Montana Fish, Wildlife & Parks

1400 South 19th Avenue
Bozeman, MT 59718

March 25, 2011

To: Governor's Office, Mike Volesky, State Capitol, Room 204, P.O. Box 200801, Helena, MT 59620-0801
Environmental Quality Council, State Capitol, Room 106, P.O. Box 201704, Helena, MT 59620-1704
Dept. of Environmental Quality, Metcalf Building, P.O. Box 200901, Helena, MT 59620-0901
Dept. of Natural Resources & Conservation, P.O. Box 201601, Helena, MT 59620-1601
Montana Fish, Wildlife & Parks:

Director's Office	Parks Division	Lands Section	FWP Commissioners
Fisheries Division	Legal Unit	Wildlife Division	Design & Construction

MT Historical Society, State Historic Preservation Office, P.O. Box 201202, Helena, MT 59620-1202
MT State Parks Association, P.O. Box 699, Billings, MT 59103
MT State Library, 1515 E. Sixth Ave., P.O. Box 201800, Helena, MT 59620
James Jensen, Montana Environmental Information Center, P.O. Box 1184, Helena, MT 59624
Janet Ellis, Montana Audubon Council, P.O. Box 595, Helena, MT 59624
George Ochenski, P.O. Box 689, Helena, MT 59624
Jerry DiMarco, P.O. Box 1571, Bozeman, MT 59771
Montana Wildlife Federation, P.O. Box 1175, Helena, MT 59624
Wayne Hurst, P.O. Box 728, Libby, MT 59923
Jack Jones, 3014 Irene St., Butte, MT 59701
Jack Atcheson, 2309 Hancock Avenue, Butte MT 59701
Beaverhead Conservation District, 420 Barrett Street, Dillon, MT 59725
U.S. Army Corp of Engineers, Helena
U.S. Fish and Wildlife Service, Helena
U.S. Fish and Wildlife Service, 420 Barrett Street, Dillon, MT 59725
Big Hole Watershed Committee, P.O. Box 931, Butte, MT 59703
Montana Trout Unlimited, P.O. Box 7186, Missoula, MT 59807
Dan Vermillion, FWP Commissioner, Livingston MT
Earnest and Colleen Bacon, 2215 Fishtrap Creek Road, Wisdom, MT 59761
Dept. of Natural Resources and Conservation, 730 N. Montana Street, Dillon, MT 59725-9424
George Grant Chapter of Trout Unlimited, P.O. Box 563, Butte, MT 59703
Skyline Sportsmen, P.O. Box 173, Butte, MT 59703
Anaconda Sportsmen, 2 Cherry, Anaconda, MT 59711

Ladies and Gentlemen:

The enclosed Environmental Assessment (EA) has been prepared for a proposal to restore westslope cutthroat trout to McVey Creek, a tributary to the Big Hole River near Melrose, MT. This project proposes to construct a fish migration barrier upstream of the Highway 43 crossing and remove non-native brook trout upstream of the barrier using rotenone. Prior to non-native fish removal, the native fish, including non hybridized westslope cutthroat trout in McVey Creek, would be salvaged and held. Once brook trout have been removed, the non-hybridized westslope cutthroat trout would be released back into the stream. A fish ladder would additionally be installed on a diversion

structure located downstream of the National Forest Boundary to allow fish passage and improve instream flows in McVey Creek for fish and livestock.

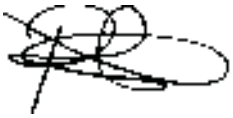
This EA is available for review in Helena at FWP's Headquarters, the State Library, and the Environmental Quality Council. It also may be obtained from FWP at the address provided above, or viewed on FWP's Internet website: http://www.fwp.mt.gov .

