Montana Fish, Wildlife & Parks

2300 Lake Elmo Drive
Billings, MT 59105
September 10, 2008

TO: Environmental Quality Council
Director's Office, Dept. of Environmental Quality
Montana Fish, Wildlife & Parks*
- Director's Office
- Parks Division
- Fisheries Division
- Wildlife Division
- Lands Section
- Design & Construction
- Legal Unit
- Regional Supervisors

Mike Volesky, Governor's Office *
Sarah Elliott, Press Agent, Governor's Office*
Montana Historical Society, State Preservation Office
Janet Ellis, Montana Audubon Council
Montana Wildlife Federation
Montana State Library
George Ochenski
Montana Environmental Information Center
Wayne Hirst, Montana State Parks Foundation
FWP Commissioner Shane Colton*
David Moore, DNRC Area Manager, Southern Land Office
County Commissioners
Other Local Interested People or Groups
* (Sent electronically)

Ladies and Gentlemen:

Attached for your review is a draft Environmental Assessment for suppressing nonnative fishes in two tributaries of the Yellowstone River near Big Timber, MT, through mechanical removal, and transferring pure Yellowstone cutthroat trout within one watershed and to another creek near Red Lodge. The streams involved are Upper and Lower Deer creeks and Thiel Creek.

Any questions should be directed to Jim Darling (247-2961 or jdarling@mt.gov). Written comments should be addressed to the undersigned by October 10, 2008.

Sincerely,

James E. Darling

Jim Darling
Fisheries Manager

Enclosure

Upper and Lower Deer Creeks Yellowstone Cutthroat Trout Conservation Efforts

Draft Environmental Assessment

September 10, 2008

Carol Endicott
Landowner Incentive Program/
Yellowstone Cutthroat Trout Biologist
1354 Highway 10 West
Livingston, MT 59047

Montana Fish, Wildlife & Parks

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List of Abbreviations

DNRC	Department of Natural Resources and Conservation
EA	Environmental assessment
FWP	Montana Fish, Wildlife & Parks
MCA	Montana Code Annotated
MEPA	Montana Environmental Protection Act
MOU	Memorandum of understanding
NHP	Montana Natural Heritage Program
USFS	United States Forest Service
USFWS	US Fish and Wildlife Service
YOY	Young-of-the-year

Executive Summary

Upper Deer and Lower Deer creeks are tributaries of the Yellowstone River located near Big Timber, Montana. Both streams, and their tributaries, have considerable conservation value for Yellowstone cutthroat trout, as they support genetically pure populations of this native fish. Threats to the persistence of these populations are substantial, and include presence of brook trout and brown trout, which outcompete or prey on Yellowstone cutthroat trout. In addition, hybridization with rainbow trout has emerged as a dire and immediate threat to the pure Yellowstone cutthroat trout in Lower Deer Creek. This proposed action involves suppressing nonnative fishes in these streams through mechanical removal, and transferring pure Yellowstone cutthroat trout within the Lower Deer Creek watershed, and to Thiel Creek, which lies about 40 miles to the southeast.

This document is an environmental assessment (EA) of the potential impacts of the restoration activities on the physical and human environment. EAs are a requirement of the Montana Environmental Policy Act (MEPA) (Montana Code Annotated [MCA] 75-1-102). This law requires state agencies to consider the environmental, social, cultural, and economic impacts of proposed activities.

Evaluation of the impacts of transfer of Yellowstone cutthroat trout and mechanical removal of brown and brook trout indicate this project would have minor, temporary effects on the environment and recreational uses, and no effects on social, cultural, or economic considerations. The most significant effects would be reductions in numbers of nonnative fishes in the affected streams, and increases in abundance and distribution of native Yellowstone cutthroat trout.

MEPA also requires public involvement and opportunity for the public to comment on projects undertaken by state agencies. A 30-day public comment period will extend from September 10 to October 10. A public meeting may occur if public interest in the project warrants this additional forum. Interested parties should send comments to:

Jim Darling
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Montana Fish, Wildlife & Parks
2300 Lake Elmo Drive
Billings, MT 59105
(406) 247-2961
jdarling@mt.gov

1.0 PROPOSED ACTION DESCRIPTION

1.1. Type of Proposed Action

This proposed action is part of native fish restoration efforts aimed at increasing and securing Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*) in its historic range in Montana. This project would address short-term conservation needs in these watersheds through the following activities:

1. Transport young-of-the-year (YOY) and age-1 Yellowstone cutthroat trout from Lower Deer Creek to above a natural falls on the same stream. Establishment of a pure Yellowstone cutthroat trout population above this impassable barrier would provide a source of pure fish for reintroduction into Lower Deer Creek in the event the population becomes extinct or hybridized lower in the drainage.
2. Transport YOY and age-1 Yellowstone cutthroat trout from Lower Deer Creek to Thiel Creek. This action would be the second translocation of Yellowstone cutthroat trout from Lower Deer to Thiel Creek, a tributary of Red Lodge Creek.
3. Mechanically remove brown trout (*Salmo trutta*), brook trout (*Salvelinus fontanalis*), and rainbow trout (*O. mykiss*) from strategic locations in Lower and Upper Deer creeks. This action would enhance Yellowstone cutthroat trout numbers and reduce the threats of hybridization and extinction pending implementation of long-term conservation actions.
4. Mechanically remove brook trout from Thiel Creek above a constructed barrier to promote establishment and self-maintenance of the translocated Yellowstone cutthroat trout population

1.2. Agency Authority for Proposed Action

Authority to conduct the proposed actions comes from the Montana Administrative Code, (MCA 87-1-702). Specifically, this statue authorizes Montana Fish, Wildlife & Parks "to perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects.

1.3. Name and Location of Project

Upper and Lower Deer Creeks Yellowstone Cutthroat Trout Conservation Project.
Yellowstone cutthroat trout conservation actions would occur at several locations. Upper Deer Creek, a tributary of the Yellowstone River in Sweet Grass County, Montana would be the site of mechanical removals of nonnatives (Figure 1). In Lower Deer Creek, the next drainage to the east, Yellowstone cutthroat trout would be collected and transported above a barrier falls, and to Thiel Creek, a tributary of Red Lodge Creek (Figure 2). Other proposed actions for Thiel Creek include mechanical removal of brook trout through electrofishing.

1.4. Name and Address of Project Sponsor

Jim Darling
Regional Fisheries Manager
Montana Fish, Wildlife & Parks
2300 Lake Elmo Drive
Billings, MT 59105
(406) 247-2961
jdarling@mt.gov

1.5. Estimated Commencement Date and Schedule

Suppression of nonnatives would begin in mid-October 2008. Capture and transfer of Yellowstone cutthroat trout would occur in spring of 2009. Suppression of nonnatives would continue during Yellowstone cutthroat trout collection efforts.

1.6. Location Affected by Proposed Action

The proposed action would occur in considerable portions of three watersheds: Upper Deer Creek, Lower Deer Creek, and Thiel Creek (see Figure 1, Figure 2, and Table 1).

Table 1: Township, range, and sections where proposed actions would occur.

Watershed	Township	Range	Sections	Action
Upper Deer Creek	2S	14E	12, 13, 14, 23, 26, 34, 36	Mechanical removal of brown trout and brook trout
	3S	14E	3, 10, 15, 22, 21, 28, 29, 32	Mechanical removal of brown trout and brook trout
Lower Deer Creek	2S	15E	29, 32	Mechanical removal of brown trout, rainbow trout, and hybrids, capture of Yellowstone cutthroat trout
Lower Deer Creek	3S	15E	30	Transfer of Yellowstone cutthroat trout
Lower Deer Creek	3S	14E	25, 26, 34	Transfer of Yellowstone cutthroat trout
Thiel Creek	6S	19E	26, 35, 36, 27, 37	Mechanical removal of brook trout and transfer of Yellowstone cutthroat trout

1.7. Project Size (Acres Affected)

	Acres		Acres
(a) Developed	0	(d) Floodplain	0
Residential	0		
Industrial	0	(e) Productive	0
		Irrigated cropland	0
		Dry cropland	0
(b) Open space/Woodlands/Recreation	0	Forestry	0
		Rangeland	0
(c) Wetlands/Riparian areas	Approx. Stream Miles[1]	Other	0
Upper Deer Creek	13		
Lower Deer Creek	10		
Thiel Creek	7		

[1]Suppression and reintroduction activities would occur somewhere within these stream miles, but not all miles would necessarily be affected.

