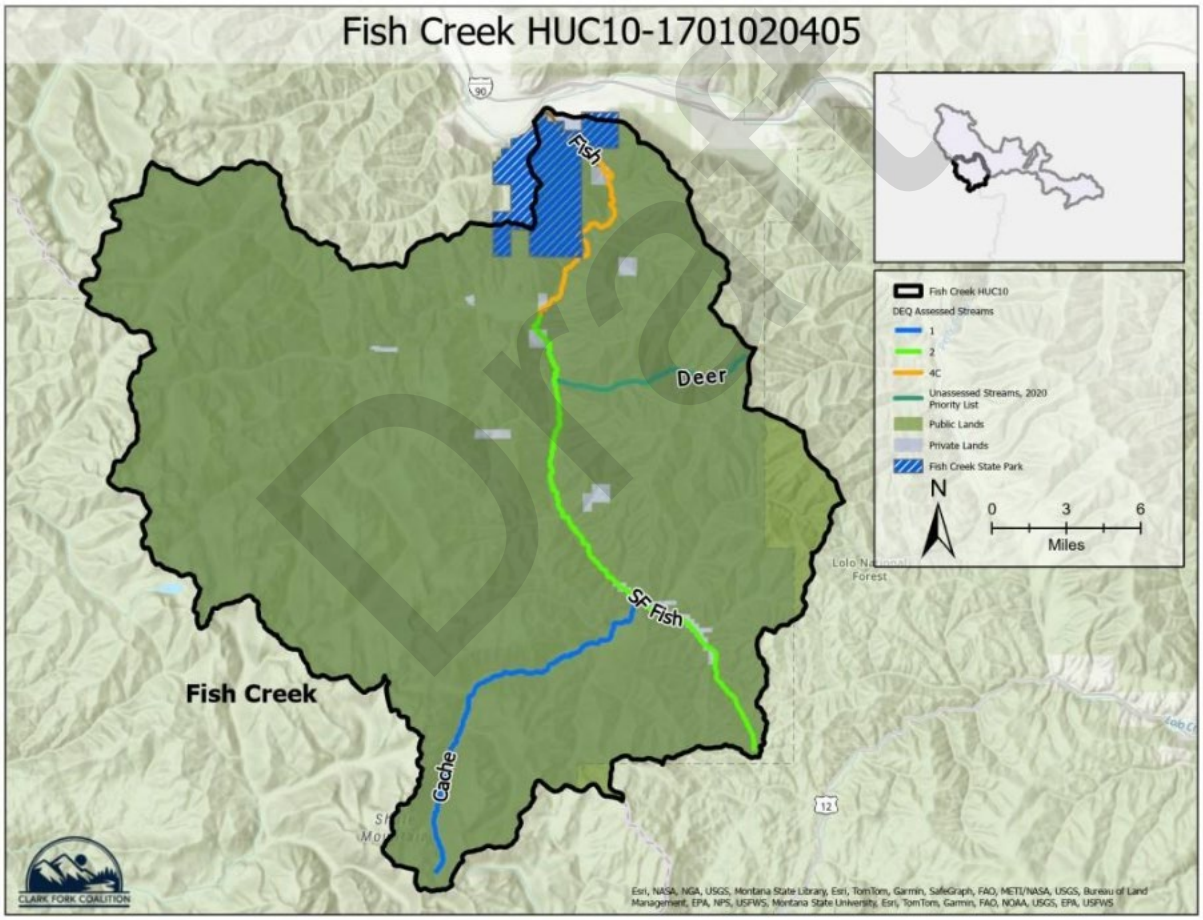
Beavers Restoration Potential

- The BRAT map identified limited areas along Petty Creek as having “strategic- long term investment” restoration or conservation opportunities (BRAT, 2020).
- The Missoula County CD is considering measures to collaborate with landowners in Petty Creek to implement BDAs in Petty Creek’s floodplain; TU is currently doing LIDAR studies to assess feasibility (Paul Parson, pers. comm.).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed interest in beaver restorations in Petty Creek’s floodplain, due to abundance of public lands and wide riparian zone. Other responses b=mentioned concern over persistent road conflicts with beavers.

3.8 FISH CREEK HUC 10-1701020405



Map 9: Fish Creek HUC map showing land ownership and hydrography. Map by: Cloe Sliva

3.8A Cache Creek (1 – Water quality is sufficient)

Description

Cache Creek flows for 12 miles from its headwaters to the confluence with the South Fork of Fish Creek. Its watershed is almost entirely on Lolo National Forest’s lands within the roadless Great Burn proposed

Wilderness area. Approximately 20-30 acres near the mouth of the stream are privately owned. It is one of the few category 1 waters in the CCF, meaning that in its most recent assessment, the DEQ found that the creek's WQ is sufficient for all designated uses. In an older DEQ assessment, the creek was noted as supporting a currently viable population of migratory bull trout, stable stream banks, cold thermal regime, natural channel morphology, clean substrate, functional riparian zones, and excellent water quality. Cache Creek is considered one of the most important spawning tributaries for bull trout in the CCF (DEQ, 2020). Subsequent sampling and assessment by FWP supported these and other intact natural resource values for the watershed (Knotek et al. 2025).

Management Measures

Fishery Health Measures

- Trout Unlimited and the Lolo National Forest decommissioned a road system in upper Montana Creek, a tributary of lower Cache Creek, reducing cumulative sediment inputs and failure risk to help improve and protect water quality and fishery values of Cache Creek.

Beavers Restoration Potential

- The BRAT map identified many sections along Cache Creek as having "easy-low hanging fruit" or "strategic- long term investment" restoration or conservation opportunities (BRAT, 2020).

Minimize Intervention Impacts

- As the Cache Creek watershed is in good health overall, any management measures that would disturb the existing condition or lead to direct or cumulative impacts should be carefully considered.

3.8B Fish Creek (4C - Impaired by non-pollutants)

Description

Fish Creek is a large, Middle Clark Fork tributary watershed (199 sq miles) that lies near the Idaho-Montana border in west-central Montana. The drainage lies predominantly in Mineral County, and its confluence with the Clark Fork River is approximately 2 miles southeast of Tarkio, MT. Impaired segments of the creek include the West and South Forks to their confluences well as the lower main stem and several tributaries that enter these reaches (DEQ, 2020). In 2010, Fish Creek State Park and the Fish Creek Wildlife Management Area were established, in collaboration with The Nature Conservancy, by purchasing large tracts of private corporate timber lands and converting them to public ownership. The Fish Creek watershed is largely managed by the Lolo NF, FWP, and DNRC (MNH Map Viewer). A USFS report from 2016 and summary by FWP (Knotek 2025) provide a detailed land ownership breakdown by sub-watershed. (USFS, 2016).

The greater Fish Creek drainage is the most intact sub-basin within the middle Clark Fork region and, as a result, is the most important native trout stronghold in the Central Clark Fork project area. Native fish species in Fish Creek include migratory bull trout, migratory and stream resident Westslope Cutthroat trout (WCT), mountain whitefish and sculpins, as well as introduced brook trout, brown trout and rainbow trout (Knotek et al., 2025; Knotek et al., 2003 and MTFWP unpublished data). Additionally, the

Fish Creek drainage is a very high-priority linkage zone for species such as grizzly bear, Canada lynx, and wolverine, and provides significant winter range and other seasonal habitats for many other wildlife (FWP, 2010).

