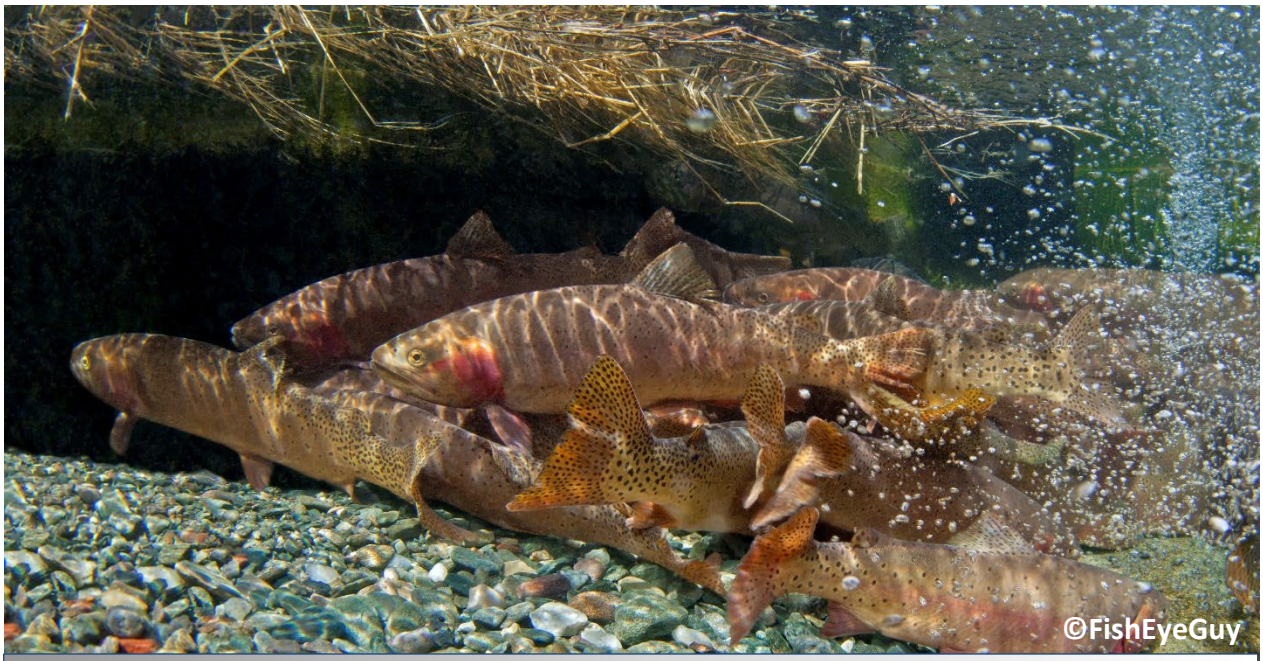
Mill Creek Meadow Spring Creek Brook Trout Removal and Yellowstone Cutthroat Trout Conservation



Draft Environmental Assessment

2021

Primary Author

Carol Endicott

Yellowstone Cutthroat Trout Conservation Biologist

Livingston Fisheries Office

6 Church Lane

Livingston, MT 59017

cendicott@mt.gov

MONTANA FISH, WILDLIFE & PARKS

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Executive Summary

The Yellowstone cutthroat trout (Figure 1) is a Montana native in decline. This spotted golden fish with its namesake red slash along its jaw has disappeared from over 70% of its historical habitat in Montana. Habitat degradation, barriers to movement, dewatering, and historical overfishing have played roles in the decline. Currently, the greatest threats are nonnative trout and shrinking of habitat that will remain cold enough in a warming climate. Concerted conservation efforts among multiple partners are working to protect the populations that remain and restore populations where possible. For more background on this stunning native trout see the Yellowstone cutthroat trout story map.

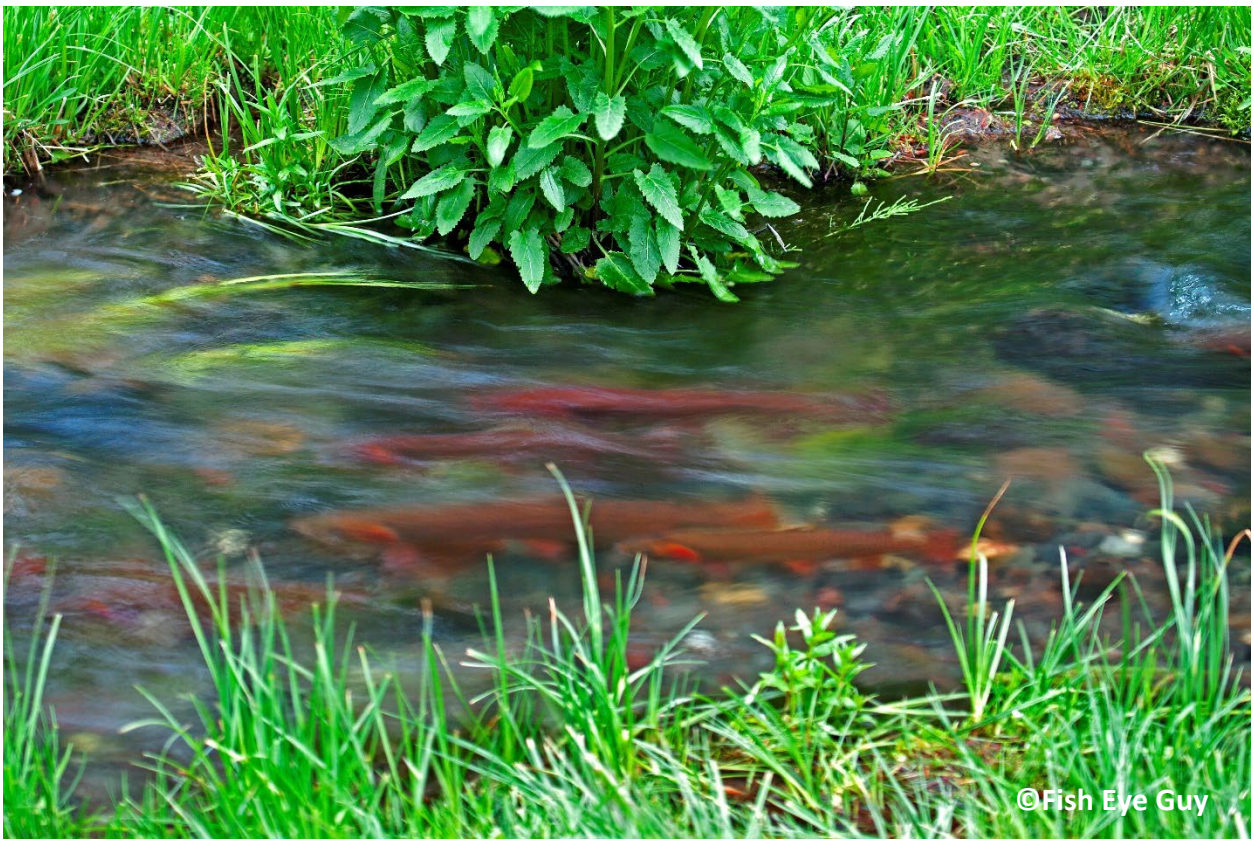

Figure 1. Yellowstone cutthroat trout in a small stream.

Mill Creek is the largest tributary to the Yellowstone River in Paradise Valley and originates in Absaroka Mountains (Figure 2). In 1996, a rock barrier was placed in channel near the Custer Gallatin National Forest to prevent invasion by rainbow trout. The watershed upstream of the barrier is the focus of conservation planning to protect the resident Yellowstone cutthroat trout in these waters. Several actions that would address the primary threats of nonnative trout are underway for this project area. This environmental assessment addresses the threat posed by brook trout in a small spring creek upstream of the barrier.