2.0 Maps of Project

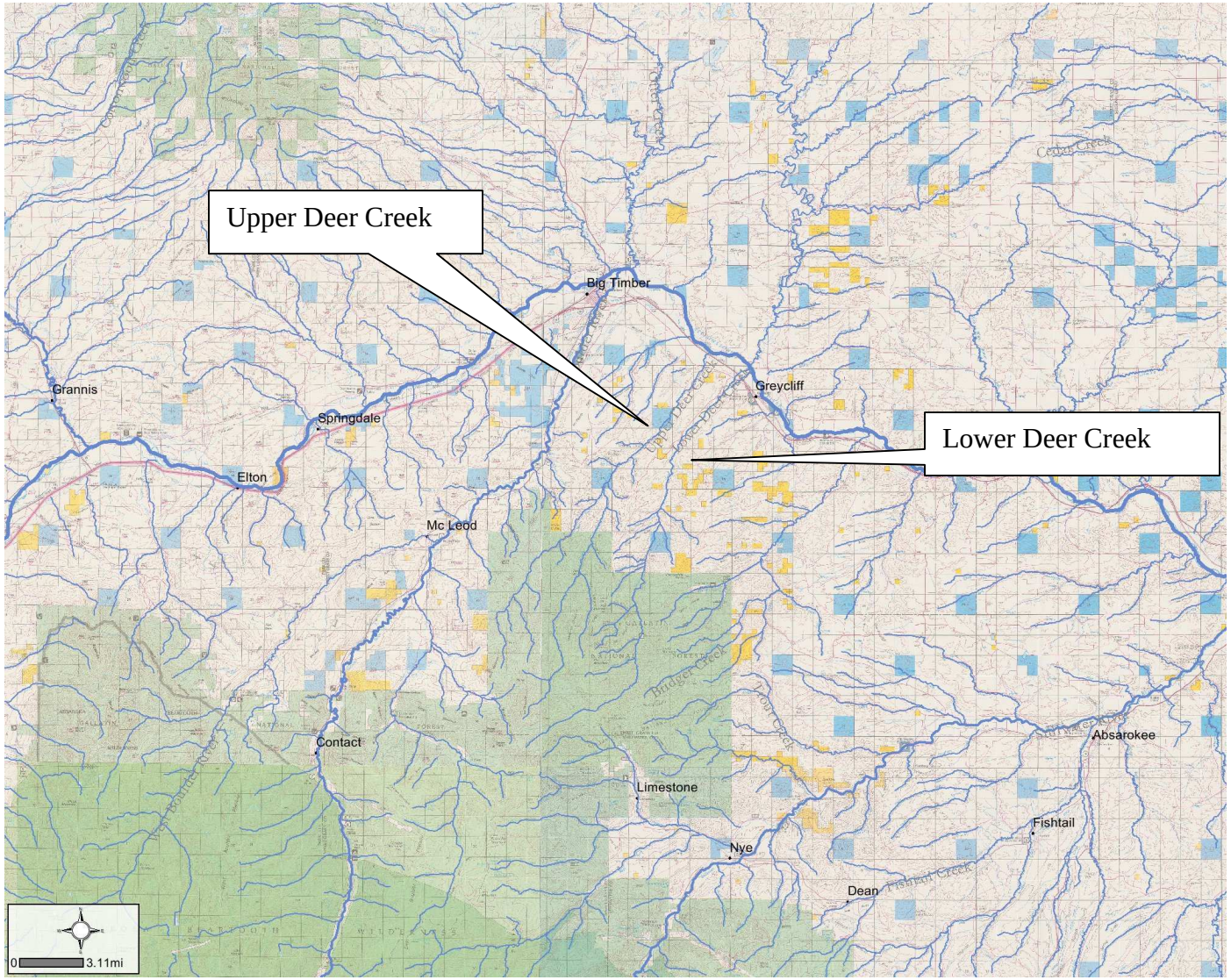

Figure 1: Map of Upper and Lower Deer creeks.

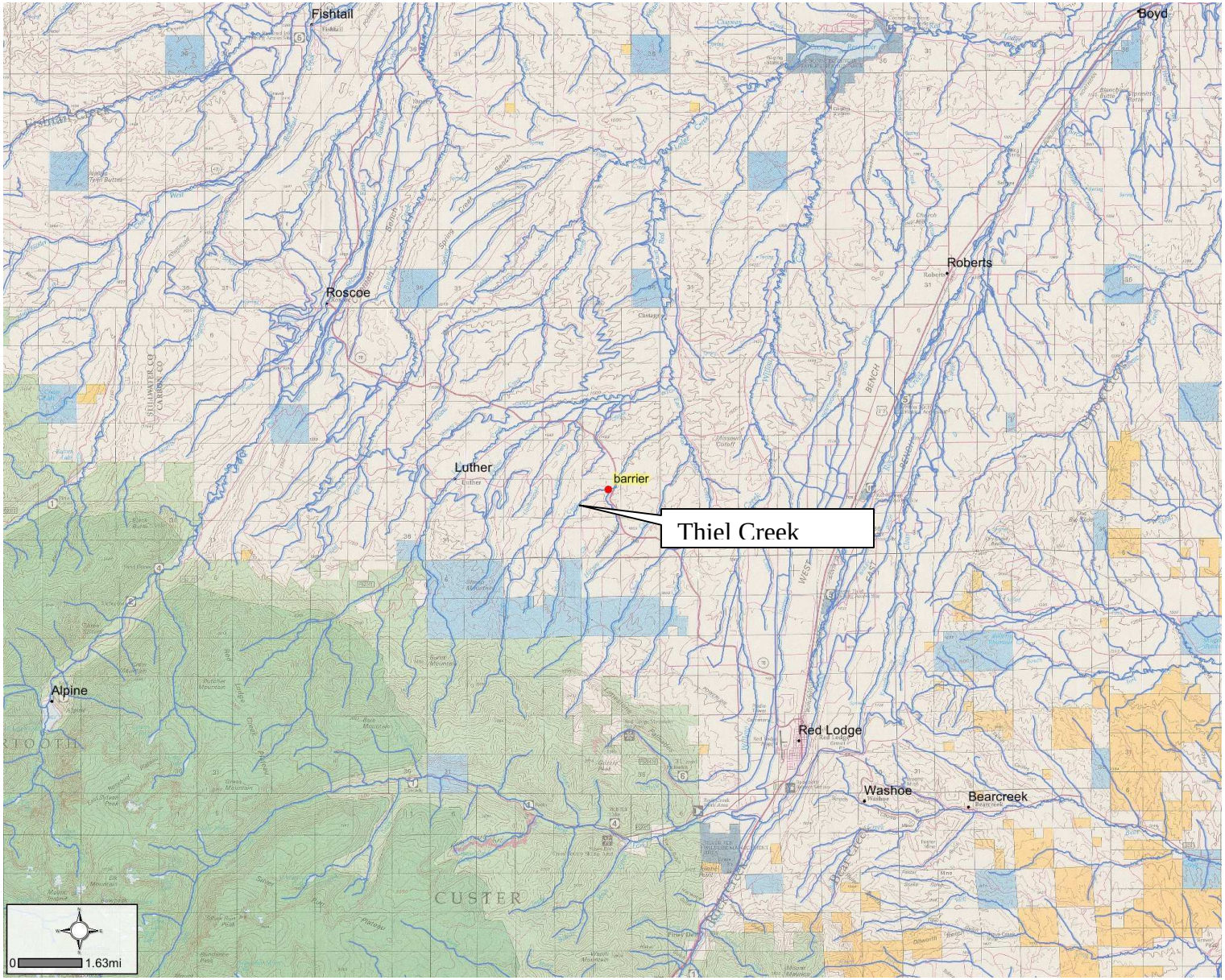

Figure 2: Map of Thiel Creek showing proximity to Red Lodge.