Intensive logging, road building, and major fires have severely degraded habitat in the South Fork, lower mainstem, and lower tributaries of the Fish Creek watershed. Historic log drives and riparian logging destroyed logjams and aquatic habitat, while sediment from tributaries and infrastructure like the Fish Creek road network have led to channel instability and high sediment loads. Despite some natural recovery, recent land acquisitions, and major road remediation and decommissioning efforts (Knotek et al 2025), the lower watershed remains heavily impaired relative to headwater reaches. Agencies including MT FWP, MT DEQ, and USFS have identified Fish Creek and its tributaries as high-priority restoration sites due to its high inherent native fisheries value, physical habitat alterations, sedimentation, and riparian degradation. Many sections are still considered "Functioning at Risk" or worse (DEQ, 2020; Knotek et al 2003; USFS 2013; Watson, 2020)

Stream Impairments

Table 23 Fish Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

FISH CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Temperature	No	Aquatic Life	Road development, timber harvesting, reduction in shade, shallow water
Barriers	No	Aquatic Life	Culverts and stream crossings
Pools	No	Aquatic Life	Lack of LWD, high road densities, overly simplified stream
Sediment	No	Aquatic Life	High road density

Management Measures

Fishery Health Measures

USFS (Wade et. al., 2016) and FWP list the following additional possible actions to improve aquatic conditions and support native l trout populations include:

- Restoring riparian conditions so that a healthy overhead canopy and buffer zone can be re-established.
- Regenerate the riparian buffer to the point where large trees provide shade and structure within the stream management zone. USFS (Wade et. al., 2016)
- Significant additions of large woody debris to increase large, deep pool habitats.
- Removing any remaining culverts and/or fish passage barriers.

- Reducing road densities (prioritizing those within 300 feet of the stream) (USFS, 2013).
- FWP's high-priority projects on Fish Creek include (Knotek 2025):
- Upgrading and installing proper BMPs.
- Mitigating road impacts, decommissioning roads, replacing and upgrading stream crossings, enhancing riparian buffers. USFS (Wade et. al., 2016)
- Replicating historic instream habitat complexity. USFS (Wade et. al., 2016)
- Purchasing private land in-holdings (Knotek et al., 2019) and conversion to public ownership.
- Protecting existing roadless headwater conditions
- In FWP's 2024 Fish Creek Recreation Management Strategy, FWP lists the following management intents related to water quality:
- Assess recreational floating, user conflicts, and the alteration of fish habitat and woody debris (FWP, 2024).

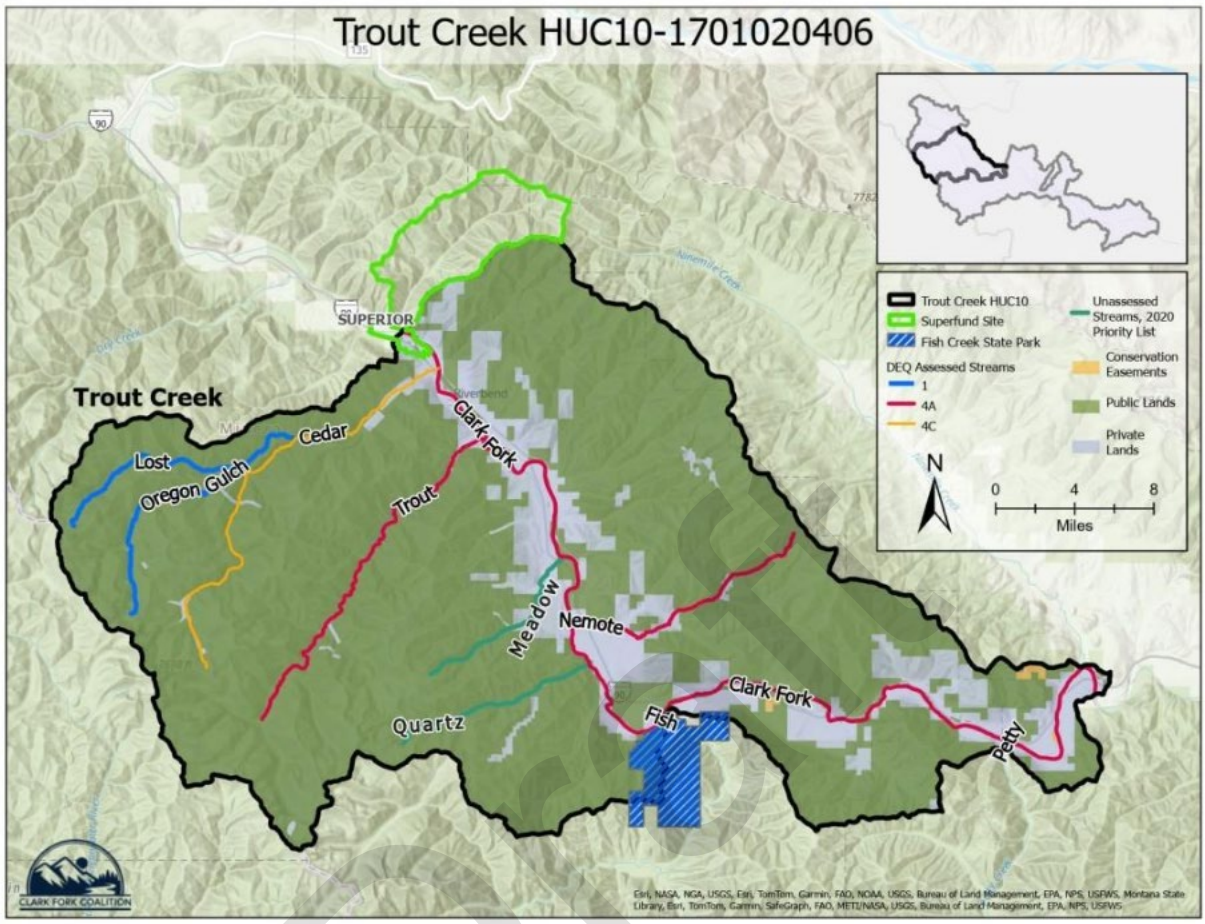
Beavers Restoration Potential

- The BRAT map identified several sections along Fish Creek as having "easy-low hanging fruit" or "straight forward- quick return" restoration or conservation opportunities (BRAT, 2020).
- Fish Creek has been a priority area for beaver restoration and conservation for decades per FWP management direction and as trapping in the drainage has been prohibited.

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed interest in an opportunity to expand a LTPBR on Deer Creek/Lower Fish Creek, given that existing beaver populations are taking advantage of abundant riparian vegetation and the drainage being closed to beaver trapping.

3.9 TROUT CREEK HUC 10-1701020406



Map 10: Trout Creek HUC map showing land ownership and hydrography. Map by: Cloe Sliva

3.9A Quartz Creek (No WQ category)

Quartz Creek flows from the Bitterroot side of the northern Bitterroot Range into the Clark Fork corridor, draining a steep, forested watershed before entering a more developed lower valley in Mineral County. DEQ has **no assigned water-quality category** for the creek due to insufficient data for formal assessment. **FWP identifies many sections of the stream corridor as impacted by intensive historic mining and ongoing private development**, which have altered riparian conditions, contributed sediment, and reduced habitat quality in lower reaches. The upper watershed remains more intact, but the cumulative effects of mining legacies and corridor development continue to influence channel stability and aquatic habitat.

Management Measures

FWP has prescribed the following measures for 1.7 miles of Quartz Creek, a closed tributary system (fish barriers prevent upstream movement from CFC):

- Improve habitat quality and connectivity within drainages, maintain fish passage barriers (FWP, 2023).
- Improve and sustain habitat for nonhybridized W cutthroat trout conservation population (FWP, 2023).
- Maintain riparian buffers and channel integrity through private lands and mining claims. USFS (Wade et. al., 2016)

Beavers Restoration Potential

- The BRAT map identified several sections along Quartz Creek as having "easy-low hanging fruit", "strategic- long term investment", or "straight-forward- quick return" restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed concern over damages to streambeds and riparian areas from contemporary mining operations on Quartz Creek.

3.9B Nemote Creek (4A - Impaired by pollutants)

Description

Nemote Creek, from its headwaters to mouth, runs through a watershed encompassing 31 sq mi. Its headwaters south of the Ninemile Divide in Lolo National Forest, flows for 10 miles until its confluence with the CCF, three miles northeast of Tarkio. Roughly 82% of the watershed is publicly owned – 56% by USFS, 26% by MT FWP, and 1% by is Montana State trust Lands. The remaining 17% is privately owned. Nemote Creek is on FWP's list of chronically dewatered streams (DEQ, 2014a). Middle portions of the drainage on mainstem (below upper Forks) are chronically dewatered.