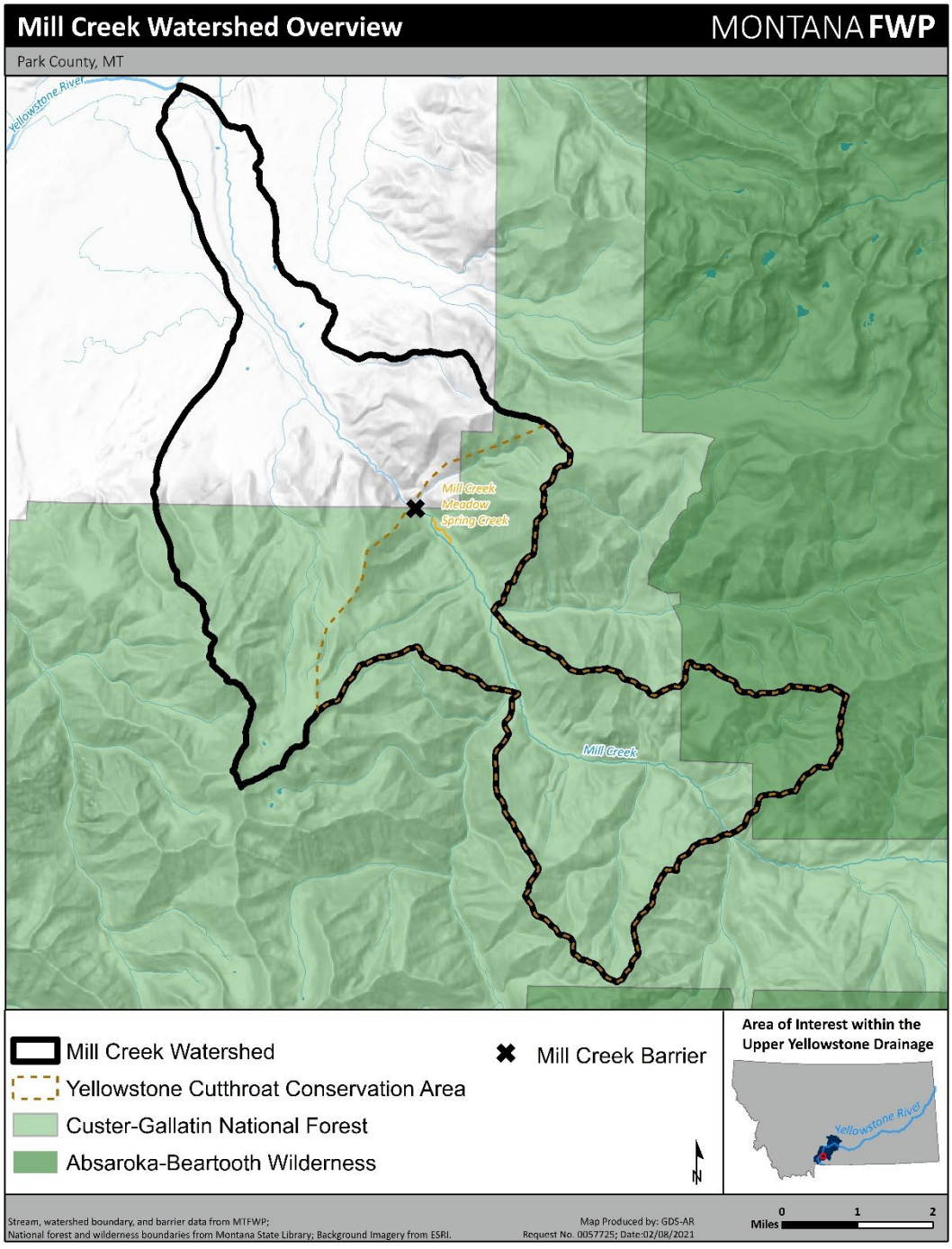

Figure 2. Mill Creek watershed and Yellowstone cutthroat trout conservation area.

Despite being a stronghold for Yellowstone cutthroat trout, upper Mill Creek's native trout face two major threats: hybridization with rainbow trout and competition with brook trout. Hybridization with rainbow trout became apparent in the lower portions of the project area in the 1990s. The source of rainbow trout could be fish leaping over the barrier at the U. S. Forest

Service boundary or the legacy of illegal introductions. Brook trout are currently restricted mostly to Mill Creek Meadow Spring Creek; however, they have potential to spread throughout the watershed, which puts Yellowstone cutthroat trout throughout the watershed at risk. Brook trout are not compatible with native cutthroat trout and tend to eliminate them in mountain streams. Removing brook trout from the Mill Creek Meadow Spring Creek would substantially reduce or eliminate this threat to Yellowstone cutthroat trout.

This EA examines two alternatives:

1. Protect a core conservation population of Yellowstone cutthroat trout by removing nonnative brook trout, rainbow trout, and rainbow trout × Yellowstone cutthroat trout hybrids using electrofishing. Woody debris and overhanging vegetation would be removed using chain saws and loppers to improve capture efficiency.
2. No action.

Alternative 1 is the proposed action. As detailed in the thorough analysis of the evidence presented in the EA, the proposed actions have short-term reduction in habitat quality relating to removal.

MEPA requires public involvement and opportunity for the public to comment on projects undertaken by the acts' respective agencies. A public comment period will extend from July 6 to August 5. A public meeting will be held during the open public comment period on a date and location to be determined. Public notice will be given when the public meeting is scheduled.

Commenters can submit comments by email or US Mail to Montana Fish, Wildlife & Parks at:

Montana Fish, Wildlife & Parks
Mill Creek Yellowstone cutthroat trout conservation
PO Box 200701
Helena, MT 59620
(406) 444-2449
fwpfishcomments@mt.gov

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List of Abbreviations

DEQ	Montana Department of Environmental Quality
EA	Environmental Assessment
eDNA	Environmental DNA
EPA	U. S. Environmental Protection Agency
EPT	Ephemeroptera, Plecoptera, Trichoptera {mayflies, stone flies, & caddisflies)
FWP	Montana Fish, Wildlife & Parks
$KMnO_4$	potassium permanganate
MCA	Montana Code Annotated
MCTSC	Montana Cutthroat Trout Steering Committee
MEPA	Montana Environmental Policy Act
mg/L	Milligrams per liter
MNHP	Montana Natural Heritage Program
MOU	Memorandum of understanding
MRDG	Minimum requirements decision guide
NEPA	National Environmental Policy Act
ppb	Parts per billion
ppm	Parts per million
USFS	U. S. Forest Service
USFWS	U.S. Fish and Wildlife Service

1 PROPOSED ACTION and BACKGROUND

1.1 *Need for Proposed Action*

1.1.1 Background

Yellowstone cutthroat trout (Figure 3) are a native to portions of Montana, Wyoming, Idaho, Nevada, and Utah and occupied cold, clean waters throughout their broad historical range. Yellowstone cutthroat trout share the honor of being Montana's state fish with westslope cutthroat trout. This stunning fish is an essential component of the natural character of the Yellowstone ecosystem and provides highly valued fishing opportunities and enjoyment of native fish in beautiful settings. {A story map[1] provides background on the history, ecology, and status of Yellowstone cutthroat trout.) This proposed action would protect a high priority population of Yellowstone cutthroat trout from brook trout and decrease the threat posed by rainbow trout and rainbow trout × Yellowstone cutthroat trout hybrids.

Figure 3. Yellowstone cutthroat trout

Yellowstone cutthroat trout have experienced substantial reductions in distribution and abundance, and in Montana, they occupy 33% of their historical range (Figure 4). Range-wide, agencies, conservation groups, and landowners are working toward protecting, restoring, and conserving Yellowstone cutthroat trout to stave off more losses and ensure Yellowstone cutthroat trout do not decrease to the point they need protection under the Endangered Species Act, or become extinct. Habitat degradation, dewatering, and barriers to movement have played a role in their decline; however, nonnative trout have been most harmful to native cutthroat trout. Climate change has emerged as another substantial threat to cutthroat trout

[1] https://mtfwp.maps.arcgis.com/apps/Cascade/index.html?appid=fdf5c7af3413435da2c2190aab5ef9c3

populations, as the amount of suitable habitat is becoming restricted to high elevations that are likely to remain cold for the foreseeable future (Isaak et al. 2015; Isaak et al. 2017).

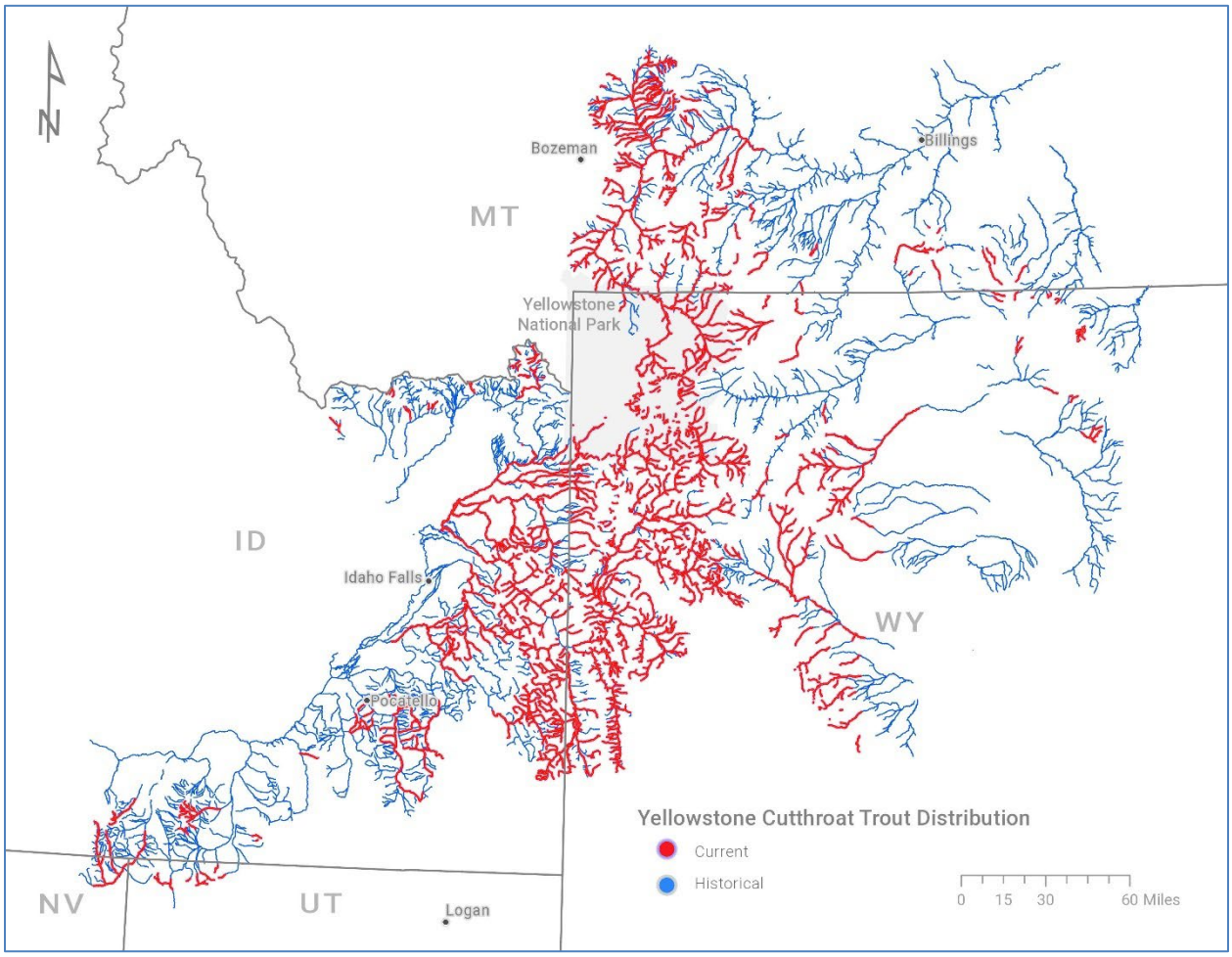

Figure 4. Historical and current distribution of Yellowstone cutthroat trout in their native range (Endicott et al. 2016).