2.1. Listing of Local, State, or Federal Agency That Has Overlapping or Additional Jurisdiction.

(a) Permits:

Agency Name:	Montana Fish, Wildlife & Parks
Permit :	Fish Transfer
Date Filed:	August 10, 2008

(b) Funding:

Agency Name:	Montana Fish, Wildlife & Parks
Funding Amount	$10,000

(c) Other Overlapping or Additional Jurisdictional Responsibilities:

Agency Name:	Montana Fish, Wildlife & Parks
Type of Responsibility:	Management of fisheries resources, including recovery of native species

2.2. Narrative Summary of the Proposed Action and Purpose of the Proposed Action.

2.2.1. Background

This action is a native fish restoration project aimed at protecting pure Yellowstone cutthroat trout populations in the Upper Deer and Lower Deer Creek basins (Figure 1), and expanding the stream miles they occupy in Lower Deer Creek. Thiel Creek, a small stream east of these drainages will also be affected, as it is a refuge for pure Yellowstone cutthroat trout transferred from Lower Deer Creek. This EA covers several proposed activities designed to address short-term needs to secure the genetically pure cutthroat trout in these watersheds. This section details the rationale for embarking on Yellowstone cutthroat trout conservation efforts.

An understanding of the status of Yellowstone cutthroat trout provides substantial justification for implementing conservation projects in these watersheds. The Yellowstone cutthroat trout is native to Montana and several neighboring states: Wyoming, Idaho, Utah, and Nevada. In Montana, Yellowstone cutthroat trout historically occupied streams and lakes in the Yellowstone River watershed having suitable habitat, water quality, and thermal regime. Like many native cutthroat, Yellowstone cutthroat trout have experienced dramatic declines in abundance and range. Conservation populations of Yellowstone cutthroat trout (> 90% genetically pure) now occupy about 34% of its historic range in Montana (May et al. 2007) with the western portion of the Yellowstone River basin being the stronghold. East of the Paradise Valley (located upstream of Livingston) and the Shields River watershed, Yellowstone cutthroat trout become increasing rare (Figure 3). Remaining populations tend to be isolated, and many co-occur with nonnative species. Both factors present considerable threats to the persistence of these populations.

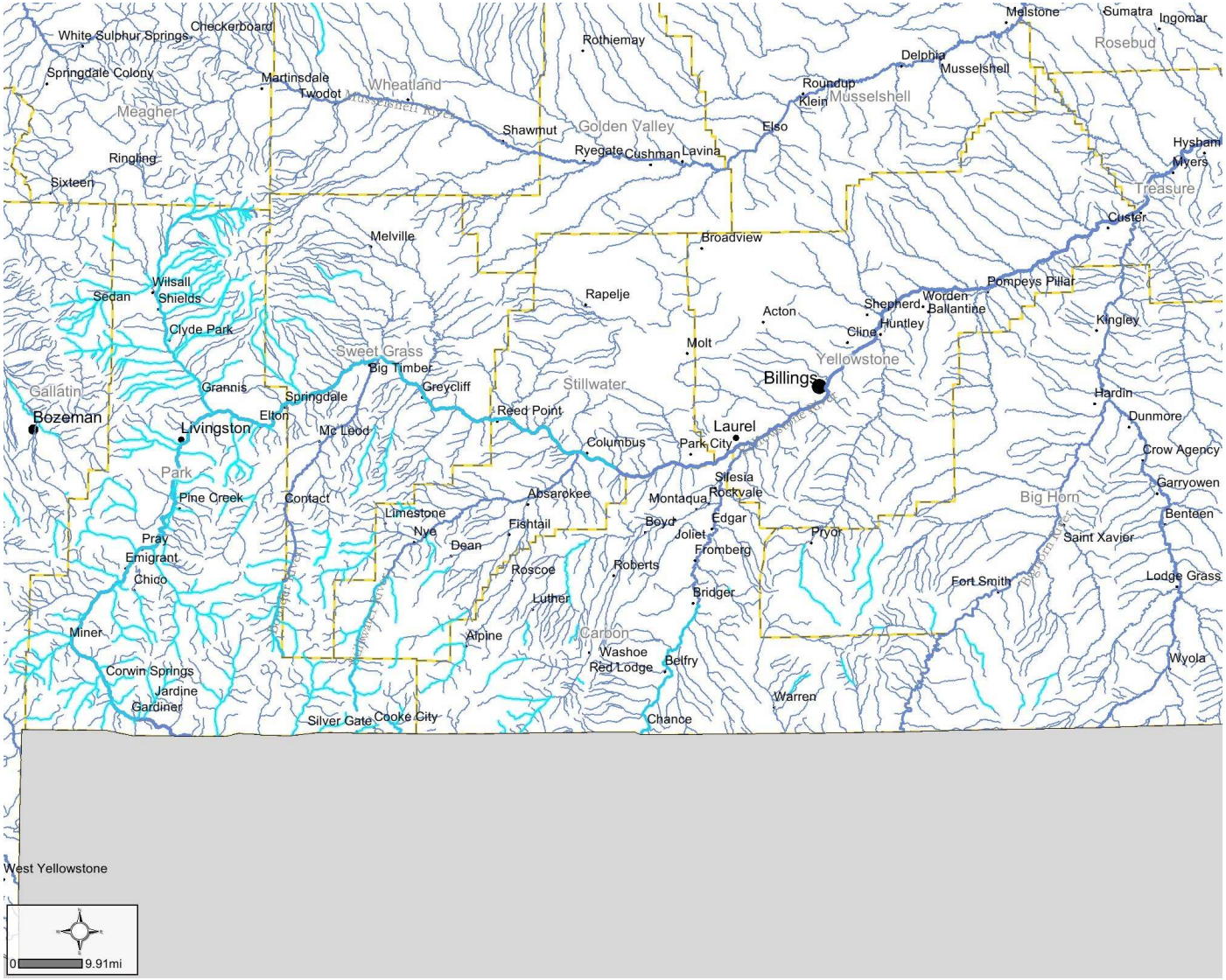

Figure 3: Distribution of Yellowstone cutthroat trout in the Yellowstone River basin in Montana. Streams in aqua support conservation populations of Yellowstone cutthroat trout.

Reductions in Yellowstone cutthroat trout populations are the result of several perturbations, including habitat degradation, dewatering, disease, and habitat fragmentation. Introduction of nonnative fishes is perhaps the greatest threat to Yellowstone cutthroat trout (Gresswell 1995, Kruse et al. 2000). Brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*) have displaced native cutthroat trout, including Yellowstone cutthroat trout, throughout the western US (Behnke 1992). Rainbow trout (*O. mykiss*) hybridize with Yellowstone cutthroat trout, resulting in a loss of genetic integrity. Often, where these species coexist, hybridization occurs (Allendorf and Leary 1988, Henderson et al. 2000), and hybridization is a leading cause of loss of Yellowstone cutthroat trout populations (Kruse and Hubert 2004). Actions that secure populations from the threats of hybridization, competition, and predation are critical tools in cutthroat trout conservation efforts.

Because reductions in range and abundance of Yellowstone cutthroat trout, state and federal agencies have assigned special status ratings to Yellowstone cutthroat trout, which guide management activities to promote conservation and restoration of this species. Montana lists Yellowstone cutthroat trout within its borders as an S2 species of special concern. This ranking applies to species "at risk because of very limited and potentially declining numbers, extent and/or habitat making it vulnerable to global extinction or extirpation (NHP and FWP 2006). Likewise, the US Forest Service (USFS) considers Yellowstone cutthroat trout to be a sensitive species. The USFS applies sensitive status to species that the Regional Forester has determined concerns exist for population viability within the state relating to a significant current or predicted downward trend in population or habitat. As considerable portions of the Upper Deer and Lower Deer Creek watersheds lie within national forest, the USFS would be a collaborator on these actions as their resources allow.

Concerns over the status of Yellowstone cutthroat trout have prompted advocacy groups to petition the US Fish and Wildlife Service (USFWS) to list this subspecies as a threatened or endangered species. In two decisions, the USFWS found listing Yellowstone cutthroat trout to be unwarranted, and the presence of stable, viable, and self-sustaining populations throughout its historic range was justification for this determination (USFWS 2001, USFWS 2006). Nonetheless, plaintiffs submitted a notice of intent to sue in 2006, indicating legal challenges are likely. In the interim, FWP and its conservation partners are dedicated to implementing projects such as this proposed action, to decrease the justification for including Yellowstone cutthroat trout on the endangered species list.