Stream Impairments

Table 24 Nemote Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

NEMOTE CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Chlorophyll-*a*	NA; non-pollutant		Chronic dewatering, crop production, riparian grazing, septic effluent
Low flow alterations	NA; non-pollutant		

Nitrogen (Total)	Yes, nutrients	Aquatic Life, Primary Contact Recreation	Chronic dewatering, crop production, riparian grazing, septic effluent
Phosphorous (Total)	Yes, nutrients	Aquatic Life, Primary Contact Recreation	Chronic dewatering, crop production, riparian grazing, septic effluent, logging road sediment, timber harvest site runoff
Temperature, water	Yes, temperature	Aquatic Life	Chronic dewatering, historic removal of riparian vegetation, absence of shade

TMDLs and Pollutant Load Reduction Goals

NEMOTE CREEK **Pollutant: Nitrogen/Phosphorous Source of pollutants:**	*Current Load (lbs./day)*	*Allowable Load (lbs./day)*	*% Reduction** **Based on growing season flow of 5.22 cfs*
Background	1.16 TN/ 0.17 TP	1.16 TN/ 0.17 TP	NA
Ag & Silviculture	14.06 TN/ 0.65 TP	6.6 TN/ 0.53 TP	53.1%/ 17.4%
Total	15.66 TN/ 0.82 TP	TMDL= 7.76 TN/ 0.70 TP	**49.1%/ 13.8% overall rdx**

NEMOTE CREEK **Pollutant: *Temperature*** **Source of pollutant:**	*Modeled Existing Load (kcal/sec))*	*TMDL (kcal/sec)*	*% Reduction Required** **Based on the modeled naturally occurring maximum temperature at river mile 2.8 during a hot summer with low flow (2.2 cfs).*
Natural and human resources that influence temperature	*1,371*	*1,104*	***19% overall rdx***

Management Measures

Fishery Health Measures

FWP has prescribed the following measures for 9.8 miles of Nemote Creek, and open tributary system with isolated reaches in headwaters (e.g., fish passage barrier presents on South Fork

- Protect habitat and ensure connectivity with tributaries to enhance natural recruitment in areas that are not native trout isolate strongholds (FWP, 2023).

- Protect and enhance WCT conservation population on South Fork Nemote.

The DEQ prescribes the following surrogate allocations to reduce temperatures on Nemote Creek:

- Improve and maintain a 50-foot riparian buffer zone.
- Improve and maintain vegetation providing effective shade.
- Prevent over-widening of stream due to human-caused sources.
- Application of all reasonable land, soil, and water conservation practices for human sources that could influence stream temperatures, including those affecting riparian shade, channel width, and instream flow (DEQ, 2014).

FWP Future Fisheries Projects

- FWP installed a fish screen on South Fork Nemote Creek in 2011 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified limited sections along Nemote Creek as having "strategic- long term investment" or "straight-forward-quick return" restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed knowledge of landowner interest in wetland and beaver restorations in the Nemote Creek watershed. Long term residents report a historical large wetland complex in the watershed.

3.9C Meadow Creek (No WQ category)

Description

FWP has listed Meadow Creek as chronically dewatered and fishless.

Management Measures

- The BRAT map identified limited sections along Meadow Creek as having "strategic- long term investment" or "straight-forward-quick return" restoration or conservation opportunities (BRAT, 2020).

3.9D Trout Creek (4A - Impaired by pollutants)

Description

Trout Creek, from its headwater to mouth, includes a watershed encompassing 71 sq mi. that flows for 15 miles from the confluence with the North Fork and South Forks in the headwaters of Trout Creek. It meets the CCF 4.5 miles southeast (just upstream) of Superior. The vast majority (98.5%) of the watershed is managed by USFS, and the remaining 1.5% is controlled by private landowners (DEQ, 2014). Private ownership is concentrated near the mouth and among several former patented mining claims scattered in the upper watershed. Current private land use near the mouth of Trout Creek is characterized as timber harvest/wood products manufacturing (DEQ, 2014a).

The Trout Creek Watershed was heavily logged in the late 1800s through the early 1900s, which has led to dramatic oversimplification of riparian habitat. More than 140 years of placer mining has resulted in a loss of large woody debris and instream complexity, unstable banks, high width-to-depth ratios, and poor riparian health. Current mining practices supplement and continue identified impacts (USFS 2013).). More logging and road construction in recent years has increased sediment input and cumulative watershed impacts and more current activities have resulted in an overly widened, overly simplified stream system lacking large complex pool habitat and overall instream complexity (USFS, 2013; Watson, 2020).

Stream Impairments

Table 25 Trout Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

TROUT CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside/littoral vegetation covers	NA; non-pollutant	Aquatic Life	
Physical substrate habitat alterations	NA; non-pollutant	Aquatic Life	
Turbidity	Yes, sediment	Aquatic Life	Wet weather NPS discharge (organic solids and sawmill leachate), silviculture activities, historic logging, lack of LWD

TMDLs and Pollutant Load Reduction Goals

Turbidity

One source of turbidity in Trout Creek arises from tannic acids from a discharge pond at a sawmill site near the mouth of the creek. Although the mill production facilities changed in the 1990s, potential sources of tannic acids remain in the floodplain (DEQ, 2014a). No actual data was available for Trout Creek, so a formal assessment could not be made. As such, allocations are provided but estimated load reductions are not. Modeling of a surrogate creek determined that the creek was currently functioning and supporting all beneficial uses at sediment yields of 68% above the natural background levels. The DEQ recommends that Trout Creek should be within 5 NTUs of natural conditions.

Management Measures

Fishery Health Measures

USFS and FWP prescribed the following as impactful and feasible management measures:

- Mitigating road impacts, including narrowing and relocating roads and installing and properly maintaining road Best Management Practices (BMPs); obliteration, seasonal closures, out sloping, and other methods could be applied to hillside roads to mitigate their impact.

- Restoring riparian vegetation, planting along roads in valley bottom to enhance riparian buffer zones.
- Adding large woody debris to improve fishery quality, pool habitat, and overall instream complexity.
- Review inactive mining claims and pursue mine site reclamation to restore conditions along the tributary (USFS, 2013).

FWP has also prescribed the following measures for 14.7 miles of Trout Creek, and open tributary system (fish barriers absent):

- Protect habitat and ensure connectivity with tributaries to enhance natural recruitment in areas that represent wild and native trout strongholds (FWP, 2023)

FWP Future Fisheries Projects

- FWP, the Lolo National Forest and partners completed instream habitat enhancements (LWD) on Trout Creek in 2010 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified several sections along Trout Creek as having "easy-low hanging fruit", "strategic- long term investment", or "straight-forward-quick return" restoration or conservation opportunities (BRAT, 2020).

3.9E Lost Creek (1 – water quality is sufficient)

Description

Lost Creek flows for 8 miles from its headwaters to its confluence with Oregon Gulch. Over 99% of the drainage is publicly owned and managed by the Lolo National Forest, with the exception of one small sliver of private land near the confluence with Oregon Gulch. There is one active gold mine within the drainage. Lost Creek is one of the few category 1 waters in the CCF, meaning that in its most recent assessment, the DEQ found that the creek's WQ is sufficient for all designated uses. The DEQ's 2004 assessment of Lost Creek describes the majority of the creek as being in very good health: a healthy riparian zone with diverse and undisturbed vegetation, woody debris, stream complexity, and substrate habitat (DEQ, 2020). Although the stream is naturally intermittent in some reaches, it still represents a core area for bull trout and W. cutthroat trout.

Management Measures

Beavers Restoration Potential

- The BRAT map identified several sections along Lost Creek as having "easy-low hanging fruit", "strategic- long term investment", or "straight-forward-quick return" restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed concern over damages to streambeds and riparian areas from contemporary mining operations on Lost Creek.