The upper Mill Creek watershed, which encompasses the area upstream of a rock barrier placed near the Custer Gallatin National Forest boundary in 1996 (Figure 5), is a stronghold for Yellowstone cutthroat trout, and protection of Yellowstone cutthroat trout is the conservation priority for the watershed (Endicott et al. 2013; FWP 2019). Despite its high conservation value, this population faces several threats. Ongoing spread of hybridization with rainbow trout is a critical concern and rainbow trout are the biggest cause of decline of Yellowstone cutthroat trout (Kruse et al. 2000). Likewise, brook trout are present in the lower reaches, and brook trout are another major threat to cutthroat trout (Dunham et al. 2002; Shepard 2010).

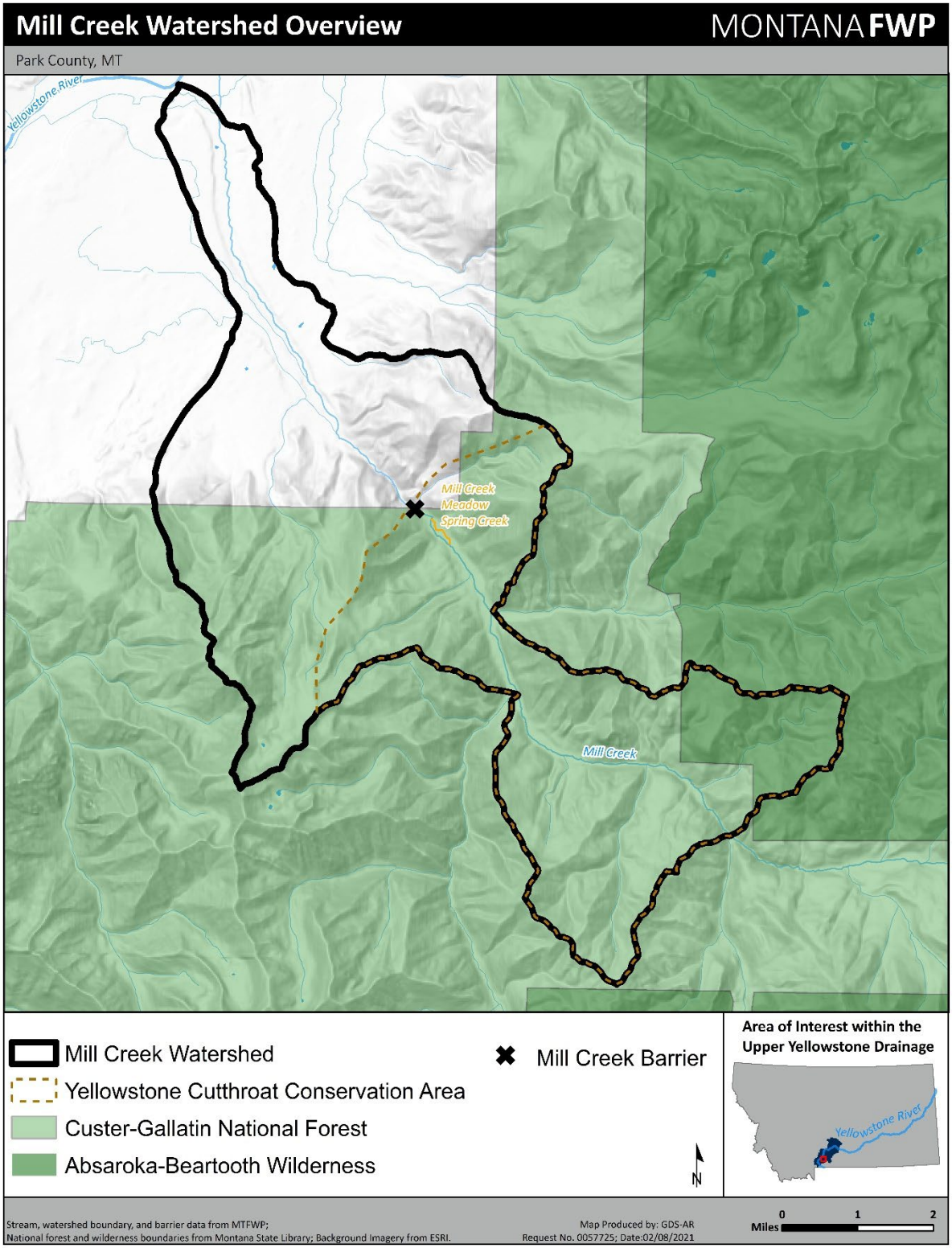

Figure 5. Upper Mill Creek watershed, existing fish barrier, and location of Mill Creek Meadow Spring Creek.

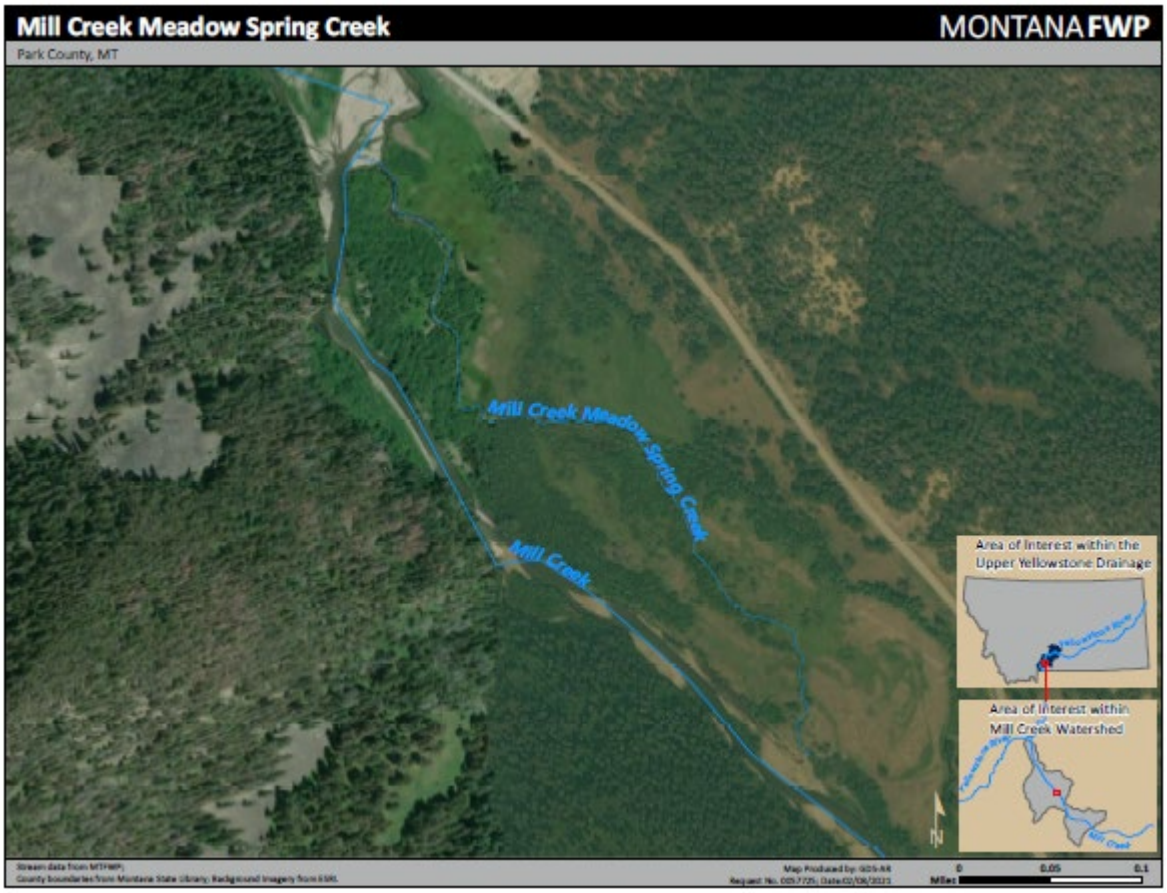

Figure 6. Mill Creek Meadow Spring Creek project area within the Mill Creek watershed.