Currently, FWP, along with partner agencies, both state and federal, is developing a conservation strategy to conserve Yellowstone cutthroat trout within Montana, and ensure its persistence over the long-term (FWP et al. DRAFT). Conservation priorities, in order of importance are as follows:

1. Identify, protect, and secure genetically unaltered populations.
2. Reintroduce genetically unaltered populations into reclaimed streams.
3. Introduce unaltered populations into historically fishless waters.
4. Protection of hybridized populations.
5. Secure introgressed populations.

The proposed actions would address the first three conservation priorities, resulting in considerable benefit to Yellowstone cutthroat trout.

2.2.2. Upper Deer Creek

Upper Deer Creek joins the Yellowstone River about six river miles downstream of Big Timber, in Sweet Grass County. Currently, the Upper Deer Creek watershed supports both native and nonnative fishes, including Yellowstone cutthroat trout, brown trout, and brook trout. Yellowstone cutthroat trout are relegated to Upper Deer Creek above its confluence with the West Fork Upper Deer Creek (Figure 4), and genetic analyses from the 1980s through 2006 show these to be pure Yellowstone cutthroat trout, with no indication of hybridization with rainbow trout (Leary 2006). Apparent absence of rainbow trout and hybrids is a promising sign for this population; however, an abundance of brown trout and brook trout present a considerable threat to the long-term persistence of Yellowstone cutthroat trout in the drainage.

Fisheries investigations in 2008 found nonnatives substantially outnumbered Yellowstone cutthroat trout at most locations in Upper Deer Creek (Jeremiah Wood, FWP, personal communication). Sampling began at the Iron Mountain Road crossing (Figure 4), where biologists captured 84 brook trout and 4 Yellowstone cutthroat trout. Over the next two miles of channel proceeding downstream, Yellowstone cutthroat trout increased in relative abundance compared to brook trout; however, brook trout remained dominant. Near the confluence with Box Canyon, brown trout emerged as the most abundant species, although Yellowstone cutthroat trout comprised about 20% of fish captured. These results indicated greater abundance of Yellowstone cutthroat trout than expected, although competition and predation remain as significant threats given the high numbers of brook trout and brown trout.

The proposed approach to securing Upper Deer Creek's pure Yellowstone cutthroat trout includes several phases, and this EA addresses the initial action. Specifically, FWP, in conjunction with the USFS, would mechanically remove brook trout and brown trout using electrofishing from accessible locations in the Upper Deer Creek watershed, above its confluence with West Fork Upper Deer Creek. The objective of this proposed action is to reduce the pressure these nonnative fishes exert on Yellowstone cutthroat trout. Yellowstone cutthroat trout would respond with increased numbers, thereby increasing the population's chances of persisting over the short-term, until future actions secure the population for the long-term.

Although not covered in this EA, description of potential future actions is informative. Eventually, installation of a fish barrier, combined with mechanical or chemical removal of nonnatives, would be the actions to promote long-term persistence of Upper Deer Creek's Yellowstone cutthroat trout population. Note that given the spatial extent of fish removal, quality of the habitat, and limited accessibility, chemical removal would likely be the most feasible alternative. Resident Yellowstone cutthroat trout would be transferred to another location during treatment, and then reintroduced into Upper Deer Creek. A potential barrier location lies on state land downstream of the confluence with the West Fork Upper Deer Creek (Figure 4). An advantage to this location is that is would provide approximately 25 miles of habitat for Yellowstone cutthroat trout, which would greatly increase the population's chances over the long-term. Nevertheless, this portion of the project is in the early planning phases and alternative barrier locations may be explored.

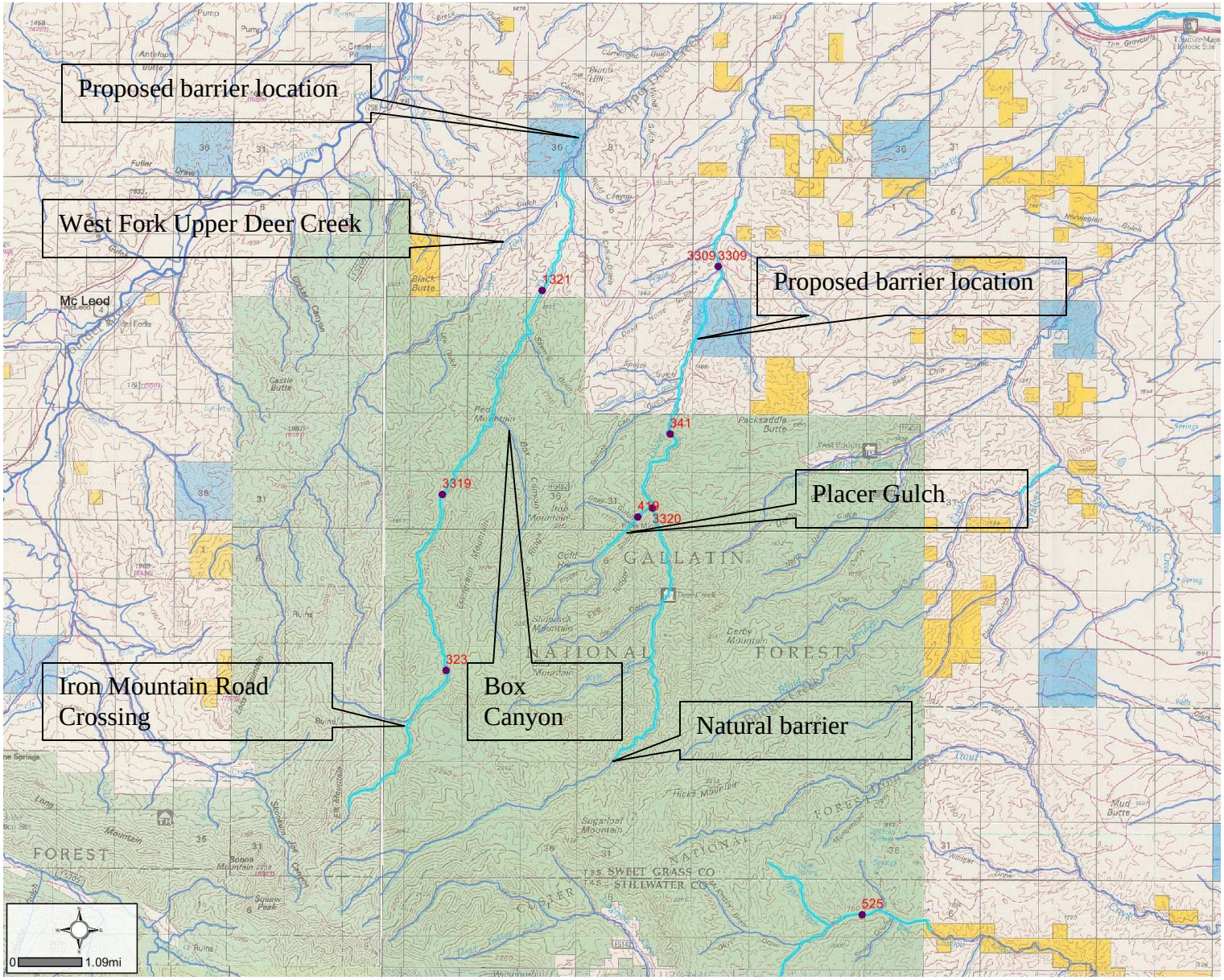

Figure 4: Upper Deer and Lower Deer Creek watersheds showing distribution of Yellowstone cutthroat trout (in aqua) and locations of key features. Locations of genetic samples are purple, numbered dots.

2.2.3. Lower Deer Creek

Lower Deer Creek is the next drainage to the east of Upper Deer Creek, and enters the Yellowstone River about 8 river miles downstream of Big Timber. The Yellowstone cutthroat trout population in Lower Deer Creek has apparently been free of hybridization until recently. The earliest genetic investigations occurred in 1989 and 1990, and these investigations found pure fish in Lower Deer Creek and Placer Gulch (Figure 4 and Table 2). In 2005, Yellowstone cutthroat trout x rainbow trout hybrids were found below the US Forest Service boundary (Leary 2006). Genetic analyses suggested the 8 hybridized fish were first generation backcrosses to Yellowstone cutthroat trout; meaning one parent was a first generation hybrid, and the other a pure Yellowstone cutthroat trout. Such pairings are typical of the early stages of hybridization, and indicate the need for immediate action to prevent further spread of hybridized fish. As expected, subsequent sampling suggested gradual expansion of hybridized fish in the Lower Deer Creek watershed. Samples collected in 2006 near Placer Gulch indicated hybridization had not spread that high; however, in 2008, biologists captured an apparent hybrid just below Placer Gulch (Jeremiah Wood, FWP, personal communication).