3.9F Oregon Gulch (1) combine with Cedar Creek

Description

Oregon Gulch flows for 11 miles from its headwaters to its confluence with Cedar Creek. Over 98% of the drainage is publicly owned and managed by the Lolo National Forest. Private lands are concentrated in the lower watershed along the lower mainstem corridor. Five Valleys Land Trust owns a conservation easement with a 47-acre parcel. There are several placer mines present in Oregon Gulch, and there are several sheds and tailings ponds below the confluence with Lost Creek. It is one of the few category 1 waters in the CCF, meaning that in its most recent assessment, the DEQ found that the creek's WQ is sufficient for all designated uses. A 2004 DEQ assessment describes excellent water quality, a healthy riparian zone, good stream complexity, and areas that were disturbed by mines having been reclaimed by vegetation (DEQ, 2020), but channels remain in relocated alignments. The stream also represents a core area for bull trout and W. cutthroat trout within the greater Cedar Creek drainage.

Management Measures

Beavers Restoration Potential

- The BRAT map identified several sections along Oregon Gulch as having "easy-low hanging fruit", "strategic- long term investment", or "straight-forward-quick return" restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed concern over damages to streambeds and riparian areas from contemporary mining operations on Oregon Gulch.

3.9G Cedar Creek (4C - Impaired by non-pollutants)

Description

Cedar Creek flows for 17 miles from its headwaters to its mouth at the CCF and includes three major upper tributary sub-basins (Upper Cedar Lost Creek and Oregon Gulch) that combine to form the lower six miles of the Cedar Creek mainstem. The majority of the Cedar Creek watershed is publicly owned and managed by the Lolo National Forest. However, several historic patented mining claims have been converted to private in-holdings along portions of both forks and most of the lower two miles of the mainstem is privately owned.,. The creek's history of intensive mining started in the 1870s. There are still numerous mines, some of which are still active, in the upper watershed. The lower three miles of Cedar Creek are considered chronically dewatered by FWP (DEQ, 2020), with the exception of the 0.5 miles immediately above the mouth.

Cedar Creek is an important cold-water fishery and native trout stronghold in this section of the Clark Fork River. The stream supports a viable migratory bull trout population and high densities of migratory W. cutthroat trout. Accordingly, this drainage has been a focus area for aquatic restoration activities and public land acquisitions.

Stream Impairments

Table 26 Cedar Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

CEDAR CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Flow regime modification	NA; non-pollutant	Aquatic life	Water diversions, roads

Management Measures

Fishery Health Measures

In 2006, a collaborative project led by Five Valleys Land Trust, Montana FWP, the Lolo National Forest, and many private conservation partners converted 5.5 miles of the lower Cedar Creek mainstem corridor to public ownership. This project involved > 200 acres of a series of private, patented mining claims that include the stream channel and riparian corridor that was purchased and converted to public (USFS) ownership.

Over the last six years, Trout Unlimited, in collaboration with the Lolo National Forest, completed major enhancement efforts along lower Cedar Creek that mitigated USFS timber management activities in the upper watershed. These projects included:

- Relocation of > 1 mile of riparian road away from the stream corridor in several locations.
- Reconnection of the creek to the floodplain where the road once was.
- Revegetation of newly constructed floodplain with native vegetation.
- Installation of log jams and large woody debris in most portions of the project reaches.
-

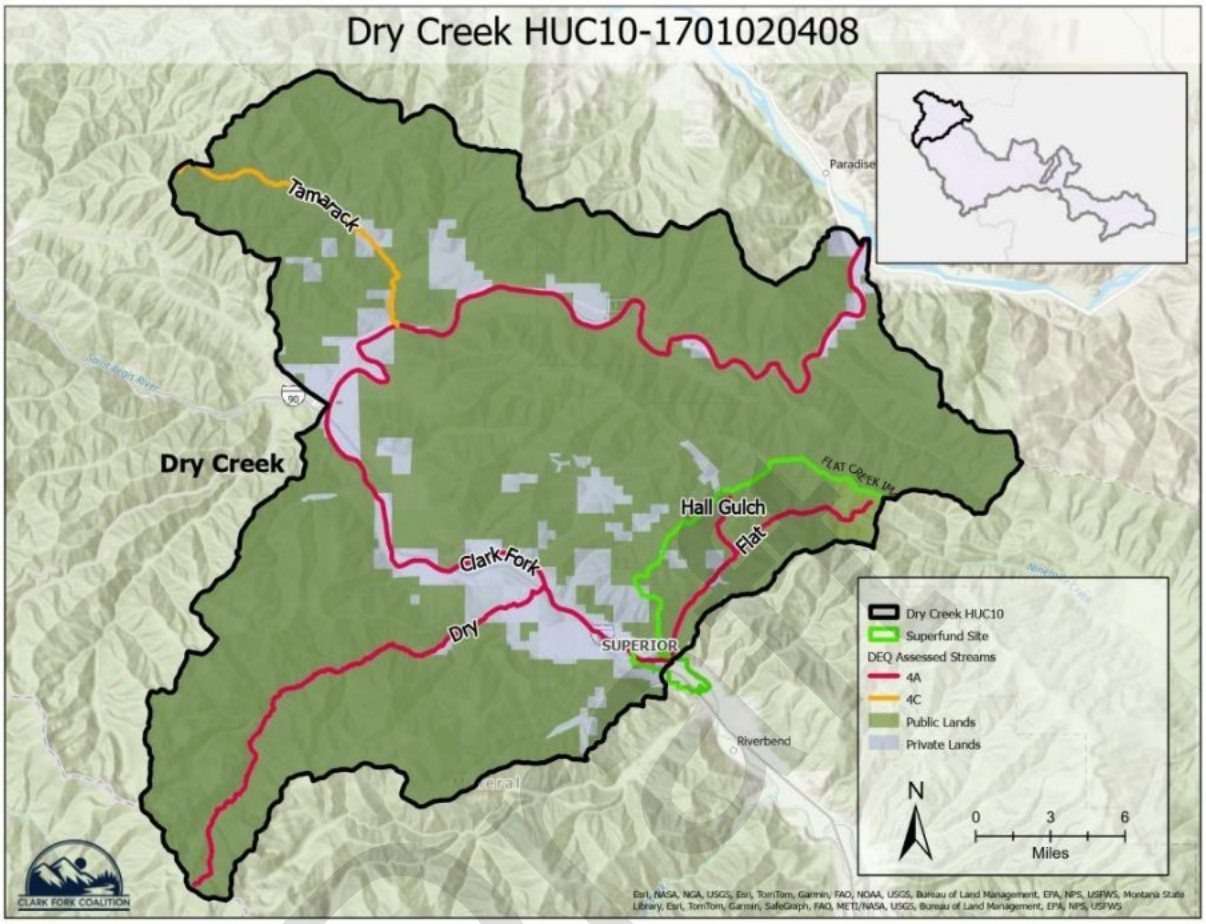
Beavers Restoration Potential

- The BRAT map identified several sections along Cedar Creek as having “strategic- long term investment”, or “straight-forward-quick return” restoration or conservation opportunities (BRAT, 2020).

2025 Stakeholder Meeting Recommendations

- At the 2025 stakeholder meeting for the CCF WRP, some comments expressed concern over damages to streambeds, riparian areas, and sedimentation from contemporary mining operations on Cedar Creek.

3.10 DRY CREEK HUC 10-1701020408



Map 11: Dry Creek HUC map showing land ownership and hydrography. Map by: Cloe Sliva

3.10A Hall Gulch (4A - Impaired by pollutants)

Description

Hall Gulch, from its headwaters to mouth, flows intermittently for 2 miles before its confluence with Flat Creek. The tributary drainage of Hall Gulch includes the Bell of the Hills and Dillon mines, both listed as a Montana Priority Abandoned Mine (DEQ, 2013).