Montana Fish, Wildlife & Parks invites you to comment on the attached proposal. Public comment will be accepted until April 25th, 2011 @ 5:00 pm. Comments should be sent to the following:

Montana Fish, Wildlife & Parks
McVey Creek Westslope Cutthroat Restoration
Attn: Jim Olsen
1820 Meadowlark Lane
Butte, MT 59701

Or e-mailed to: jimolsen@mt.gov

Sincerely,



Patrick J. Flowers
Region Three Supervisor

DRAFT
ENVIRONMENTAL ASSESSMENT

MCVEY CREEK WESTSLOPE CUTTHROAT TROUT RESTORATION
March 2011

PART I: PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action: The proposed action would restore native westslope cutthroat trout (WCT) in McVey Creek by constructing a fish migration barrier at the Highway 43 crossing and removing non-native brook trout upstream of the barrier. Brook trout would be removed using rotenone in the formulation of CFT Legumine. The non-hybridized WCT present in McVey Creek would be captured using electrofishing prior to fish removal and held in non-treated waters, then released back into the stream following brook trout removal. A fish ladder would also be installed at a private irrigation diversion located approximately 3 miles upstream of the barrier to provide fish passage around the site and instream flows downstream.

B. Agency Authority for the Proposed Action:

87-1-702. Powers of department relating to fish restoration and management. The department is hereby authorized to perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects as defined and authorized by the act of congress, provided every project initiated under the provisions of the act shall be under the supervision of the department, and no laws or rules or regulations shall be passed, made, or established relating to said fish restoration and management projects except they be in conformity with the laws of the state of Montana or rules promulgated by the department, and the title to all lands acquired or projects created from lands purchased or acquired by deed or gift shall vest in, be, there remain in the state of Montana and shall be operated and maintained by it in accordance with the laws of the state of Montana. The department shall have no power to accept benefits unless the fish restoration and management projects created or established shall wholly and permanently belong to the state of Montana, except as hereinafter provided.

C. Estimated Commencement Date:

Barrier Construction: Summer 2011 (pending funding)
Fish removal: Late August to early September 2011. Potential second removal if necessary in 2012
Reintroduction of WCT: Immediately following successful removal of brook trout using salvaged WCT from McVey Creek.

D. Name and Location of the Project: Westslope cutthroat trout restoration in McVey Creek, tributary to the Big Hole River near Wisdom, Montana.

McVey Creek is located in Beaverhead County approximately 5 miles northeast of the town of Wisdom, Montana: T1S, R15W Sec 35, T27N R15W, Sec 1, 2, 12, R14W, Sec 7, 8, 9, 16, 17,

18, 19, 20, 21, 22 (Figure 1). The McVey Creek drainage originates on the Beaverhead-Deerlodge National Forest, and flows through DNRC administered lands and private property owned by three different parties.