Table 2: Results of genetic analyses for trout collected in Lower Deer Creek and Placer Gulch. Figure 4 displays locations of samples.

Sample #	Sample Date	N	# Markers	Taxa ID	Power	Individuals	Citation
419 (Placer Gulch)	8/2/1990	10	Not reported	YCT		10	MFISH database
341	8/31/1989	25	Not reported	YCT	Not reported	25	Cited in Leary 2007
3309	3/30/2005	21	R8W4	YCT YCTxRBT		13 8	Leary 2006
3320	10/2/2006	31	R14W8	YCT?	R99W99	31	Leary 2007

The presence of hybridized fish in Lower Deer Creek was an alarming find that spurred considerable action and planning to protect the remaining pure Yellowstone cutthroat trout, including efforts to secure pure Yellowstone cutthroat trout in another stream. In 2006, FWP began searching for a suitable location to build a barrier to isolate pure fish from hybrids. Only one site met the biological criteria for selection of a long-term barrier location, as it protected a sufficient length of stream to promote long-term persistence of a population (Figure 4) (Olsen and Endicott 2008). Unfortunately, FWP was unable to obtain permission to access this site over private land. Barrier construction on this piece of state land will therefore require aircraft to move materials, equipment, and personnel to the site. The use of helicopters increases project costs substantially, and presents a major obstacle to implementing the action in the near future. Other alternatives, such as constructing barriers at sites within the Gallatin National Forest, face similar expenses in terms of the site accessibility and the need for aircraft. Moreover, these would not be long-term solutions, as potential sites simply do not protect enough habitat to support a population over time, and have potential to isolate fish from important spawning areas in Placer Gulch.

This EA covers several short-term actions to secure Lower Deer Creek's remaining pure Yellowstone cutthroat trout. Specific activities would include suppression through mechanical

removal of brown trout, rainbow trout, and hybridized fish using in electrofishing. These efforts would reduce competition and predation pressure on the existing pure Yellowstone cutthroat trout, as well as risks of further hybridization. Fish suppression would occur within the Gallatin National Forest boundary. In addition, pure Yellowstone cutthroat trout captured during fish removal would be transported above a natural barrier on Lower Deer Creek (Figure 4), and to Thiel Creek (Figure 2). As adult fish tend to leave areas where they have been transferred, YOY and age-1 fish will be moved to these alternative locations. These secured fish would provide a source of locally adapted, pure Yellowstone cutthroat trout to restock in Lower Deer Creek, should hybridization spread through the stream,

Discussion of the potential effects of Yellowstone cutthroat trout transfer above the barrier falls on Lower Deer Creek is warranted. These falls form a total fish barrier, and this portion of stream was historically, and is currently, fishless. Introduction of fish into fishless waters requires special consideration, as sensitive species of invertebrate or amphibian with intolerance to coexistence fish may be present in fishless waters. Nevertheless, the impacts of Yellowstone cutthroat trout introductions into this reach will likely be minimal, as previous stocking, attempts have occurred in this reach. The first occurred in 1991, with more following in 2002 through 2003. The effects of these plants, if any, would have already been realized from the earlier stocking attempts. Note that the failure of these previous planting effort was likely related to the relatively low numbers of fish introduced to this reach.

2.2.4. Thiel Creek

Thiel Creek is a tributary of East Red Lodge Creek, located west of Red Lodge along the Beartooth Front. This small stream has been the subject of ongoing efforts to conserve the Lower Deer Creek Yellowstone cutthroat trout population. This EA addresses continued actions to reestablishing and securing a pure Yellowstone cutthroat trout population in this stream.

In 2006, wildfire in the Lower Deer Creek drainage, combined with the evidence of recent hybridization of Yellowstone cutthroat trout, spurred FWP to seek a refuge for the remaining pure population. Thiel Creek emerged as a likely candidate, given its accessibility, excellent habitat, landowner support, adequate water, and absence of rainbow trout. Yellowstone cutthroat trout established in this stream would provide the source of future reintroductions back to Lower Deer Creek if necessary. In addition, reintroduction of Yellowstone cutthroat trout into Thiel Creek addresses the second conservation priority, by reintroducing the fish into its historically occupied waters. During fall of 2006, FWP constructed a barrier to prevent the upstream movement of nonnative fishes and transferred pure Yellowstone cutthroat trout from Lower Deer Creek into Thiel Creek. In addition, crews electrofished the area of reintroduction, and moved all captured brook trout below the barrier.

This EA covers the continuation of reintroduction of pure Yellowstone cutthroat trout into Thiel Creek. The proposed action includes transfer of a portion of pure Yellowstone cutthroat trout captured in Lower Deer Creek into Thiel Creek, above the constructed barrier. In addition, crews will electrofish this portion of Thiel Creek and its tributary Ellis Creek, and move captured brook trout below the barrier. In remote portions of the stream, where fish transfer would be infeasible, captured brook trout would be lethally removed.

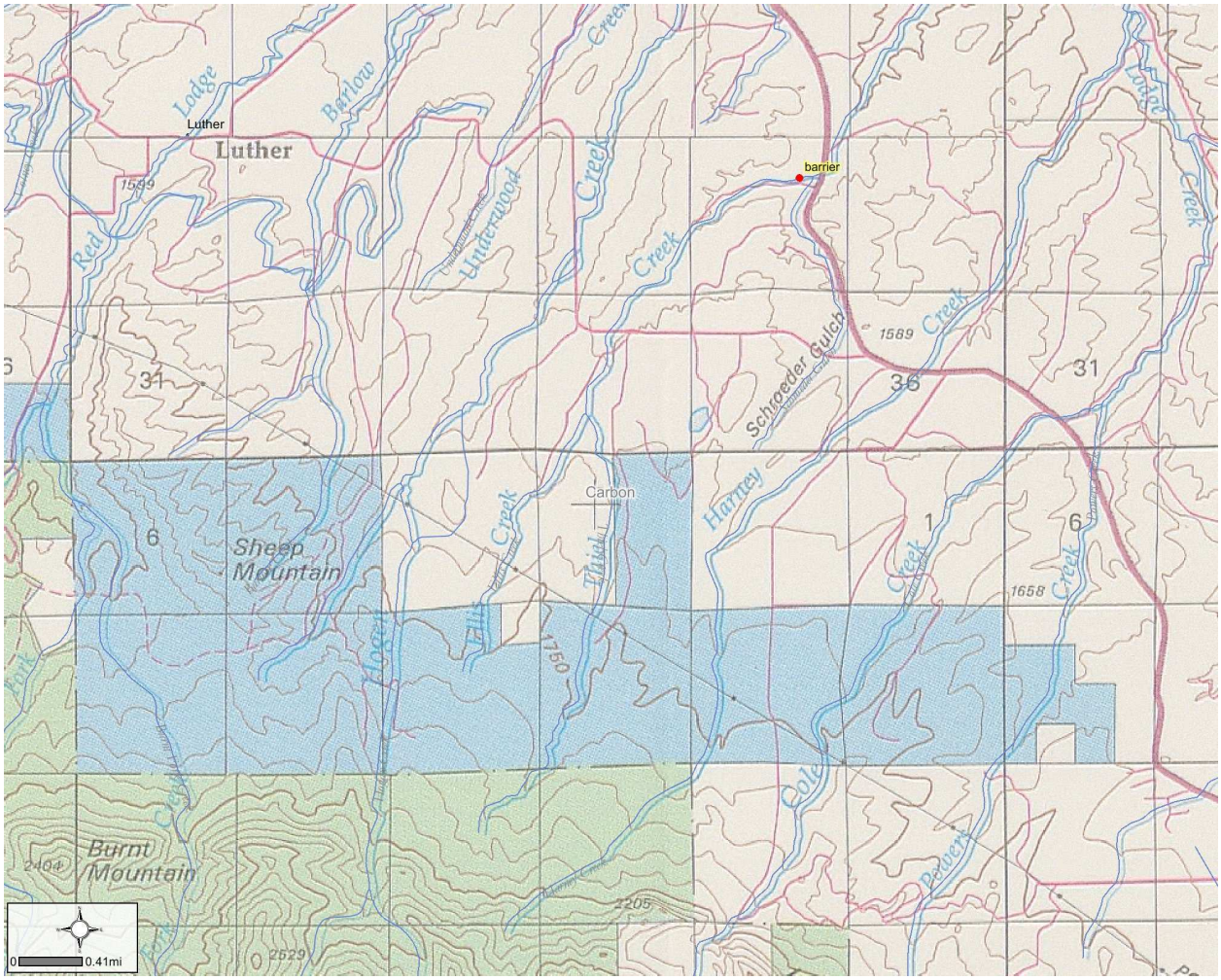

Figure 5: Close up of Thiel Creek showing location of the barrier.