Stream Impairments

Table 27 Hall Gulch, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

HALL GULCH	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Causes of Impairment			

Antimony	Yes, metals	Drinking Water	Abandoned Iron Mountain Mine and Mill, adit discharge, Belle of the Hills mine, Dillon mill
Arsenic	Yes, metals	Aquatic Life, Drinking Water	Abandoned Iron Mountain Mine and Mill, adit discharge, Belle of the Hills mine, Dillon mill
Iron	Yes, metals	Aquatic Life	Abandoned Iron Mountain Mine and Mill, adit discharge, Belle of the Hills mine, Dillon mill
Lead	Yes; metals	Aquatic Life, Drinking Water	Abandoned Iron Mountain Mine and Mill, adit discharge, Belle of the Hills mine, Dillon mill
Zinc	Yes, metals	Aquatic Life, Drinking Water	Abandoned Iron Mountain Mine and Mill, adit discharge, Belle of the Hills mine, Dillon mill

TMDLs and Pollutant Load Reduction Goals

HALL GULCH* Pollutant: *Metals	*Current Load (µg/L)*		*Target Load (µg/L)*		*TMDL (lbs./day)*		*% Reduction Required*	
	High flow	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***
Antimony	*18*	*37*	*6*	*6*	*0.003*	*0.003*	***67%***	***84%***
Arsenic	*31*	*317*	*10*	*10*	*0.005*	*0.005*	***68%***	***97%***
Iron	*3,280*	*1,100*	*1,000*	*1,000*	*0.540*	*0.540*	***70%***	***9%***
Lead	*0.7*	*22.7*	*18.58*	*18.58*	*0.010*	*0.010*	***0%***	***18%***
Zinc	*2,160*	*5,310*	*387.83*	*387.83*	*0.209*	*0.209*	***82%***	***93%***

Management Measures

The leaking adit causing the metals pollution in Hall Gulch is being closely monitored by the DEQ. No other remediation actions are required at this time.

No known fish presence in Hall Creek.

3.10B Flat Creek (4A - Impaired by pollutants)

Description

Flat Creek, from its headwaters to mouth, runs through a watershed encompassing 46 sq mi, and flows for 8 miles until its confluence with the CCF, at Superior, MT. Roughly 88% of the watershed is publicly owned by USFS; the State of Montana owns 6%, and local government 0.3%. The remaining 5% is privately owned. Flat Creek is significantly impacted by historic mining activities and remnant mine tailings, impairing both aquatic life and drinking water (DEQ 2014a).

The Flat Creek Iron Mountain Mine (FC IMM) operated from 1909 to 1930, and 1947 to 1953. Mine waste was left near the creek and washed by flooding down the creek to its confluence with the Clark Fork River. In addition, mine waste was used as fill in Superior, contaminating public & private property. The resulting soil, groundwater, and surface water contamination led the EPA to place the site on the Superfund National Priorities List in 2009 (EPA 2011, 2018). Prior to national Superfund designation, the MT DEQ placed the site on Montana's State Superfund List. Starting in 2002, EPA conducted a series of contaminated soil removals, using a variety of repositories, finally placing the materials in a permanent repository in 2013 (EPA, 2018).

The DEQ, USFS, and TU, in cooperation with the Montana Environmental Trust Group (METG), have begun cleanup efforts in the Flat Creek Watershed (OU2), including the removal of Flat Creek streamside tailings. The DEQ and the USFS used funding obtained through the ASARCO Bankruptcy to remove the mine wastes from those areas where they post the greatest threat to the stream. (EPA 2018). The USFS is projected to finish their floodplain cleanup projects on their property in the summer of 2025, and the EPA is preparing to begin their remedial investigation for OU2. Despite the recent and drastic remediation and restoration work done on Flat Creek, there is no up-to-date WQ information available (as of June 2025). Additionally, several sections of Flat Creek are vulnerable to flooding events, similar to the 10-year event in 2018 that destroyed some of the restored reaches. These events may lead to severe downcutting of the channel in vulnerable reaches, undermining completed restoration projects and contributing to sediment impairments in Flat Creek and the Clark Fork River (Paul Parson, pers. comm).

Stream Impairments

Table 28 Flat Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

FLAT CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Physical substrate habitat alterations	NA; non-pollutant		
Sedimentation/siltation	Yes, sediment	Aquatic Life	Historic logging, aggraded tailing deposits on

			streambanks, road encroachment
Antimony	Yes, metals	Drinking Water	Abandoned Iron Mountain Mine and Mill, adit discharge
Arsenic	Yes, metals	Drinking Water	Abandoned Iron Mountain Mine and Mill
Cadmium	Yes, metals	Aquatic Life	Abandoned Iron Mountain Mine and Mill
Lead	Yes, metals	Aquatic Life, Drinking Water	Abandoned Iron Mountain Mine and Mill
Mercury	Yes, metals	Drinking Water	Abandoned Iron Mountain Mine and Mill
Zinc	Yes, metals	Aquatic Life	Abandoned Iron Mountain Mine and Mill

TMDLs and Pollutant Load Reduction Goals

FLAT CREEK **Pollutant: *Sediments*** **Source of pollutant:**	*Current Load (tons/yr)*	*Allowable Load (tons/year)*	*% Reduction Required*
Roads	*0.6*	*0.2*	*71%*
Streambank erosion	*517.7*	*435.2*	*16%*
Upland sources	*118.2*	*107.6*	*9%*
Total	*636.5*	*543.0*	***15% overall rdx***

FLAT CREEK **Pollutant: *Metals***	*Current Load (µg/L)*		*Target Load (µg/L)*		*TMDL (lbs./day)*		*% Reduction Required*	
	High flow	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***	***High flow***	***Low flow***
Antimony	*39*	*37*	*6*	*6*	*1.180*	*0.071*	***85%***	***84%***
Arsenic	*45*	*7*	*10*	*10*	*1.967*	*0.118*	***78%***	***0%***

Cadmium	*2.51*	*0.92*	*0.36*	*0.41*	*0.071*	*0.005*	***86%***	***55%***
Lead	*498*	*14.6*	*5.20*	*6.58*	*1.023*	*0.077*	***99%***	***55%***
Mercury	*0.425*	*0.009*	*0.05*	*0.05*	*0.010*	*0.001*	***88%***	***0%***
Zinc	*560*	*160*	*166.07*	*194.37*	*32.66*	*2.288*	***70%***	***0%***

Management Measures

Despite an extensive mining history and remaining large scale impacts, Flat Creek supports a viable Westslope cutthroat trout conservation population. This 'protected' population occurs primarily upstream of intensively mined reaches on USFS ownership and represents a significant, nonhybridized tributary population that is isolated from hybridization by the barrier at the mouth.

Fishery Health Measures

The DEQ recommends:

- Stabilizing eroding stream banks in middle portions of Flat Creek.
- Reducing sediment loading from roads (DEQ, 2014a).

FWP has prescribed the following measures for 7.4 miles of Flat Creek, a closed tributary system (fish barriers prevent upstream movement from CFC):

- Improve habitat quality and connectivity within the upper basin, maintain the upstream fish passage barrier at the mouth (FWP, 2023).

Metals Management

- 2016-2017: Montana Department of Environmental Quality (DEQ) and the United States Forest Service (USFS) conducted a removal action, removing tailings present within the Flat Creek floodplain on Montana Environmental Trust Group property and USFS administered lands.
- 2022 – current: USFS and TU conducted additional removal of tailings present within the Flat Creek floodplain on the remaining portions of USFS administered lands. TU restored the riparian areas and floodplain function in the reaches they did remedial actions on.
- EPA is working towards beginning a Remedial Investigation of the remaining contamination within OU2. This will include investigating the extent of any remaining contaminated solid media (tailings piles, floodplain tailings, etc.), sediment, surface water, and groundwater. They will use this information to determine what risks these contaminated media may pose to both human and ecological health. Then, we will continue through the superfund process to eventually continue any cleanup work that may be required, based on our investigations.

Once the watershed is ready for EPA-led restoration projects, ideally stream channels should be restored to the stream channel type indicated in the CCF Tributaries TMDL – B4 channel for upper and middle Flat Creek, and C4 channel for the lower reach (DEQ, 2014b)

Beavers Restoration Potential

- The BRAT map identified several sections along Trout Creek as having "easy-low hanging fruit", "strategic- long term investment", or "straight-forward-quick return" restoration or conservation opportunities (BRAT, 2020).