Mill Creek Meadow Spring Creek is a small stream that emerges within the floodplain adjacent to Mill Creek and flows for about ½ miles before its confluence with Mill Creek (Figure 7). The stream occupies a single thread channel and has a relatively narrow and deep channel, consistent with Rosgen's e-channel type (Rosgen 1996). Its short length and relatively simple habitat make Mill Creek Meadow Spring Creek a suitable candidate to try mechanical removal of brook trout. Multiple electrofishing passes have been successful in removing brook trout from short reaches of stream, especially when fieldworkers remove woody debris and overhanging vegetation that provides cover and tangles nets (Shepard et al. 2014). The tendency of brook trout to aggregate in Mill Creek Meadow Spring Creek during fall during spawning would further facilitate effective removal of brook trout. Volunteers would clear debris and overhanging vegetation to increase the ease of capture.

Figure 7. The Mill Creek Meadow Spring Creek proposed project area.

Removal efforts would focus on the spring creek, although adjacent waters in Mill Creek and East Fork Mill Creek would be electrofished for this project, and nonnatives and hybrids would be removed when encountered. Recent data show brook trout to be rare outside the spring creek, and they likely congregate in the creek in fall to spawn (Figure 7); however, reconnaissance electrofishing in neighboring waters would be an added measure to promote removal of brook trout, rainbow trout, and hybrids that are outside Mill Creek Meadow Spring Creek. A block net placed at the confluence of Mill Creek Meadow Spring Creek and Mill Creek would prevent brook trout occupying Mill Creek Meadow Spring Creek from escaping into larger waters during removal efforts. A trap would be set at the mouth of Mill Creek Meadow Spring Creek to capture brook trout entering to spawn on nights between removal efforts.

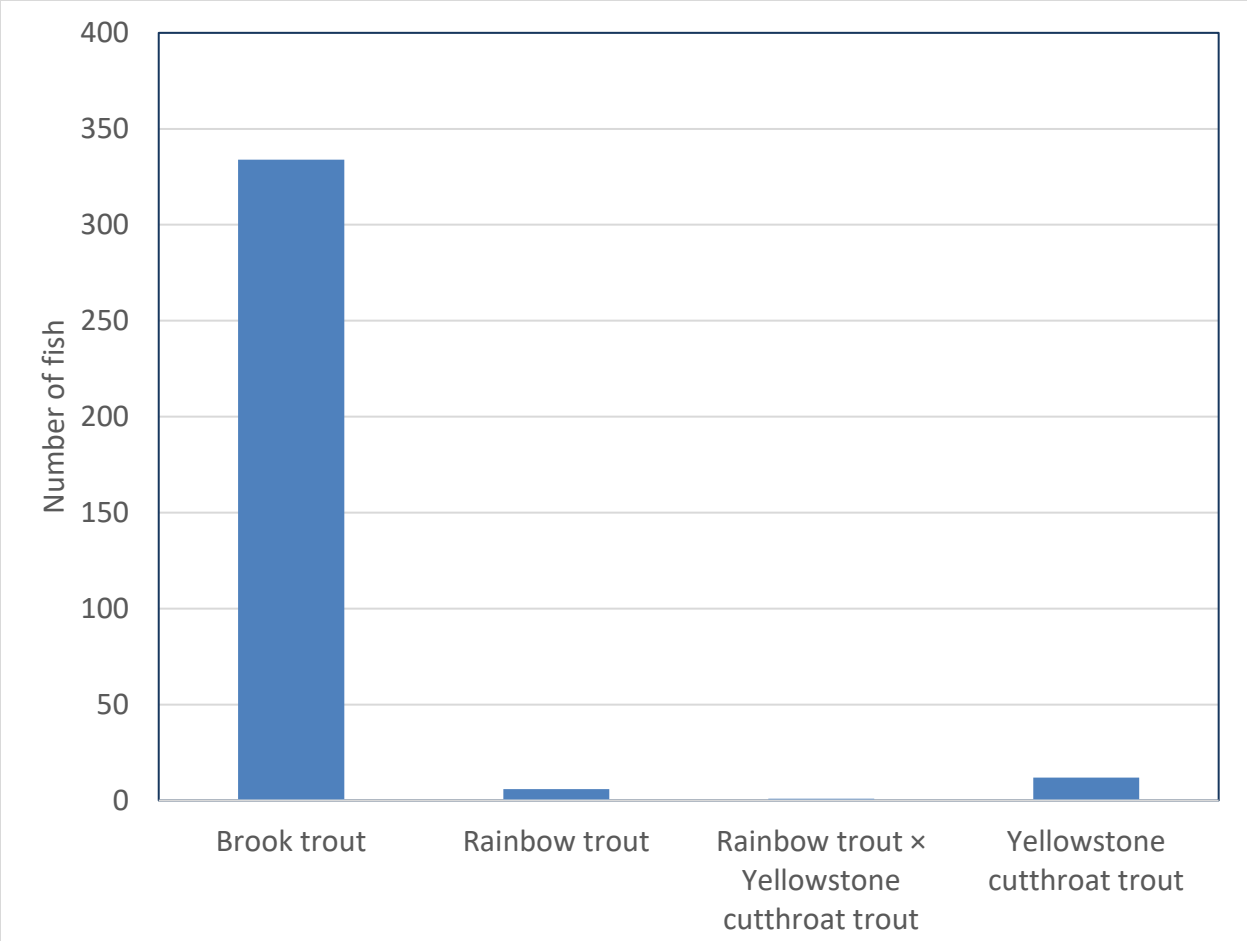

Figure 8. Fish captured in Mill Creek Meadow Spring Creek on October 16, 2016.

The goal of the project is to eradicate brook trout in Mill Creek Meadow Spring Creek, which appears to be the sole, established source of brook trout, although pioneering brook trout are likely present outside of the spring creek. Targeting brook trout in Mill Creek Meadow Spring Creek during fall would coincide with their use of the stream for spawning, and previous efforts have found brook trout to be exceptionally dense in Mill Creek Meadow Spring Creek during fall spawning.

A secondary goal is to suppress rainbow trout and rainbow trout × Yellowstone cutthroat trout hybrids in and near Mill Creek Meadow Spring Creek. In places where rainbow trout have found a favorable window for spread and establishment, rainbow trout have resulted in emerging threats to native cutthroat trout and a resulting rapid loss of fitness (Fausch et al. 2001; Heim et al. 2020). These fish pose an immediate and irreversible threat of hybridization, which jeopardizes upper Mill Creek's status as a secure stronghold for Yellowstone cutthroat trout. This project would take advantage of opportunities to suppress rainbow trout until additional measures to protect Mill Creek's Yellowstone cutthroat trout from hybridization.

1.1.2 Justification for Brook Trout Removal

Brook trout are not native to Montana and are among the greatest threats to the persistence of our native trout. The extent to which brook trout are displacing cutthroat trout throughout the West has been a conservation concern for decades. In a review, Griffiths (1988) found cutthroat trout less likely to be present in streams with brook trout than other nonnative trout. In Yellowstone National Park, brook trout had eradicated Yellowstone cutthroat trout from most streams where they were present (Gresswell 1995). Compounded with hybridization with rainbow trout, competition with brown trout, and constriction of suitable habitat due to climate change (Isaak et al. 2015; Isaak et al. 2017), habitat degradation, and dewatering, Yellowstone cutthroat trout face an uncertain future without implementation of projects such as this one.

The tendency for brook trout to invade new waters and displace cutthroat trout is the subject of considerable study. Researchers have investigated the conditions favorable for invasion, the biology of brook trout that promotes invasion success, and the factors that result in loss of cutthroat trout following invasion of brook trout. Researchers studying invasions of nonnative trout have identified substantial lags in establishment of nonnatives following transfer to nearby waters (Crooks and Soulé 1999; Fausch et al. 2001; Al-Chokhachy and Sepulveda 2018; Heim et al. 2020; Endicott 2021). Lag can be the result of a species' inherent rate of population growth and invasion, environmental factors that promote spread and establishment during a favorable window, or genetic factors that lessen the fitness of the native species (Crooks and Soulé 1999). Removing brook trout would prevent their spread into headwaters where they would threaten resident Yellowstone cutthroat trout.

Currently, the Mill Creek watershed does not provide the best habitat for brook trout. Brook trout are native to eastern and midwestern North American and did not evolve in steep, Rocky Mountain streams, which have harsher conditions and colder temperatures than most of the species' native range. However, climate change has been reducing snowpack, altering timing and intensity of spring runoff, and warming temperatures (Stewart et al. 2005; Knowles et al. 2006) making conditions less harsh and more favorable to brook trout in many Rocky Mountain streams. Removing brook trout would prevent their spread and establishment higher in the watershed as the climate warms.

Invasion by brook trout has five components: transport, establishment, spread, effects on native organisms, and effects on humans (Dunham et al. 2002). In the upper Mill Creek watershed, the initial transport phase was from either an undocumented stocking by fisheries agencies decades ago, or they came from humans releasing brook trout into the project area either before laws existed to prevent introduction of nonnatives into new waters, or these fish

were stocked illegally. The existing stocking records document only cutthroat trout being stocked into these waters (FWP 2021).

Establishment and spread allow for stepwise and expanding invasion into new habitat; however, several factors can limit spread of brook trout. In the high elevation project area with great capacity to accumulate mountain snowpack, cold water and heavy spring runoff can limit establishment of brook trout (Adams 1999; Cunjak et al. 2011). Being fall spawners, brook trout young are susceptible to extreme spring runoff events (Cunjak et al. 2011). Their eggs and alevins may be in the gravel during spring floods that rework the streambed and smash these vulnerable life stages. Likewise, newly hatched brook trout may not be able to withstand these extreme events and be swept from the project area. Yellowstone cutthroat trout fry do not suffer through spring runoff, as they are spring spawners and their fry emerge in summer.