2.3. Agencies Consulted during Preparation of the EA

Agencies consulted included signatories of the cutthroat trout restoration strategy and memorandum of understanding (MOU) (FWP 2007), and agencies with land or fisheries management responsibilities in the drainages, or information on local ecological resources. Consultation with agency signatories of the cutthroat trout MOU relates to their obligations under this agreement. In 2007, the Montana Cutthroat Trout Steering Committee completed this MOU and conservation agreement for Yellowstone cutthroat trout and westslope cutthroat trout (FWP 2007), which replaces an expired MOU and conservation strategy for Yellowstone cutthroat trout (FWP 2000). The goals of both documents include the following: 1) ensure the long-term, self-sustaining persistence of each subspecies distributed across their historic ranges, 2) maintain the genetic integrity and diversity of non-introgressed (genetically pure) populations, and 3) protect the ecological, recreational, and economic values of each subspecies. Signatories of this MOU include collaborators on this project and consulted agencies: FWP, the Gallatin National Forest, and Department of Natural Resources and Conservation. This project is consistent with the goal of ensuring the long-term persistence of Yellowstone cutthroat trout, and the defining the signatories' commitment to finding collaborative opportunities to restore and expand populations of Yellowstone cutthroat trout within their historic range.

As a major landholder in the Upper Deer Creek and Lower Deer Creek, and signatory of the cutthroat trout conservation strategy and MOU, the Gallatin National Forest was among the agencies consulted during preparation of the EA. This project is consistent with their obligations to native fish conservation, as described on their website[1]. Specifically, the Gallatin National Forest's management of Yellowstone cutthroat trout emphasizes conserving and protecting genetically pure populations, which is consistent with this proposed action. The Gallatin National Forest will likely collaborate on these actions, contributing personnel and associated support.

The DNRC has responsibility for management of state owned lands, and all three watersheds have considerable acreage of state lands (colored blue on Figure 4 and Figure 5). As a signatory of the cutthroat trout MOU (FWP 2007), DNRC supports the proposed action. In addition, DNRC has expressed willingness to assist in fish suppression and transfer, pending availability.

The Montana Natural Heritage Program (NHP) was another agency consulted in the process of preparing this EA. Queries included requests for information on distribution and natural history strategies of numerous species. This information allowed evaluation of the potential impacts of proposed actions on vegetation, fish, and wildlife.

[1] http://www.fs.fed.us/r1/gallatin/?page=resources/fish/native

3.0 ENVIRONMENTAL REVIEW

This chapter examines potential risks to human health and the environmental that would occur with implementation of the proposed alternative, mechanical removal of nonnatives in Upper Deer, Lower Deer, and Thiel creeks, and transfer of pure Yellowstone cutthroat trout to Lower Deer Creek above the natural barrier, and Thiel Creek. For details of all alternatives considered, see 4.0 ALTERNATIVES.

3.1. Physical Environment

3.1.1. Land Resources

Land Resources	**Impact**					
Would the proposed action result in:	**Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Soil instability or changes in geologic substructure?		X				
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil, which would reduce productivity or fertility?		X				
c. Destruction, covering or modification of any unique geologic or physical features?		X				
d. Changes in siltation, deposition or erosion patterns that may modify the channel of a river or stream or the bed or shore of a lake?		X				
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

3.1.2. Air

Air	**Impact**					
Would the proposed action result in:	**Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Emission of air pollutants or deterioration of ambient air quality?		X				
b. Creation of objectionable odors?		X				
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally, or regionally?		X				
d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants?		X				
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

3.1.3. Water

Water Would the proposed action result in:	Impact Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Discharge into surface water or any alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity?		X				
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of floodwater or other flows?		X				
d. Changes in the amount of surface water in any water body or creation of a new water body?		X				
e. Exposure of people or property to water related hazards such as flooding?		X				
f. Changes in the quality of groundwater?		X				
g. Changes in the quantity of groundwater?		X				
h. Increase in risk of contamination of surface or groundwater?						
i. Effects on any existing water right or reservation?		X				
j. Effects on other water users as a result of any alteration in surface or groundwater quality?		X				
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				
l. Would the project affect a designated floodplain?		X				
m. Would the project result in any discharge that would affect federal or state water quality regulations? (Also see 2a)		X				

3.1.4. Vegetation

Vegetation Would the proposed action result in:	Impact Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Changes in the diversity, productivity or abundance of plant species (including trees, shrubs, grass, crops, and aquatic plants)?			X			4a
b. Alteration of a plant community?		X				
c. Adverse effects on any unique, rare, threatened, or endangered species?		X				4c
d. Reduction in acreage or productivity of any agricultural land?		X				
e. Establishment or spread of noxious weeds?			X		YES	4e
f. Would the project affect wetlands, or prime and unique farmland?		X				

COMMENT 4a: Changes in diversity, productivity, or abundance of plants.
Alternative 1: Proposed Action
Field personnel would contribute to minor trampling of vegetation along the stream. These effects would be short term and minor.

Alternative 2: No action.
This alternative would have no effect on vegetation.

COMMENT 4c: Adverse effects on any unique, rare, threatened, or endangered species.
Alternative 1: Proposed Action
The Montana Natural Heritage Program lists only one plant species of special concern as occurring within the townships and ranges encompassed by the proposed action. The small-winged sedge (*Carex stenoptila*) has been documented in T2S R15E, which includes portions of the Lower Deer Creek watershed. This sedge occupies a range of habitats from dry, often rocky soil of grasslands and open forest in montane and subalpine zones, and moist soil along streams in valleys, so it has potential to be present along Lower Deer Creek. Project implementation scheduled for fall and spring will not coincide with the sensitive reproductive stages of this plant, which occur in July and August. Therefore, if encountered by field crews, no impacts are likely from trampling or associated disturbance.

Alternative 2: No action.
This alternative would have no impact on the small-winged sedge.

COMMENT 4e: Establishment or spread of noxious weeds
Alternative 1: Proposed Action
Trucks and four wheelers transporting gear and personnel have potential to spread noxious weeds from seeds transported in the undercarriage. To mitigate and reduce the risk of invasion or spread of noxious weeds, all vehicles would be cleaned before arrival on site, which will include an undercarriage wash.

Alternative 2: No action.
This alternative would have no effect on spread on establishment or spread of noxious weeds.

3.1.5. Fish and Wildlife

Fish and Wildlife Would the proposed action result in:	Unknown	Impact None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Deterioration of critical fish or wildlife habitat?		X				
b. Changes in the diversity or abundance of game animals or bird species?			X		YES	5b
c. Changes in the diversity or abundance of non-game species?			X			
d. Introduction of new species into an area?			X		No	5d
e. Creation of a barrier to the migration or movement of animals?		X				
f. Adverse effects on any unique, rare, threatened, or endangered species?			X			5f
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest or other human activity)?		X				
h. Would the project be performed in any area in which T&E species are present, and would the project affect any T&E species or their habitat? (Also see 5f)			X			5f
i. Would the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)		X				

Comment 5b: Changes in the diversity or abundance of game animals or bird species?
Alternative 1: Preferred Action
This proposed action would alter fish community composition in Upper Deer Creek, Lower Deer Creek, and Thiel Creek by reducing densities of nonnative fishes. Increases in densities of Yellowstone cutthroat trout from reduction of competition with, and predation by, nonnatives would mitigate reductions in brook trout and brown trout.

Alternative 2: No Action
This alternative would have no impact on game or bird species.