3.10C Dry Creek (4A - Impaired by pollutants)

Description

Dry Creek, from its headwater to mouth runs through a watershed encompassing 44.6 sq mi. Its headwaters originate in the Bitterroot Mountain Range along the Montana-Idaho border. It flows 16 miles to its confluence with the CCF, four miles west of Superior, Montana. Roughly 96% of the watershed is owned by the USFS, and the remainder is privately owned. FWP has listed Dry Creek as chronically dewatered (DEQ, 2014a), with most intermittent reaches occurring along the lower 2-3 miles of the mainstem.

Stream Impairments:

Table 29 Dry Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

DRY CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Alteration in streamside/littoral vegetative covers	NA; non-pollutant	Aquatic Life	
Nitrogen (Total)	Yes, nutrients	Aquatic Life, Primary Contact Recreation	Riparian grazing, septic effluent, chronic dewatering
Low flow alterations	NA; non-pollutant		

TMDLs and Pollutant Load Reduction Goals

Pollutant: *Nitrogen* **Source of pollutant:**	*Current Load (lbs./day) **	*Allowable Load (lbs./day) **	*% Reduction Required** **Based on growing season flow of 6.47 cfs*
Natural Background	*1.43*	*1.43*	*NA*
Agriculture/subsurface wastewater disposal	*15.69*	*8.18*	*47.9%*

Total	*17.12*	*TMDL=9.61*	***43.9% overall rdx***

Management Measures

Fishery Health Measures

Dry Creek predominantly supports native Westslope cutthroat trout and introduced brook trout. Historically, bull trout were present but has not been confirmed in recent decades. FWP has prescribed the following measures for 15.3 miles of Dry Creek, and open tributary system (major fish passage barriers absent):

- Protect habitat and ensure connectivity with tributaries to enhance natural recruitment of wild trout.
- Prioritize protection and enhancement of native trout strongholds (FWP, 2023).
- Mitigate mainstem natural dewatering that is exacerbated by irrigation withdrawals.

FWP Future Fisheries Projects

- FWP and USFS replaced wood crib diversion with rock weirs on Dry Creek to improve fish passage in 2004 (FWP, 2017).

Beavers Restoration Potential

- The BRAT map identified several sections along Dry Creek as having “strategic- long term investment”, or “straight-forward-quick return” restoration or conservation opportunities (BRAT, 2020).

3.10D Tamarack Creek (4C - Impaired by non-pollutants)

Description

Tamarack Creek flows predominantly through public USFS and DNRC ownership for 9.5 miles from its headwaters to its mouth at the CCF. An older DEQ assessment of the creek describes that Tamarack Creek historically likely had a healthy cold-water fishery for bull trout, Westslope cutthroat, and whitefish. The species composition has been altered by the introduction of brook trout and a culvert under Highway 135 that acts as a complete fish passage barrier but maintains high genetic purity for the resident Westslope cutthroat trout population. FWP noted consistent riparian impacts from grazing and streamside roads and has listed Tamarack Creek as chronically dewatered based on conditions in a 2.5-mile reach along the lower mainstem located downstream of the Dry Fork.

Stream Impairments

Table 30 Tamarack Creek, Stream Impairments and Causes from Montana Department of Environmental Quality. (2020). Clean Water Act Information Center.

TAMARACK CREEK **Causes of Impairment**	**TMDL created; pollutant category**	**Impaired beneficial use**	**Sources of impairment**
Fish passage barrier	NA; non-pollutant	Aquatic Life	Dam or impoundment

- **NOT considered an impairment. Is this listed in the TMDL?**
- **Actual obvious impairments noted are sediment, road encroachment, and riparian degradation.**

Management Measures

FWP has prescribed the following measures for 8.2 miles of Tamarack Creek, a closed tributary system (fish barriers prevent upstream movement from CFC):

- Improve habitat quality and connectivity within drainages, maintain fish passage barrier at the mouth (FWP, 2023).
- Maintain and improve habitat for Westslope cutthroat trout 'Core' population isolation.

Beavers Restoration Potential

- The BRAT map identified several sections along Tamarack Creek as having "easy-low hanging fruit", "strategic- long term investment restoration or conservation opportunities (BRAT, 2020).

Section 4: Restoration Goals and Objectives

The overall goals of the Central Clark Fork watershed are as a durable and productive river system that nurtures robust cold-water fisheries, delivers clean and dependable water for agriculture needs, sustains vibrant riparian and wetland environments, and empowers communities to take an active role in their care. Within this overall vision, CFC and its partners have the following broad goals for the Central Clark Fork watershed:

- **Reduce erosion and sediment delivery** from streambanks, roads, disturbed floodplains, and uplands to support cold-water aquatic life and improve channel stability.
- **Increase rangeland health and productivity** through grazing and land-management practices that maintain plant cover, soil health, and watershed function.
- **Build drought and flood resilience and reduce chronic dewatering** by promoting nature-based solutions that attenuate flood events and naturally store water for later in the season (e.g., floodplain restoration, channel reconnection, and stormwater mitigation).
- **Focus on projects that restore natural processes and are self-sustaining** vs. those that artificially modify hydrologic processes and require long-term maintenance.
- **Empower the public by increasing their awareness and understanding of** how NPS pollution degrades water quality and what steps can be taken to address it.

- Protect and improve fisheries values, including overall watershed health, natural stream processes, and strategic fish passage barriers that isolate native trout conservation populations.

Section 5: Project Implementation Schedule and Measurable Milestones (EPA elements 6, 7)

Table 31 Project Implementation Schedule

Location	Project	Impairment/ Beneficial Use	Schedule	Partners	Approx cost	Project stats
Mulkey Creek	BLM identified 6.58 stream miles of Mulkey Creek (titled gulch in plan document)	Sediment	2026-2028	BLM-Engendering CFC-Project Management	$260,000	Improve road drainage for 6.58 miles
Rattler Gulch	BLM identified 4.57 stream miles restore channel geomorphology through road management. Pull culvert in the headwaters of W.F. Rattler Gulch to improve hydraulic function. Improve road drainage on Rattler Gulch Rd, in coordination with Granite County and MT state	Sediment and Phosphorus	2026-2028	BLM-Engendering CFC-Project Management Granite Co.	$180,000 $150,000	Improve road drainage for 4.57 miles. Culvert
Deep Creek	BLM identified 5.71 stream miles to restore and assess opportunities to improve sedimentation and nutrient impairments. Replace culverts; address drainage issues on Cave Gulch Rd (BLM, 2024b)	Sediment and Nitrogen	2026-2028	BLM-Engendering CFC-Project Management	$230,000 $200,000	Improve road drainage by 5.71 miles. Culverts

Location	Project	Impairment/ Beneficial Use	Schedule	Partners	Approx cost	Project stats
Tenmile Creek	BLM identified 1.99 stream miles of Tenmile Creek on BLM lands with the following baseline Riparian Management Objectives: Reduce sediment from road undercutting on BLM lands.	Sediment and Phosphorus	2026-2028	BLM-Engendering CFC-Project Management	$80,000	Improve road drainage for 1.99 miles.
Cramer Creek	BLM and FWP identified 2.05 stream miles of Cramer Creek Maintain/improve riparian shade through canopy management. Potential for improvements to streamside vegetation of forest structure improvements. Maintain or improve large woody debris.	Sediment, Aluminum Lead	2026-2028	FWP BLM-Engendering CFC-Project Management	$80,000 $50,000 $150,000 $60,000	Improve road drainage for 2.05 miles. Riparian vegetation Fencing Woody brush bank treatments
Clark Fork River, Clinton Area	Mainstem Clark Fork habitat restoration through wetland recovery, tributary reconnection, focusing on Reach 1 to improve riparian corridor function with energy dissipation, bank roughening, regenerative agriculture, and floodplain reconnection.	Cu, Fe, Pb, nutrients, organic enrichment, chlorophyll	2028-2032	EPA FWP CFC MCD Missoula Co. MCWQD MDT Missoula Regional Connectivity Group	$1-$2 million	High energy banks: large wood, bank roughening, and floodplain reconnection Low energy banks: wetland creation, revegetation, and regenerative agriculture