Brook trout appear to be restricted to Mill Creek Meadow Spring Creek with occasional brook trout occurring in Mill Creek and East Fork Mill Creek, although sampling in the 1990s found brook trout to be relatively abundant in Mill Creek upstream of the constructed barrier, and a few brook trout were captured in East Fork Mill Creek in the 1960s (FWP 2021). Basin-wide fish sampling and collection of eDNA to locate brook trout have not found brook trout to have spread beyond the confluence of East Fork Mill Creek. Focusing removal on Mill Creek Meadow Spring Creek during fall spawning would likely be effective in capturing most brook trout; however, expanding effort into the main stem Mill Creek and East Fork Mill Creek as resources allow would be extra protective.

Effects of brook trout invasion on native fish is the fourth component of the invasion process (Dunham et al. 2002). Nonnative fish can eliminate native fish through hybridization, predation, and competition, or a combination of these stressors. Research on brook trout and cutthroat trout interactions in the Intermountain West suggest brook trout displace cutthroat trout through competition for resources given substantial similarities in their habitat and food requirements (Griffiths 1988; Shepard 2010). The mechanisms that promote displacement of cutthroat trout are complex, with behavioral interactions, habitat use, and nature of the habitat influencing the outcome (Dunham et al. 2002). Nevertheless, the overlap of habitat and food requirements between brook trout and cutthroat trout, known as niche overlap, allows brook trout to displace cutthroat trout in suitable habitats (Shepard 2010).

The most pronounced effect of brook trout on cutthroat trout may be reduction in survival of young ages (Novinger 2000; Dunham et al. 2002; Shepard et al. 2002; Peterson et al. 2004; McGrath and Lewis 2007; Shepard 2010). Brook trout are fall spawners and have several months of growth before cutthroat trout fry emerge. The ability of the larger, older brook trout

to exclude newly emerged and smaller Yellowstone cutthroat trout from necessary resources appears to account for failure of young cutthroat trout to survive. Yellowstone cutthroat trout did not evolve with a competitor for this habitat, making occupation of critical rearing habitat by larger brook trout young especially harmful to Yellowstone cutthroat trout.

The last component of a brook trout invasion is its effect on humans (Dunham et al. 2002). Given their ability to displace cutthroat trout, brook trout affect the ability of state and federal agencies to conserve cutthroat trout as required under law.

Another cost to humans of a brook trout invasion and resulting displacement of native cutthroat trout is a loss of biodiversity and part of the natural heritage of a wild place. Not all people value native cutthroat trout; however, many value them passionately. Failure to act brings the moral cost of losing part of our natural world, and cumulatively, failure to act threatens the persistence of Yellowstone cutthroat trout. We are answerable to future generations to protect our natural world and its native inhabitants.

1.1.3 Justification for Rainbow Trout and Hybrid Removal

Although brook trout are the primary species targeted for removal, rainbow trout and hybrids would also be removed when encountered. Rainbow trout are the biggest cause of decline of Yellowstone cutthroat trout (Kruse et al. 2000), and the invasion of rainbow trout over the barrier at the Custer Gallatin National Forest boundary puts this stronghold for Yellowstone cutthroat trout at risk, especially when considering how quickly hybridization reduces fitness (Muhlfeld et al. 2009). Mill Creek Meadow Spring Creek does not appear to provide preferred habitat for rainbow trout and hybrids, as they were relatively rare during an October sampling effort (Figure 8). Nevertheless, the risk rainbow trout pose warrants removal when encountered.

1.2 *Goal of Proposed Action*

The goal of the proposed action is to secure a core conservation population of Yellowstone cutthroat trout in the upper Mill Creek watershed by removing nonnative brook trout after capturing them with electrofishing and traps and suppressing rainbow trout and rainbow trout × Yellowstone cutthroat trout hybrids when encountered.

1.3 *Relevant Plans*

FWP is the lead agency for this project, and the project would follow priorities and practices established for conservation of native trout in Montana (Table 1). These documents describe management, conservation, and restoration goals for Yellowstone cutthroat trout, listed or

sensitive wildlife species, or criteria for maintaining the natural or aesthetic values of the surrounding landscape.

Table 1. Planning and strategy documents with relevance to conserving Yellowstone cutthroat trout in the upper Shields River watershed.

Agency	*Title*	*Website*
FWP	Statewide fisheries management plan 2019	http://fwp.mt.gov/fishAndWildlife/management/fisheries/statewidePlan/
FWP	Yellowstone cutthroat trout strategy for Montana (Endicott et al. 2013)	http://fwp.mt.gov/fwpDoc.html?id=59859
FWP	Yellowstone cutthroat trout: A wild survivor story map	https://mtfwp.maps.arcgis.com/apps/Cascade/index.html?appid=fdf5c7af3413435da2c2190aab5ef9c3
Montana Cutthroat Trout Steering Committee (MCTSC)	Memorandum of understanding and conservation agreement for westslope trout and Yellowstone cutthroat trout in Montana (MCTSC 2007)	http://fwp.mt.gov/fishAndWildlife/management/yellowstoneCT/

1.4 *Overlapping Jurisdictions & Authority*

FWP has the authority and responsibility to implement native fish conservation projects in Montana. The Montana Code Annotated {MCA 87-1-702; MCA 87-1-201[9][a]) directs FWP to perform the following actions:

- Perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects;
- Manage wildlife, fish, game and nongame animals in a manner that prevents the need for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq;
- Manage listed species, sensitive species, or a species that is a potential candidate for listing under the federal Endangered Species Act, U.S.C. 1531, et seq., in a manner that assists in the maintenance or recovery of those species.

1.5 *Estimated Commencement Date:*

Mechanical removal of brook trout would likely begin in fall of 2022, unless wildfire or weather interfere with site access. Mechanical removals require substantial effort (Shepard et al. 2014). To promote project success, mechanical removals would occur annually for 10 years, or until brook trout are eradicated.

1.6 *Consultation*

Preparation of this EA included consultation with several entities. Under state policy, agencies going through the MEPA process must contact tribes with interest in the area. The project area has been home to several tribes over centuries, with the Crow Tribe most recently occupying these lands. FWP's tribal liaison and diversity coordinator will review the EA and consult with tribal entities. The final proposed project shall include a detailed plan for including tribal perspectives and interests in the area in accordance with FWP's tribal consultation policy.

2 Alternatives

2.1 *Alternatives Considered*

2.1.1 Alternative 1: Proposed Action

The proposed action is to mechanically remove brook trout, rainbow trout, and rainbow trout × Yellowstone cutthroat trout hybrids from Mill Creek Meadow Spring Creek using electrofishing and traps, with an emphasis on brook trout. Before removal efforts begin, overhanging vegetation and debris would be removed to increase capture success. As resources allow, removals would occur in adjacent portions of Mill Creek and East Fork Mill Creek.

The level of effort would follow research on projects where mechanical removal was a feasible and effective approach to eradicating the nonnative fish from the project area (Shepard et al. 2014). Mechanical removal can be effective in streams less than 2 miles in length, and Mill Creek Meadow Spring Creek is about ½-miles long. Factors that increase successful eradication include using multiple treatments per year, maximizing the number of electrofishing passes per removal event, and removing overhanging vegetation and other debris that provide refuge for fish (Shepard et al. 2014). In addition, the tendency for brook trout to aggregate during fall (Cunjak and Power 1986) would concentrate brook trout in Mill Creek Meadow Spring Creek, where they can be easily captured.

Removal efforts would primarily occur in October when brook trout are congregating in Mill Creek Meadow Spring Creek, although removal passes may also be attempted in other months to determine effectiveness. Two or more field crews of 2 to 3 people would conduct removal passes using backpack electrofishers. The number of removal events would vary with staff availability, but a minimum of 4 days of removal efforts would occur each year with numerous passes occurring each day. The number of passes required to eradicate brook trout varied among streams (Shepard et al. 2014) with as few as 13 and as many as 29 required to eradicate brook trout. Considering the short length of Mill Creek Meadow Spring Creek and its simple

habitat, eradication may be possible in one week of treatments, as field crews would likely be able to conduct 29 passes in one week.

Installation of a trap at the confluence of Mill Creek Meadow Spring Creek with Mill Creek would capture brook trout entering the small stream and provide information on brook trout movements and their presence beyond Mill Creek Meadow Spring Creek. In addition, the trap or block nets would serve as a barrier to downstream movement of brook trout and prevent their escape to larger waters during removal efforts.

Removal passes in Mill Creek and East Fork Mill Creek would occur as resources allow and as monitoring indicates brook trout may be outside Mill Creek Meadow Spring Creek. Environmental DNA or eDNA present in stream samples allows for determination of the spatial extent of brook trout. Samples collected in 2018 found brook trout eDNA upstream of the barrier, which could have been from fish in Mill Creek Meadow Spring Creek. No brook trout eDNA was found in synoptic sampling at locations throughout upper Mill Creek (FWP 2021). The apparently restricted distribution of brook trout would contribute to the success of eradication efforts.

Although the project has potential to eradicate brook trout in a single year with the effort described, some fish may evade capture, or brook trout may spawn before removal and their offspring would recolonize Mill Creek Meadow Spring Creek. Monitoring using electrofishing and eDNA would guide the duration of the removal effort and the number of passes planned for subsequent years.