Comment 5f: Adverse effects on any unique, rare, threatened, or endangered species
Alternative 1: Preferred Action
The NHP database lists several animal species of special concern as occurring in or near the Upper Deer Creek and Lower Deer Creek watersheds (Table 3) and Thiel Creek drainage (Table 4). Field guide information provided by the NHP website allows inference on potential impacts to these species. Evaluation of their habitat needs, forage base, presumed distribution, and migration timing suggests impacts to these species would be nonexistent or negligible.

Among the mammals of special concern, impacts of the proposed actions would be minor and of short duration. Presence of field crews may temporarily displace large mammals, such as the gray wolves, wolverines, lynx, and grizzly bears, from occupied habitat. Conversely, availability of dead fish from suppression efforts would attract scavenging animals to the stream corridor

over the short-term. Impacts on the Preble's shrew would be negligible, as this species prefers arid habitats to streamside areas.

Table 3: Animal species of special concern known to occur in townships and ranges within the affected areas in the Upper Deer and Lower Deer creeks watersheds (T2S R14E, T3 R14E, T2S R15E, T3S R15E) from the NHP website (http://fieldguide.mt.gov/).

Group	Scientific Name	Common Name	Global Rank	State Rank	USFWS	USFS
Mammals	*Canis lupus*	Gray Wolf	G4[1]	S3[2]	LE[3]	Endangered
Mammals	*Gulo gulo*	Wolverine	G4	S3		Sensitive
Mammals	*Lynx canadensis*	Canada Lynx	G5[4]	S3	LT[5]	Threatened
Mammals	*Sorex preblei*	Preble's Shrew	G4	S3		
Mammals	*Ursus arctos*	Grizzly Bear	G4	S2[6]S3	L, DM[7]	Threatened
Birds	*Centrocercus urophasianus*	Greater Sage-Grouse	G4	S3		Sensitive
Fish	*Oncorhynchus clarkii bouvieri*	Yellowstone Cutthroat Trout	G4T[8]2	S2		Sensitive

[1] G4 or S4: uncommon but not rare (although it may be rare in parts of its range), and usually widespread

[2] G3 or S3: Potentially at risk because of very limited and/or declining numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the state.

[3] LE: listed endangered- Any species in danger of extinction throughout all or a significant portion of its range (16 U.S.C 1532[6])

[4] G5 or S5 Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.

[5] LT: Listed threatened: Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C 1532[20]).

[6] G2 or S2: At risk because of very limited and/or declining numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the state.

[7] DM: Delisted taxon, recovered, being monitored for first five years

[8] T: Infraspecific taxon (trinomial) – the status of infraspecific taxa (subspecies or variety) are indicated by a "T-rank" followed by the Species' global rank

Effects of the proposed actions on bird species of special concern would likewise be negligible. None of these birds consume fish as a regular part of their diet, so temporary reductions in fish density would not affect these species. Habitat preferences for the bird species tend towards uplands, so activity within the riparian corridor would have limited and incidental influence. Finally, several of the bird species of special concern are neotropical migrants (bobolink, broad-tailed hummingbird, sage sparrow), and would not be present during fish suppression activities in the fall.

Agapetus montanus, a caddis fly, is also among species of special concern near Thiel Creek (Table 4). Rationale for its inclusion as an S2 species of special concern is the relatively few streams in Montana in which it has been documented (less than 30), although increased sampling and reporting are expected to identify far more streams in the future. Field guide information provided by NHP suggests Thiel Creek may provide suitable habitat for *Agapetus montanus*. If present, brook trout suppression, combined with Yellowstone cutthroat trout transfer, would have negligible to minor effects on this invertebrate. The decrease in brook trout density may temporarily decrease predation pressure on all invertebrates with an aquatic life history stage; however, growth of the reestablished Yellowstone cutthroat trout population would soon restore the predation pressure on aquatic invertebrates to previous levels.

The Yellowstone cutthroat trout is another species of special concern present in these streams. The proposed action would be highly beneficial to Yellowstone cutthroat trout, when conducted with the proposed safeguards. These measures include genetic testing of transferred fish, to ensure hybridized fish are not among the fish introduced to Thiel Creek and Lower Deer Creek above the natural barrier. In addition, all fish will be tested for disease before introduction into other waters. If fish test positive for any diseases within the suite monitored by FWP, these fish will not be transferred. The consequences of transfer of genetically pure and disease free fish would be protection of a genetically pure population, reintroduction of Yellowstone cutthroat trout into previously occupied waters, and range expansion into previously fishless waters. These benefits are the top three conservation priorities under the developing conservation strategy for Yellowstone cutthroat trout (FWP draft).

Table 4: Animal species of special concern known to occur in the township and range encompassing the affected reaches of Thiel Creek (T6S R19E) from the NHP website (http://fieldguide.mt.gov/).

Group	Scientific Name	Common Name	Global Rank	State Rank	USFWS	USFS
Mammals	*Canis lupus*	Gray Wolf	G4[1]	S3[2]	LE[3]	Endangered
Mammals	*Ursus arctos*	Grizzly Bear	G4	S2[4]S3	LT[5], DM[6]	Threatened
Birds	*Amphispiza belli*	Sage Sparrow	G5[7]	S1S3B[8]		
Birds	*Dolichonyx oryzivorus*	Bobolink	G5	S2		
Birds	*Selasphorus platycercus*	Broad-tailed Hummingbird	G5	S1B		
Birds	*Strix nebulosa*	Great Gray Owl	G5	S3		
Fish	*Oncorhynchus clarki bouvieri*	Yellowstone cutthroat trout	G4T[9]2	S2		Sensitive
Invertebrates	*Agapetus montanus*	An Agapetus caddis fly	G2	S2		

[1] G4 or S4: uncommon but not rare (although it may be rare in parts of its range), and usually widespread

[2] G3 or S3: Potentially at risk because of very limited and/or declining numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the state.

[3] LE: listed endangered- Any species in danger of extinction throughout all or a significant portion of its range (16 U.S.C 1532[6])

[4] G2 or S2: At risk because of very limited and/or declining numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the state.

[5] LT: Listed threatened: Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C 1532[20]).

[6] DM: Delisted taxon, recovered, being monitored for first five years

[7] G5 or S5 Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.

[8] Breeding – rank refers to the breeding population of the species in Montana

[9] T: Infraspecific taxon (trinomial) – the status of infraspecific taxa (subspecies or variety) are indicated by a "T-rank" followed by the species' global rank

3.2. Human Environment

3.2.1. Noise and Electric Effects

Would the proposed action result in:	Impact					
	Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Increases in existing noise levels?		X				
b. Exposure of people to serve or nuisance noise levels?		X				
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property?		X				
d. Interference with radio or television reception and operation?		X				

3.2.2. Land Use

Would the proposed action result in:	Impact					
	Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Alteration of or interference with the productivity or profitability of the existing land use of an area?		X				
b. Conflicted with a designated natural area or area of unusual scientific or educational importance?		X				
c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action?		X				
d. Adverse effects on or relocation of residences?		X				

3.2.3. Risks/Health Hazards

Would the proposed action result in:	Impact					
	Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?		X				
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?		X				
c. Creation of any human health hazard or potential hazard?		X				
d. Would any chemical piscicides be used?		X				

3.2.4. Community Impact

Would the proposed action result in:	Impact					
	Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Alteration of the location, distribution, density, or growth rate of the human population of an area?		X				
b. Alteration of the social structure of a community?		X				
c. Alteration of the level or distribution of employment or community or personal income?		X				
d. Changes in industrial or commercial activity?		X				
e. Increased traffic hazards or effects on existing transportation facilities or patterns of movement of people and goods?		X				

3.2.5. Public Services/Taxes/Utilities

Would the proposed action result in:	Impact					
	Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Would the proposed action have an effect upon or result in a need for new or altered governmental services in any of the following areas: fire or police protection, schools, parks/recreational facilities, roads or other public maintenance, water supply, sewer or septic systems, solid waste disposal, health, or other governmental services? If any, specify: _____		X				
b. Would the proposed action have an effect upon the local or state tax base and revenues?		X				
c. Would the proposed action result in a need for new facilities or substantial alterations of any of the following utilities: electric power, natural gas, other fuel supply or distribution systems, or communications?		X				
d. Would the proposed action result in increased used of any energy source?		X				
e. Define projected revenue sources			X		YES	10e
f. Define projected maintenance costs		X				

Comment 10e: This proposed project would be accomplished using FWP fisheries staff (Table 5). Fisheries biologists from DNRC and the USFS would assist as their schedules allow.