Location	Project	Impairment/ Beneficial Use	Schedule	Partners	Approx cost	Project stats
Sixmile Creek Clark Fork River, Mill Creek HUC reach (Grass Vally Area)	Mainstem Clark Fork habitat restoration through wetland recovery, tributary reconnection, focusing on the Sixmile culvert-to-bridge upgrade and O'Keefe Creek area to reduce metals and nutrients and improve riparian corridor function	Cu, Fe, Pb, nutrients, organic enrichment, chlorophyll	2026-2029	EPA FWP TU MCD Missoula Co. MCWQD MDT Missoula Regional Connectivity Group	$3 – $5 million $500,000	Culvert replacement with bridge 900 feet of stream restoration and 18-acre wetland restoration
Petty Creek	FWP has prescribed the following measures for 4.3 miles of Petty Creek, and open tributary system (fish barriers absent): Protect habitat and ensure connectivity with tributaries to enhance natural recruitment in areas that are not native trout strongholds (FWP, 2023) Beavers Restoration Potential The BRAT map identified limited areas along Petty Creek as having "strategic- long term investment" restoration or conservation opportunities (BRAT, 2020). The Missoula County CD is considering measures to collaborate with landowners in Petty Creek to implement BDAs in Petty Creek's floodplain; TU is currently doing LIDAR studies to assess	Temperature, and sediment	2028-2032	FWP USFS TU MCD	$100,000 engineering $300,000 fencing $20,000 education $500,000 Habitat enhancement	Woody brush bank treatments, revegetation, fencing, and education

Location	Project	Impairment/ Beneficial Use	Schedule	Partners	Approx cost	Project stats
	feasibility (Paul Parson, pers. comm.).					
Nemote Creek	2025 stakeholder meeting for the CCF WRP, some comments expressed knowledge of landowner interest in wetland and beaver restorations in the Nemote Creek watershed. Long term residents report a historical large wetland complex in the watershed.	Nitrogen, total; Phosphorous, total; Temperature. chlorophyll-a; flow regime modification	2028-2030	CFC Beaver Working Group FWP Mineral CD	$500,000 Habitat enhancement $20,000 education	Woody brush bank treatments, revegetation, wetland creation, and education
Flat Creek	Stream and wetland restoration	Sb, Fe, Pb, Zn, As, Cd, Hg; Sedimentation physical substrate habitat alterations	2026-2029	Mineral CD TU EPA MT DEQ	$500,000 Habitat enhancement $20,000 education	Woody brush bank treatments, revegetation, wetland creation, and education
Main Stem Clark Fork River	Education on 310 rules, regenerative agriculture, vegetating riparian areas, and livestock fencing	Nitrogen, total; Phosphorous, total; Temperature. chlorophyll-a; flow regime modification	On-going	Minneral CD, FWP, Missoula CD, CFC, TU, WWF, Counties and Cities	$200,000	Education on 310 rules, regenerative agriculture, vegetating riparian areas, and livestock fencing

Section 6: Financial and Technical Resources Needed (EPA element 4)

Potential Funding Sources to be explored.

- Section 319 NPS Grant Program (DEQ)- Main Funding Mechanism
- Future Fisheries Improvement Program (FWP)
- Renewable Resource Grant and Loan Program for planning and projects that conserve, manage, develop, and preserve Montana's renewable resources (DNRC)

- Reclamation and Development Grant Program for drought-related planning and projects (DNRC)
- Wetland Program Development Grants (EPA)
- Flood Mitigation Assistance Grant (MT Disaster and Emergency Services)
- The Beaver Institute Landowner Cost-Share Grants
- Assistance for Granite County Landowners (NRCS)
- MT Statewide Conservation Grants (NRCS)
- Ranching for Rivers

Table 32 Financial resources needed estimated from the following cost per unit (as of 2026 prices)

Measure	Unit	Treatment Cost per Unit
Channel Construction	Linear Feet (LF)	$25
Woody Brush Bank Treatments	Linear Feet (LF)	$10-$15
Road Drainage work (gravel, grading, culvert cleaning/ replacement)	Mile	$20,000
Large woody structure construction	Each	$500-$600
Vegetative wood matrix 1	Linear Feet (LF)	$20-25
Vegetative wood matrix 2	Linear Feet (LF)	$30-$35
Bridge	Each	$1 -$3 million
Category 1 Rock (10-12”)	Each	$8-$10
Habitat enhancement (BDA)	Each	$100-$300
Furnish streambed fill	Cubic Yard (CY)	$50-$75
Containerized Plantings	Each	$100
Riparian seed	Acre coverage	$700
Hydrologist or Engineer	Per hour	$100-$150

Beaver Analog	Each	$1000-$2000
Electric fence (no gates, etc.)	Per foot (FT)	$1.25

Technical Assistance

There are many organizations interested in helping to restore the Clark Fork River Central Watershed. Technical assistance may be provided by the following groups:

- Montana Fish Wildlife and Parks Biologists – Aquatic habitat protection and enhancement, Fisheries management, improvement and monitoring
- Missoula County Weed District – Weed management.
- Missoula Valley Water Quality District – Groundwater/surface water interactions and restoration
- Missoula City Stormwater – Education and compliance with MS4 stormwater
- Clark Fork Coalition – Monitoring and Restoration methodologies, fish passage, project design and implementation
- Trout Unlimited – Fisheries and aquatic restoration, restoration project design and implementation
- Lolo National Forest – Fisheries and Hydrology, infrastructure design and maintenance, tributary watershed management
- Beaver Working Group – beaver conflict resolution practices, low tec restorations, and BDAs
- SWCA, River Design Group – Stream restoration design
- DEQ Water Quality Specialist – Water Quality Monitoring
- Watershed Education Network – wood assessment and education
- Minneral and Missoula Conservation District – Permitting and design of riparian zone, Irrigation, Fencing, and Agricultural practices.

Section 7: Education and Outreach (EPA elements 5)

Development of the Central Clark Fork Watershed Restoration Plan (WRP) relied on extensive public outreach and stakeholder engagement across the basin. Between 2018 and 2020, local governments, state and federal agencies, conservation districts, nonprofit organizations, and private landowners participated in interviews, meetings, and collaborative planning sessions to identify watershed values, concerns, and restoration priorities. To facilitate ongoing dialogue, a basin-wide stakeholder forum was convened in 2025 to reboot discussions around watershed issues, share information, and coordinate restoration strategies. The draft pan was revised with stakeholder review and updates. There were 3 more meetings in 2026 focusing on finalizing the draft with specific projects to reduce non-point source water pollution. In all these interactions consistently emphasized the importance of education around water quality, fisheries, floodplain function, and community resilience, while also noting the rapid land-use changes occurring throughout the basin. These conversations helped identify both positive

and negative trends in watershed health, highlight areas where restoration would be most effective, and clarify the types of projects stakeholders were willing to support or participate in.

Land-use planning efforts also contributed to watershed engagement. Local government long-range planning for areas transitioning from agricultural land to residential/recreational development identified opportunities to restore key reaches of the Clark Fork River and its tributaries. These planning documents, along with technical assessments prepared by land managers and other partners, were shared with landowners and stakeholders to guide project development and funding strategies.

A major theme that emerged from public outreach was the need for education around regulatory tools that protect waterways, particularly Montana's 310 permitting process for the Land and Water Protection Act. Many landowners expressed interest in learning how these laws apply to streambank work, floodplain modifications, culvert replacements, and riparian vegetation management. Stakeholders emphasized that clearer guidance and proactive education would help prevent unintentional impacts to streams, improve compliance, and support long-term watershed health. As a result, the WRP identifies 310 permitting and LWPA education as basin-wide priorities, with conservation districts, counties, and nonprofit partners committed to developing outreach materials, workshops, and landowner support programs.