2.1.2 Alternative 2: No Action

Under the no action alternative, agencies would not remove brook trout from Mill Creek Meadow Spring Creek or nearby waters.

2.2 *Alternatives Considered but Dismissed*

2.2.1 Chemical Removal

Under this alternative, we would use a formulation of rotenone to remove brook trout from Mill Creek Meadow Spring Creek. In this case of Mill Creek Meadow Spring Creek, rotenone would be effective, but research shows mechanical removal is more cost-effective in short reaches of stream with simple habitat (Shepard et al. 2014). Removing debris would further facilitate capture of brook trout, rainbow trout, and hybrids. Opting for mechanical removal in these situations where it has high potential to be effective avoids potential adverse effects on nontarget organisms.

2.2.2 Angling

Angling would not eradicate brook trout or substantially suppress the population. Angling does not target young-of-the-year fish and is otherwise an inefficient means of fish capture. Any reductions in fish numbers from angling would free resources for the next generation of brook trout. Few anglers would be interested in fishing this small stream when much more productive and picturesque streams are nearby. Catch and possession limits for brook trout are 20 fish per day and 20 fish in possession, so interested anglers could assist in reducing numbers of brook trout by harvesting brook trout.

3 Affected Environment and Predicted Environmental Consequences

3.1 *Land Use*

3.1.1 Alternative 1: Proposed Action – Land Uses

Recreation, primarily angling, and livestock grazing are the main land uses along Mill Creek Meadow Spring Creek. The project would eliminate opportunities to fish for brook trout, although few anglers target brook trout in Mill Creek Meadow Spring Creek, and most anglers are targeting native Yellowstone cutthroat trout in the adjacent Mill Creek. Brook trout would remain abundant and well-distributed across trout-bearing waters in Montana, which would provide quality angling and opportunities to harvest brook trout. Removal of brook trout would be protective of the watershed's Yellowstone cutthroat trout, which provide a popular recreational fishery and high-quality angling.

Livestock grazing would be unaffected by the project. The current level of use by livestock is compatible with riparian function and stream channel integrity along Mill Creek Meadow Spring Creek. Future restoration of Mill Creek through the meadow includes best management practices to control livestock's access to streams.

3.1.2 Alternative 2: No Action

The no action alternative puts the future of upper Mill Creek's Yellowstone cutthroat trout at risk of being displaced by brook trout. The opportunity to fish for native Yellowstone cutthroat trout could be eventually lost.

3.1.3 Comparison of Alternatives and Cumulative Effects

Implementing the proposed action would have minor and short-term effects on land uses in the project area. The loss of brook trout in a 0.5-mile stream that receives little fishing pressure would be mitigated by protecting the high-quality angling for Yellowstone cutthroat trout in adjacent Mill Creek. Brook trout would remain widespread throughout Montana and provide

plentiful opportunities for fishing and harvest. Removing brook trout would be protective of this high value fishery of native Yellowstone cutthroat trout. No cumulative effects outside of eradication of a small population of brook trout is expected.

Not implementing the project could alter recreation by allowing brook trout to remain in this stronghold for Yellowstone cutthroat trout. Brook trout are among the biggest threats to Yellowstone cutthroat trout, especially in headwater streams, so removing these fish would be protective over the long-term. Brook trout would continue to provide recreational fishing in Montana, and more waters are managed for brook trout fisheries than native trout fisheries (FWP 2019) so removing the recently invaded brook trout would not affect overall opportunity to fish for and harvest brook trout. The cumulative effects of not implementing the project include loss of angling opportunity for Yellowstone cutthroat trout within their historic range and loss of a core conservation population of Yellowstone cutthroat trout.

3.2 *Soils*

3.2.1 Alternative 1: Proposed Action

Soils would be unaffected by the proposed action.

3.2.2 Alternative 2: No Action

The no action alternative would not affect soils.

3.2.3 Comparison of Alternatives and Cumulative Effects

Neither alternative would affect soils.

3.3 *Vegetation*

3.3.1 Alternative 1: Proposed Action—Vegetation

Under the proposed action, fieldworkers would be in the project area during removal efforts and have potential to trample sensitive plant species. The Montana Natural Heritage Program provides information on status, life history, and habitat needs that plant species of concern occurring within a specified area (MNHP 2021). The download for the township and range in which the Mill Creek Meadow Spring Creek occurs found three plant species of concern (Table 2).

Table 2: Plant species of concern known to occur near the project area (MNHP 2021).

Species Group	Common Name	Scientific Name	State Rank	CGNF Rank
Vascular plants	Musk-root	*Adoxa moschatellina*	S3	SK
Vascular plants	Beautiful Fleabane	*Erigeron formosissimus*	S1S3	
Vascular plants	Whitebark Pine	*Pinus albicaulis*	S3	C

S1 = At high risk because of extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.
S3 = Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.
SK- sensitive - known
C= candidate for protection under the Endangered Species Act.

Review of field guide information on these plant species indicate the proposed action would have minor or no effect on these plant species of concern. For musk-root and beautiful fleabane, an October project implementation would be protective of these plants, which could find suitable habitat within the floodplain of Mill Creek and adjacent to Mill Creek Meadow Spring Creek. Fieldworkers would be present after plants have completed sensitive flowering stages, will have gone to seed, and would be dormant.

Whitebark pine occur in higher elevations in the Mill Creek watershed, and the project area does not provide suitable habitat for this terrestrial plant that grows at high elevation. This project would not affect whitebark pine.

3.3.2 Alternative 2: No Action

The no action alternative would not affect vegetation.

3.3.3 Comparison of Alternatives and Cumulative Effects

Neither alternative would harm plant species of concern in the project area. Short-term trampling of dormant vegetation would occur under the proposed action. No cumulative effects would be expected for plants in the project area under either alternative.

3.4 *Wildlife and Fish*

3.4.1 Alternative 1: Proposed Action

Changes in the Diversity and Abundance of Game Animals and Birds

Given the wildness of the surrounding area, the project area supports an abundance of game species, including moose, elk, mule deer, white-tailed deer, black bear, and gray wolf. Upland game birds including dusky grouse and ruffed grouse are also likely present. Presence of fieldworkers would temporarily displace game species during removal efforts. This disturbance would be short-term and minor, with efforts being restricted to 1 to 2 weeks per year. Mill Creek Meadow Spring Creek has homes and ranch infrastructure, is close to a road, and is popular among anglers, so the human footprint is already substantial along Mill Creek Meadow Spring Creek.

Diversity or Abundance of Nongame Species

A diversity of nongame animals call Mill Creek Meadow Spring Creek and nearby Mill Creek home. These include many songbirds, small mammals, invertebrates, amphibians, and reptiles. Timing the project for October would result in many species having migrated for the winter, being dormant or hibernating. Animals present during mechanical removal efforts would be temporarily disturbed, which would be minor and short-term. The area is a popular for fishing, and humans occupying the project area is a common occurrence.

Potential Effects on Species of Special Concern and Sensitive, Threatened or Endangered Species

Presence or potential presence of species of concern comes from field sampling and observations and the Montana Natural Heritage Program database. The Montana Natural Heritage Program {MNHP) maintains a database and field guide on species distribution, status, ecology, life history strategies of animals, and sightings throughout the state. This database provided the technical basis for determining potential effects on species of special concern. The database includes a comprehensive list of citations to support information presented in the field guide and this document.

The project area is within the range of numerous species of special concern and species designated as sensitive by the USFS (Table 4). The ranges delineated are broad and may not reflect the suitability of habitat for a given species occurring within the project area. The footprint of the project area is small, and many species known to the area are unlikely to be present in the project area.

Bison have been observed in the larger project area; however, this project would be unlikely to affect bison. A fence and bison guard on Highway 89 South, constructed in the late 2000s, restricts the movement of bison into Paradise Valley when they move out of Yellowstone National Park during winter months. Bison no longer have access to lands beyond the fence and would not be present in the project area during brook trout removals.

Table 3: Species of special concern, sensitive, and threatened species with ranges overlapping the project area.

Species Group	Common Name	Scientific Name	State Rank	CGNF Rank
Mammals	Bison	*Bos bison*	S2	
Mammals	Canada lynx	*Lynx canadensis*	S3	LT,CH
Mammals	Grizzly bear	*Ursus arctos*	S2S3	LT
Mammals	Hoary bat	*Lasiurus cinereus*	S3	
Mammals	Little brown myotis	*Myotis lucifugus*	S3	
Mammals	Long-eared myotis	*Myotis evotis*	S3	
Mammals	Townsend's big-eared bat	*Corynorhinus townsendii*	S3	SK

Mammals	Wolverine	*Gulo gulo*	S3	SK
Birds	Golden eagle	*Aquila chrysaetos*	S3	
Birds	Harlequin duck	*Histrionicus histrionicus*	S2B	SK
Birds	Peregrine falcon	*Falco peregrinus*	S3	SK
Fish	Yellowstone cutthroat trout	*Oncorhynchus clarkii bouvieri*	S2	SK
Invertebrates	Berry's mountainsnail	*Oreohelix strigosa berryi*	S1S2	

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

S2 = At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.

S3 = Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.

LT= listed as threatened under Endangered Species Act.