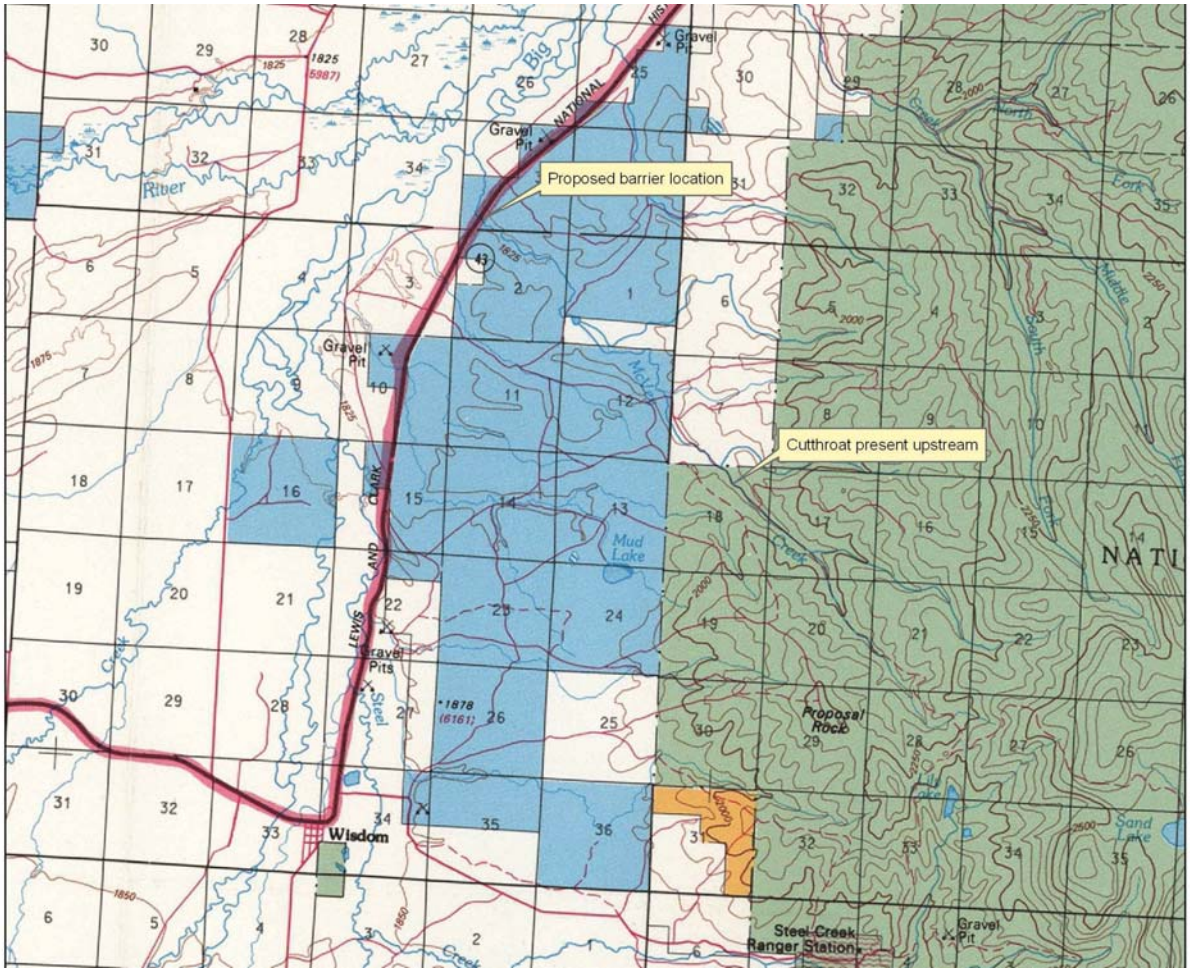


Figure 1. McVey Creek project location.

E. Project Size (acres affected)

1. Developed/residential – 0 acres
2. Industrial – 0 acres
3. Open space/Woodlands/Recreation – 0 acres
4. Wetlands/Riparian –The stream to be included in the restoration project is approximately 6 miles long. A 1.3 mile long tributary stream (fish bearing) that enters McVey Creek near the Forest Service Boundary will also be included in the project. Therefore the total length of the stream treatment will be 7.3 miles.
5. Floodplain – 0 acres
6. Irrigated Cropland – 0 acres
7. Dry Cropland – 0 acres
8. Forestry – 0 acres

9. Rangeland – 0 acres

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

The cutthroat trout is Montana's state fish. Westslope cutthroat trout *Oncorhynchus clarkii lewisi* (WCT) were first described by the Lewis and Clark Expedition in 1805 near Great Falls, Montana, and are recognized as one of fourteen interior subspecies of cutthroat trout. The historical range of WCT includes Idaho, Montana, Washington, Wyoming, and Alberta, Canada. In Montana, WCT occupy the Upper Missouri and Saskatchewan River drainages east of the Continental Divide, and the Upper Columbia Basin west of the Divide. Although still widespread, WCT distribution and abundance in Montana has declined significantly in the past 100 years due to a variety of causes including introductions of nonnative fish, habitat degradation, and over-exploitation (Hanzel 1959, Liknes 1984, McIntyre and Rieman 1995, Shepard et al. 1997, Shepard et al. 2003). Reduced distribution of WCT is particularly evident in the Missouri River drainage where genetically unaltered WCT are estimated to persist in less than 5% of the habitat they once occupied, and most remaining populations are restricted to isolated headwater habitats (Shepard et al. 2003, Shepard et al. 2005). Many of these remaining populations are further at risk of extinction due to small population size and the threats of competition, predation and hybridization with non-native trout species.

The declining status of WCT has lead to its designation as a *Species of Special Concern* by the State of Montana, a *Sensitive Species* by the U.S. Forest Service (USFS), and a *Special Status Species* by the Bureau of Land Management (BLM). In addition, a petition was submitted in 1997 to the U.S. Fish and Wildlife Service (USFWS) to list WCT as "threatened" under the *Endangered Species Act* (ESA). USFWS status reviews have found that WCT are "not warranted" for ESA listing (DOI 2003); however, this finding was in litigation until 2008, and additional efforts to list WCT under ESA are possible.