Because many Central Clark Fork tributaries flow through rapidly developing or mixed-ownership landscapes, coordinated outreach remains essential. The WRP builds on the basin's collaborative foundation by providing a shared vision, clear priorities, and a structure for communication as projects move from concept to implementation. This approach ensures that restoration actions are grounded in community values, supported by local partners, and aligned with the long-term health of the Central Clark Fork watershed.

Section 8: Monitoring Plan and Criteria for Measuring Progress (EPA elements 8, 9)

Table 33 Monitoring Methods

Parameter	Methods	Responsible Parties	Costs
Sediment	Bank Erosion Hazard Index (BEHI), Pool depth, and Wolman Pebble Count	CFC TU	$1000/mile
Temperature	Direct Measurement including synoptic. $40 - $60/hour	CFC TU	$40 - $60/hour $1000/station

Stream flow	Rating curve with 7 visits per summer	CFC TU	$40 - $60/hour $1000/station
Vegetation	Riparian Vegetation Photo points	CFC	$600/mile
Nutrients	Laboratory analysis	DEQ	$6000/station
Metals	Laboratory analysis	DEQ	$6000 – $10,000/station
Fisheries	Inventory fish-passage barriers. Monitor fish.	CFC FWP	$40 - $60/hour
Education and Outreach	Tracking the number of people attending events, receiving educational materials or participating in restoration activities.	CFC, Mineral CD, Missoula CD, Granit, CD	$40 - $60/hour

Criteria

Parameter	Criteria	Timeframe
Temperature	Reduce high temperature by 1 – 2°F. Fishery Maintain WCT genetic purity in isolates.	15 years
Sediment	Sediment Reduce sediment loading by 15% 15 years.	15 years
Vegetation	Vegetation Increase shade percentage by 10 – 15% 15 years	15 years
Fishery	Expand the area of perennial flow in the main stem reach. Enhance connectivity with Clark Fork River Mitigate fish passage obstructions.	15 years
Education and Outreach	>200 people reached Participating in revegetation efforts with conservation districts Engaging students from 4 local schools in the restoration project	15 years

Summary

The Central Clark Fork Watershed Restoration Plan (WRP) provides a coordinated, science-based framework for improving water quality, aquatic habitat, and watershed health across the Central Clark Fork Basin. Building earlier restoration plans completed for the Upper (2012) and Lower (2019) Clark Fork, this is the first comprehensive plan for the central portion of the basin. It incorporates substantial work completed during the 2017–2020 planning effort and reflects priorities identified through

stakeholder engagement, water-quality assessments, and agency guidance. The WRP is designed to help communities understand current watershed conditions, identify impaired waters, and implement targeted restoration actions that reduce pollution from both point and nonpoint sources. It also serves as an educational tool and a foundation for securing federal and state restoration funding.

The plan prioritizes restoration in tributaries and mainstem reaches where sediment, nutrients, metals, temperature, and habitat impairments limit beneficial uses such as cold-water fisheries, recreation, and aquatic life. Implementation focuses on road-related sediment reduction, riparian restoration, wetland recovery, floodplain reconnection, fish-passage improvements, and beaver-based restoration where appropriate. Projects were developed in partnership with BLM, FWP, EPA, conservation districts, counties, Trout Unlimited, the Clark Fork Coalition, and other watershed organizations.

Between 2026 and 2032, the WRP outlines restoration actions across multiple tributaries—including Mulkey Creek, Rattler Gulch, Deep Creek, Tenmile Creek, Cramer Creek, Petty Creek, Nemote Creek, and Flat Creek—along with major mainstem Clark Fork River projects near Clinton, Grass Valley, and Sixmile Creek. These projects include improving road drainage on more than 20 miles of BLM roads, replacing undersized culverts, restoring riparian vegetation and large wood, constructing wetlands, reconnecting floodplains, and implementing regenerative agriculture practices. Mainstem projects address metals (Cu, Fe, Pb, Zn, As, Cd, Hg), nutrients, sediment, chlorophyll-a, and temperature impairments through wetland creation, side-channel reconnection, bank roughening, and riparian corridor enhancement.

The plan also emphasizes long-term stewardship through education, outreach, and community involvement. Ongoing efforts include landowner education on the 310-permit process, riparian planting, livestock fencing, and regenerative agriculture. By aligning local knowledge with agency priorities and watershed science, the WRP provides a clear path toward restoring water quality, improving habitat resilience, and protecting the ecological integrity of the Central Clark Fork Basin for future generations.

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Appendices

Appendix 1: The Smurfit-Stone Pulp Mill Near Frenchtown

Written in 2025 by Travis Ross of the Missoula Valley Water Quality District

The Smurfit-Stone Mill is an inactive pulp and paper mill located on the Clark Fork River, about 12 miles northwest of the city of Missoula, in Missoula County. The mill operated from 1957 to 2010 and made pulp from wood & cardboard then made cardboard liner paper from the pulp. In the first year of operation, wastewater from the industrial processes was discharged directly to the Clark Fork River resulting in fish kills, foam and discoloration. Beginning in 1958, wastewater was treated and discharged to unlined storage ponds and directly to the Clark Fork during high river flows.

The property covers about 3,150 acres. The core industrial footprint (about 150 acres) includes the former mill, a wood chip staging area, the effluent clarifier, and the hog fuel area. Over 900 acres of the property consist of a series of unlined ponds used to store both treated (primarily through aeration) and untreated wastewater effluent from the mill, as well as primary sludge recovered from wastewater

that entered the clarifier. Some of these ponds were subsequently used for disposing of solid wastes produced at the mill. Much of the remaining property (approximately 1,800 acres) is used for agricultural purposes, with over 1,200 acres of grasslands for cattle grazing and over 600 acres irrigated for alfalfa and grain crops. While the core industrial part of the property is fenced and has a security building, other parts of the property are not fenced, including the west side which is separated from the Clark Fork River by earthen berms.

While the mill site has not been declared a superfund site (not added to the National Priority List), the EPA is in the remedial investigation phase, determining the nature and extent of contamination and evaluating the human and ecological risk present at the site. This will result in a cleanup feasibility study which will determine next steps towards remediation of the site. The Montana Department of Justice Natural Resource Damage Program is concurrently evaluating the impact the site had on natural resources.

The EPA is evaluating surface and groundwater contamination and migration pathways from the mill and has divided the site into source areas that potentially contain hazardous substances including former sludge ponds, landfills, wastewater storage ponds.

Chemicals of potential concern include dioxins, furans, pcbs, arsenic, cadmium, lead, and manganese.

Some of these hazardous substances have been detected in ground water beneath the property, as well as in the Clark Fork River), at concentrations elevated above background.

A berm stability study conducted by the potentially responsible parties concluded that the earthen berms between the river and the waste ponds would not be overtopped by a 100-year flood; however long-term stability is of question. Channel migration/avulsion could erode the berms, causing downstream deposition of contaminated sediments.

The Clark Fork River is a fishery that supports a variety of finfish, including the federally designated threatened bull trout, as well as other species that are harvested for human consumption. Significant areas of wetlands are present along the Clark Fork River, in areas adjacent to and downstream of the Smurfit-Stone Mill. The segment of the Clark Fork River directly adjacent to the mill is listed as a Wildlife Protected Area by the Northwest Power and Conservation Council as it is a bald eagle nesting and winter concentration area, a big game critical wintering/spring area, and a historical peregrine falcon nesting area. The mill property also lies within the Clark Fork River- Grass Valley Important Bird Area, so designated due to its significance to bird species of conservation concern. It is considered the largest and most significant wetland-water complex in the Missoula area for migratory species such as waterfowl, shorebirds, herons, and raptors.

Because of the potential value to wildlife, water quality and watershed functions (like flood moderation), cleanup and restoration of the historic floodplain part of the property is highly desirable.

More information can be found from the EPA.