CH = critical habitat

SK= known sensitive species

The Montana Natural Heritage Program lists the larger area as critical habitat for Canada lynx (Table 3). This designation relates to rare carnivore monitoring in the upper Mill Creek drainage in the 2000s (Gehman et al. 2010). A single female was observed during six consecutive winters in the headwaters of Mill Creek from 2003 through 2009. This female apparently did not encounter a male or have kittens while present in Mill Creek. She was presumed to have died or left the Mill Creek watershed, and no signs of Canada lynx have been seen in the watershed since. The project would have negligible effects on Canada lynx. They would be unlikely be present close to roads and development if present in the watershed. Canada lynx stick to forested, montane areas where their prey of snowshoe hare and mountain grouse are abundant.

The project is within grizzly bear country. Encounters with bears would be unlikely given the number of fieldworkers present during removals. Dead fish would be taken away to avoid attracting bears to an area with residences and substantial recreational use. Fieldworkers may temporarily disturb bears during removals, but this disturbance would be short-term and minor.

Several bat species of concern have been observed close to the project area. Several factors would limit disturbance to bats. Project timing for October would likely coincide with bats occupying hibernacula or some species, like the hoary bat, migrate south for the winter. Limiting brook trout removals to daytime would avoid the active periods of bats in the event a warm, fall evening entices bats out to forage.

The potential for wolverines to experience disturbance from proposed project activities is limited. Wolverines have been observed in the general area in the past 5 to 10 years, and the overall number of observations since data have been collected in the 1970s is from 25 to 38 wolverines (MNHP 2021). Wolverines prefer large tracts of mountainous, roadless wilderness (Groves 1988), and the project area is relatively heavily roaded. Moreover, wolverines in Montana have expansive home ranges, with females averaging nearly 150 square miles and males averaging 162 square miles (Hornocker and Hash 1981). The combination of road avoidance and the small footprint of the project area would make the proposed action highly unlikely to influence wolverines. If disturbed, the disturbance would be short-term and minor, with wolverines being temporarily displaced from a small area of unsuitable habitat.

Birds of prey including the peregrine falcon and golden eagle are among species of concern known to occur near the project area. Peregrine falcons migrate south in September and would not be present during brook trout removals. Golden eagles are generalists and highly mobile. Presence of fieldworkers during brook trout removals would be unlikely to disturb golden eagles.

Harlequin ducks have been known to breed in Mill Creek. This duck lives mostly along the eastern Pacific coast, but it flies into the Rocky Mountains to breed in cold, mountain streams. Males arrive first and return to the Pacific Ocean soon after mating. Hens and their broods would have migrated to the overwintering, marine habitat by September. Not being present during the project, this action would not affect harlequin ducks.

Yellowstone cutthroat trout are a state species of concern and the USFS designates them as a sensitive species. The goal of the project would be to protect a high elevation population of Yellowstone cutthroat trout within the climate shield (Isaak et al. 2015; Isaak et al. 2017). The goal is compatible with state law and Montana's fisheries management plan (FWP 2019). Yellowstone cutthroat trout would be released unharmed during brook trout removals.

The Berry's mountainsnail is the only invertebrate species of concern reported in the area of the proposed action. This terrestrial snail is known from one observation over 20 years ago. It is a rare species with patchy distribution in Montana and little survey data available. As a terrestrial snail that holds its eggs internally in their shells until hatching, this project is unlikely to affect this rare, terrestrial snail.

Creation of a Barrier to the Movement or Migration of Animals

This project would employ traps that would capture fish entering Mill Creek Meadow Spring Creek and block nets that would keep fish in the stream during electrofishing. Trapping would

provide information on presence of brook trout outside of Mill Creek Meadow Spring Creek. The block nets would keep fish from escaping capture by leaving Mill Creek Meadow Spring Creek. Such barriers to movement would be short-term and relegated to the removal effort.

Increase in Conditions That Would Stress Wildlife

Presence of fieldworkers along the ½-mile length of Mill Creek Meadow Spring Creek for several days over a few years would temporarily displace wildlife, but this disturbance would be short-term and of limited spatial extent, making it short-term and minor.

3.4.2 Alternative 2: No Action

The no action alternative would not protect a high conservation value population of Yellowstone cutthroat trout. Brook trout would remain a threat that could spread through the basin, and brook trout are not compatible with Yellowstone cutthroat trout in headwater streams. Failure to reduce numbers of rainbow trout and hybrids would further jeopardize the genetic integrity of Mill Creek's Yellowstone cutthroat trout. Eventual loss of Mill Creek's Yellowstone cutthroat trout is possible through hybridization with rainbow trout and competition with brook trout.

3.4.3 Comparison of Alternatives and Cumulative Effects

The proposed action would bring measurable benefit to Yellowstone cutthroat trout with removal of brook trout and incidental removal of hybrids and rainbow trout. Effects on nontarget organisms would be negligible and short-term. Failing to act puts Mill Creek's Yellowstone cutthroat trout at risk. No cumulative effects, other than a protected population of Yellowstone cutthroat trout is expected from the proposed action.

The no action alternative would allow brook trout to remain in a stronghold for Yellowstone cutthroat trout. So far, brook trout have not made major inroads into the larger watershed; however, a favorable period with low water years and warm temperatures may allow brook trout to spread to headwaters. By not removing rainbow trout and rainbow trout × Yellowstone cutthroat trout hybrids, nonnative genes would continue to spread through the watershed, which decreases fitness of offspring and is the major cause of decline of Yellowstone cutthroat trout. The cumulative effect of the no action alternative would be loss of this stronghold for Yellowstone cutthroat trout.

3.5 *Water Resources*

3.5.1 Alternative 1: Proposed Action

Potential Effects on Surface Water Quality

Mechanical removal of brook trout would have minor and extremely short-term effects on water quality. Mill Creek Meadow Spring Creek's streambed is heavily sedimented, so the disturbance of fieldworkers electrofishing would temporarily increase turbidity. Removal of overhanging vegetation may temporarily increase water temperature by decreasing shading, but this alteration would be short-lived with riparian shrubs growing after the project is completed.

Potential Effects on Groundwater Quality

This proposed action would not affect groundwater quality.

Effects on Other Water Users

This project would not affect other water users.

Relevance to State of Federal Water Quality Standards

The proposed action does not have relevance to state or federal water quality standards. No permits are needed.

3.5.2 Alternative 2: No Action

Under the no action alternative, no changes relating to state or federal water quality standards would occur, and no permits would be necessary.

3.5.3 Comparison of Alternatives and Cumulative Effects

Neither action would affect water quality, water users, or result in cumulative effects.

4 Effects on the Human Environment

4.1 *Aesthetics and Recreational Opportunities*

4.1.1 Alternative 1: Proposed Action

The proposed action would protect opportunities to fish for Yellowstone cutthroat trout in Mill Creek, which is an angler favorite. Allowing brook trout to remain and eventually expand could result in loss of Mill Creek's Yellowstone cutthroat trout. In the cold waters of the project area, a brook trout fishery would not offer the same recreational opportunities as Yellowstone

cutthroat trout. Brook trout are currently restricted to a small area in Mill Creek Meadow Spring Creek and are rarely targeted by anglers.

Landownership affects recreational opportunities along Mill Creek and Mill Creek Meadow Spring Creek (Figure 9). The spring creek's confluence with Mill Creek is on the Custer Gallatin National Forest, but landownership changes to private about 0.1-mile upstream of the confluence. Anglers can access Mill Creek and Mill Creek Meadow Spring Creek legally and fish through the meadow. Mill Creek offers considerably higher quality fishing than Mill Creek Meadow Spring Creek. Anglers would have potential to run into field crews during the removal efforts. This would be a minor and short-term alteration of the angling experience.

The project coincides with rifle season. Hunters have access to the public lands within a small portion Mill Creek meadow but would need permission to hunt the private land (Figure 9). Brook trout removal efforts would have little potential to alter hunting. The Mill Creek meadow is a small inholding surrounded by national forest, and hunters would have the rest of the watershed to hunt.