Table 5: Labor required to accomplish preferred alternative.

Activity	Number of People	Number of Days	Person –days
Electrofish Upper Deer Creek	4	3	12
Electrofish Lower Deer Creek	4	3	12
Fish Transfer	4	4	16

3.2.6. Aesthetics/Recreation

Aesthetics/Recreation Would the proposed action result in:	Unknown	Impact None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Alteration of any scenic vista or creation of an aesthetically offensive site or effect that is open to public view?		X				
b. Alteration of the aesthetic character of a community or neighborhood?		X				
c. Alteration of the quality or quantity of recreational/tourism opportunities and settings? (Attach Tourism Report)			X		YES	11c
d. Would any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		X				

Comment 11c: Alteration of the quality or quantity of recreational/tourism opportunities and settings?

Alternative 1: Proposed Action
Suppression of brook trout and brown trout would reduce opportunities to harvest these nonnative fishes from these three streams, which would alter the quality of the recreational experience for some anglers. Ultimately, with implementation of all proposed actions for these streams, which will result in eradication of nonnatives and reestablishment of Yellowstone cutthroat trout, special regulations allowing harvest of Yellowstone cutthroat trout are likely, which would mitigate for the loss of nonnatives.

The eventual planned restoration of a healthy, pure Yellowstone cutthroat trout would also change the quality of the recreational opportunities in the affected streams. The ability to fish for native fish in a beautiful setting is a relatively rare opportunity in south-central Montana, and one that many anglers would value. Anglers preferring nonnatives would still have many options given the wide range and health of brown trout and brook trout populations in Montana.

Alternative 2: No Action
This alternative would not alter the quality or quantity of existing recreational/tourism opportunities.

3.2.7. Cultural/Historical Resources

Cultural/Historical Resources Would the proposed action result in:	Impact Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Destruction or alteration of any site, structure or object of prehistoric historic, or paleontological importance?		X				
b. Physical change that would affect unique cultural values?		X				
c. Effects on existing religious or sacred uses of a site or area?		X				
d. Would the project affect historic or cultural resources?		X				

3.2.8. Summary Evaluation of Significance

Would the proposed action, considered as a whole:	Impact Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Have impacts that are individually limited, but cumulatively considerable? (A project or program may result in impacts on two or more separate resources, which create a significant effect when considered together, or in total.)		X				
b. Involve potential risks or adverse effects, which are uncertain but extremely hazardous if, they were to occur?		X				
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard or formal plan?		X				
d. Establish a precedent or likelihood that future actions with significant environmental impacts would be proposed?		X				
e. Generate substantial debate or controversy about the nature of the impacts that would be created?			X		YES	13e
f. Is the project expected to have organized opposition or generate substantial public controversy? (Also see 13e)			X		YES	See 13e
g. List any federal or state permits required.						13g

Comment 13e: Potential for debate or controversy
Alternative 1: Proposed Action
Fish suppression using lethal means has potential to draw controversy from the public; however, to date, actions using lethal mechanical removal have not met with opposition. Educating the public on the importance of the proposed action in terms of benefit to Yellowstone cutthroat trout, combined with discussion of the expense and lack of ecological benefit to nonlethal suppression, would mitigate risks of opposition to this component of the proposed action. 4.2.1

Alternative 3: Non-lethal suppression of brook trout and brown trout in Upper Deer and Lower Deer creek details these disadvantages of nonlethal suppression.

Alternative 2: No Action
Given the status of Yellowstone cutthroat trout, not proceeding with this project may also generate controversy or debate. Considerable support exists for restoring Yellowstone cutthroat trout to its historic habitat. Failure to proceed with proposed projects, where environmental assessments find environmental, social, economic, cultural impacts to be minor and temporary, may spur controversy or debate from native fish advocates. Furthermore, failing to implement project that would meet the goals, objectives, and priorities of the Yellowstone cutthroat trout conservation MOU and developing conservation strategy would draw criticism from signatories and the public.

Comment 13g: List and federal or state permits required.
FWP requires a fish transfer form to be completed before moving live fish from one water to another. This process addresses risks associated with disease and genetic contamination. The area fisheries biologist submitted the application for this transfer form in August of 2008.

4.0 ALTERNATIVES

Three alternatives received consideration during preparation of the environmental assessment. The proposed alternative (alternative 1) and no action (alternative 2) were evaluated in detail. The third alternative was eliminated from full consideration, as it would entail considerable expense, but no commensurate ecological benefit.

4.1. Alternatives Given Detailed Study

4.1.1. Alternative 1: Nonnative fish suppression and transfer of pure Yellowstone cutthroat trout.

The proposed action includes suppression of nonnative fishes in three streams using lethal means, and transfer of pure Yellowstone cutthroat trout to refuges to establish locally adapted brood stock for reintroduction into Lower Deer Creek. In Thiel Creek, brook trout captured along much of its length would be transported below a barrier, except where site conditions make this infeasible. Predicted outcomes include the following:

- Short-term security of existing pure Yellowstone cutthroat trout populations in Lower Deer Creek, Upper Deer Creek, and Thiel Creek; and
- Expansion of Yellowstone cutthroat trout into historically fishless waters in Lower Deer Creek.

4.1.2. Alternative 2: No action.

The no-action alternative would entail no activities to protect the remaining pure Yellowstone cutthroat trout in Lower Deer Creek and Upper Deer Creek, which would have several consequences. In Upper Deer Creek, the remaining Yellowstone cutthroat trout population would continue to be exposed to competition with, and predation by the nonnative brook trout and brown trout. Over the long term, this would likely result in the ultimate elimination of the basin's pure Yellowstone cutthroat trout population, as nonnative fishes are the leading cause of extirpation of cutthroat trout (Gresswell 1995, Kruse et al. 2000).

In Lower Deer Creek, the no-action alternative would have much quicker negative consequences for the remaining pure Yellowstone cutthroat trout in this stream. Existing rainbow trout and hybrids would continue to interbreed with pure Yellowstone cutthroat trout, further contaminating the gene pool, resulting in the loss of a pure population. By not securing pure Yellowstone cutthroat trout in the alternate locations, the brood stock available for reintroducing pure Yellowstone cutthroat trout following construction of a barrier, would be from the first fish rescue in 2006. Securing more fish in Thiel Creek, and establishing a population in Lower Deer Creek would increase the potential of having a viable brood stock for reintroduction, should hybridization continue as expected.

4.2. Alternatives Considered but Not Given Detailed Study

4.2.1. Alternative 3: Non-lethal suppression of brook trout and brown trout in Upper Deer and Lower Deer creeks.

Under this alternative, brook trout and brown trout would be physically removed from Upper Deer Creek and Lower Deer Creek and moved elsewhere. This alternative would be considerably more expensive, given the need to hold and transport live fish. Moving fish downstream would not be effective, as no barrier exists that would prevent fish from returning. This alternative would also require expensive disease testing before fish could be transferred to another location. No ecological benefit would be realized from transferring fish, as any natural receiving water would likely be near or at its carrying capacity.

5.0 ENVIRONMENTAL ASSESSMENT CONCLUSION SECTION

5.1.1. Evaluation of Significance Criteria and Identification of the Need for an EIS

Evaluation of potential impacts on the physical and human environment in 3.0 ENVIRONMENTAL REVIEW provides the basis for determining the need for an environmental impact statement (EIS), which is a more rigorous evaluation of potential impacts to human health and the environment from the proposed action. If evaluation of these significance criteria suggests the proposed action would result in significant impacts, an EIS would be required.

This environmental review demonstrates that the impacts of this proposed project are not significant. The proposed action would benefit Yellowstone cutthroat trout in Lower Deer Creek, Upper Deer Creek, and Thiel Creek with minimal impact on the physical, biological, or the human environment.

5.1.2. Level of Public Involvement

Several factors influence the appropriate level of public involvement for a given proposed action. Risks to human health, the environment, local economics, as well as the seriousness of the environmental issues are key considerations. This project will include a 30-day public comment period. The public will be informed of the potential project through press releases in local newspapers and through a notice on FWP's website (http://fwp.mt.gov/news/default.aspx). If public interest is considerable, FWP will host a public meeting.

5.1.3. Public Comments

The public comment period will extend from September 10, 2008 through October 10, 2008.

Send comments to:

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5.1.4. Parties Responsible for Preparation of the EA

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