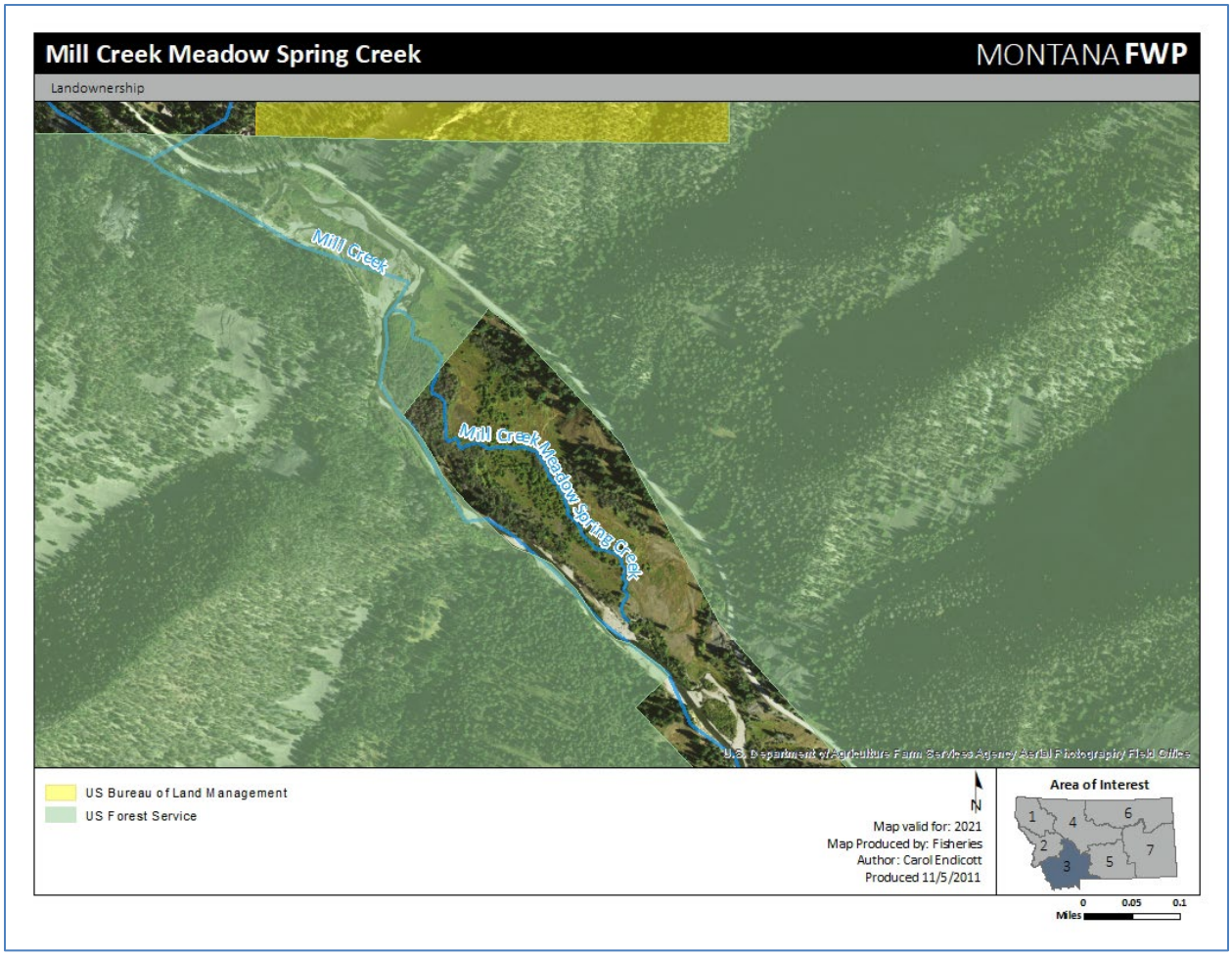

Figure 9. Landownership along Mill Creek Meadow Spring Creek.

4.1.2 Alternative 2: No Action

Not implementing the project could allow brook trout to expand from Mill Creek Meadow Spring Creek into the larger watershed, and climate change alters snowpack and runoff in ways that favor brook trout expansion. The establishment of brook trout in the larger watershed would put the Yellowstone cutthroat trout at risk given the incompatibility of brook trout to cutthroat trout (Dunham et al. 2002; Shepard 2010). Moreover, not implementing the project would not allow for incidental removal of rainbow trout and rainbow trout × Yellowstone cutthroat trout that also threaten Mill Creek's Yellowstone cutthroat trout. A vulnerable population of Yellowstone cutthroat trout would not be protected and would be subjected to the primary causes of their decline.

4.1.3 Comparison of Alternatives and Cumulative Effects

Implementing the project would result in short-term disturbance associated with fieldworkers implementing the project and a temporary reduction in the abundance of Yellowstone

cutthroat trout. Yellowstone cutthroat trout populations recover rapidly when returned to reclaimed streams. Removal of brook trout would protect recreational fishing for native cutthroat trout, which is an increasing rare angling opportunity. No cumulative effects to recreation are expected.

The no action alternative would result in eventual loss of a core conservation population of Yellowstone cutthroat trout and eliminate the opportunity to fish for native cutthroat trout in a beautiful, serene setting. Cumulatively, climate change and nonnative fishes are reducing the habitat occupied by Yellowstone cutthroat trout, and not implementing the project would contribute to the cumulative loss of Yellowstone cutthroat trout populations.

4.2 *Community and Taxes*

4.2.1 Alternative 1: Proposed Action

The proposed action would not affect the community beyond the already stated recreational and conservation benefits. Taxes would not be affected.

4.2.2 Alternative 2: No Action

The no action alternative would not have short-term effects on the community; however, over the long term, the cumulative effects of failing to follow through on native fish restoration projects increases the likelihood of including Yellowstone cutthroat trout for protection under the Endangered Species Act. Listing could have a far-reaching effect in communities throughout the Yellowstone cutthroat trout's native range, as it would reduce flexibility in the land and water management activities of landowners, agencies, agriculture, and extractive industries.

4.2.3 Comparison of Alternatives and Cumulative Effects

The proposed action would not affect the community or taxes; however, allowing a population of Yellowstone cutthroat trout to be displaced by brook trout would increase justification for listing the fish for protection under the Endangered Species Act. Cumulatively, listing would not be beneficial to rural communities or governments, as it would decrease flexibility in land management options.

4.3 *Air Quality*

4.3.1 Alternative 1: Proposed Action

Electrofishing is the primary method of removal of brook trout proposed, and battery-powered backpack electrofishers do not release exhaust. Removal in Mill Creek and East Fork Mill Creek would require a boat-mounted electrofisher run by a gas-fueled generator. The generator

would release exhaust that would dissipate rapidly outdoors. This alteration of air quality would be short-term and minor.

4.3.2 Alternative 2: No Action

This alternative would not affect air quality.

4.3.3 Comparison of Alternatives and Cumulative Effects

The proposed activity would have minor, short-term effects on air quality with localized release of exhaust. The no action alternative would not affect air quality. No cumulative effects from use of a generator for short durations is expected.

4.4 *Noise and Electrical Effects*

4.4.1 Alternative 1: Proposed Action

Backpack electrofishers emit a beep when current is flowing in water; however, this noise is not audible far beyond the field crew. If boat-mounted electrofishers are used, the generators powering the electrofisher would make noise during its use. In both cases, the noise is short-term. The noise of the generator would travel farther than the beeping of the electrofisher but would be audible to people close to fieldworkers and would be short-lived. Fieldworkers would wear ear protection as they work close to the generator. The proposed action would not have effects on electrical services.

4.4.2 Alternative 2: No Action

This alternative would not affect noise or electrical services.

4.4.3 Comparison of Alternatives and Cumulative Effects

The proposed action would bring short-term noise from generators and the backpack electrofishers. The no action alternative would not affect noise.

4.5 *Risk or Health Hazards*

4.5.1 Alternative 1: Proposed Action

The proposed action brings risk of injury to fieldworkers from working in rough terrain, and this risk is common to fisheries fieldwork. Following safety requirements for electrofishing would reduce risks to fieldworkers. The project would pose no other risks or health hazards to the public.

4.5.2 Alternative 2: No Action

This alternative would have no effect on human health or related hazards.

4.5.3 Comparison of Alternatives and Cumulative Effects

The proposed action would pose minimal risk to human health as long as fieldworkers following FWP's electrofishing policy, which includes numerous safety measures. Electrofishing is a common activity and injuries can occur, but safety measures mitigate the risk. The no action alternative would not pose a risk to human health. No cumulative effects to human health are expected from either alternative.

4.6 *Cultural Resources*

4.6.1 Alternative 1: Proposed Action

This alternative would not affect cultural resources because no ground ground-disturbing activities are part of the proposed action.

4.6.2 Alternative 2: No Action

This alternative would not affect cultural resources.

4.6.3 Comparison of Alternatives and Cumulative Effects

Neither alternative would affect cultural resources.

5 Need for an Environmental Impact Statement

Evaluation of the environmental, social, cultural, and economic effects of the proposed alternative found any effects to be short-term and minor. Moreover, the proposed action would be beneficial in achieving conservation goals for Yellowstone cutthroat trout. The community would benefit from protecting and improving the status of this native fish.

Evaluation of the no action alternative found this alternative would have no negative effects on most aspects of human health or the environment. However, this alternative would likely result in the loss of a core conservation population of Yellowstone cutthroat trout. Protecting genetically unaltered Yellowstone cutthroat trout cutthroat trout is the highest priority under the MOU for cutthroat trout conservation in Montana (MCTSC 2007). State and federal law authorizes agencies and their partners to implement projects that protect imperiled populations of Yellowstone cutthroat trout.

FWP reviewed the alternatives and found the proposed alternative would have no, or only short-term and minor effects on all the categories evaluated. Therefore, there is no need for the preparation of an environmental impact statement.

6 Public Participation

6.1 *Public Involvement*

Public notification of the EA release and opportunities will be through the following media:

- Legal notices posted in *The Livingston Enterprise, The Bozeman Daily Chronicle, The Billings Gazette*
- Direct mailing to adjacent landowners and interested parties
- Public notices on the FWP webpage {*http://fwp.mt.gov*)
- At least one public meeting will be held during the public comment period. Date, time, and location of the public meeting will be publicly noticed.

Copies of this EA will be available for public review at FWP Headquarters the FWP website {*http://fwp.mt.gov*).

6.2 *Public Comment Period*

The public comment period will extend from July 6 to August 5. Written comments will be accepted until 5:00 pm on August 5.

Send comments to:

Montana Fish, Wildlife & Parks
Mill Creek Yellowstone cutthroat trout conservation
PO Box 200701
Helena, MT 59620
(406) 444-2449
fwpfishcomments@mt.gov

6.2.1 Parties Responsible for Preparation of the EA

Carol Endicott
Montana Fish, Wildlife, and Parks
6 Church Lane
Livingston, MT 59047
{406) 222-3710
cendicott@mt.gov

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