In an effort to advance range-wide WCT conservation efforts in Montana, a Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana was developed in 1999. Several federal and state resource agencies cooperated in drafting the agreement including the BLM, Montana Fish, Wildlife & Parks (FWP), USFS, and Yellowstone National Park (YNP), non-governmental conservation and industry organizations, tribes, resource users, and private landowners (FWP 1999: MOU). The MOU outlined goals and objectives for WCT conservation in the Montana which if met would significantly reduce the need for special status designations and listing of WCT under the ESA. The MOU was revised and endorsed by signatories in 2007 (FWP 2007). As outlined in these MOU's, *the primary management goal for WCT in Montana is to ensure the long-term self-sustaining persistence of the subspecies in its historical range*. This goal can be achieved by maintaining, protecting, and enhancing all designated WCT "conservation" populations, and by reintroducing WCT to habitats where they have been extirpated.

McVey Creek is a tributary to the Big Hole River with its origins in the West Pioneer Mountains (Figure 1). Surveys in the 1990's and 2006 indicate the WCT population occupies about 1.3 miles of stream and likely includes fewer than 200 fish age one and older. Genetic tests on WCT

from McVey Creek in 1989 and 2006 indicate the fish are non-hybridized. Non-native brook trout are abundant in McVey Creek and have been found to greatly outnumber WCT in almost all reaches of the stream. WCT displacement by brook trout is common where the species overlap and is recognized as an important reason for the loss of many WCT populations. This displacement has been attributed to a size and competitive advantage young brook trout have over WCT due to timing of reproduction (Shepard and Nelson 2004). Brook trout displacement appears to be occurring in McVey Creek as WCT, which were likely common throughout the stream, but are now restricted to only the headwater reaches of the mainstem. Without efforts to remove brook trout, it is probable that over a short time period (i.e. < 50 years) brook trout will completely displace WCT from McVey Creek.

Conservation of remaining WCT populations, like that in McVey Creek, is the primary strategy for conservation of WCT in Montana (MOU 1999). Few WCT populations are considered secure in the Big Hole River drainage, and efforts to protect remaining populations like in McVey Creek are necessary to ensure continued persistence of the species in the basin. These rare local populations maintain the remaining genetic diversity of the species, and each may perpetuate adaptive traits that are important to the species as whole (Leary et al. 1998). For afore-mentioned reasons, these populations will be an invaluable source for restoring WCT to streams they once occupied, and their disappearance would be a significant loss for WCT conservation efforts.

In an effort to conserve WCT in McVey Creek, a diversion structure was modified with the intent to function as a barrier just below the National Forest boundary in the mid 1990's. Approximately 2000 brook trout were removed upstream of the fish barrier using electrofishing. Removal efforts were not successful because the barrier was found to allow fish passage, and brook trout reinvaded the upper portions of the stream. Recent efforts were made from 2007-2009 to conserve WCT in McVey Creek by electrofishing the stream and removing brook trout. These efforts were also unsuccessful due to the lack of an adequate fish barrier to keep brook trout from recolonizing the creek and the difficulty of electrofishing through dense willow stands. After several years of attempting to remove brook trout using electrofishing, it became evident that such efforts were not likely to eradicate the fish in a reasonable period of time.

Livestock grazing is the primary land management activity surrounding McVey Creek. There are two irrigation diversion points on the stream: one near the forest boundary on the south side of the stream and the other approximately one mile upstream of the highway 43 crossing on the north side of the stream. Grazing impacts are minimal on the stream banks and riparian area on the National Forest, moderate on privately owned parcels of land, and minimal to moderate on DNRC lands. Many of the areas that demonstrated moderate grazing impacts appear to be in a recovering state due to recent changes in livestock management. The stream is occasionally dewatered downstream of the Forest Service boundary for irrigation, but this occurrence is rare because livestock depend on the stream for water downstream. To reduce the likelihood of dewatering and to facilitate fish passage, a fish ladder is proposed for this irrigation diversion. The fish ladder would ensure instream flows and provide fish passage around the irrigation diversion when the boards are in the diversion structure.

The goal of this project is to secure the existing population of non-hybridized WCT in McVey Creek by establishing a fish migration barrier and removing brook trout upstream of this barrier. This action is proposed to be completed in 4 stages: 1) construction of a fish migration barrier to prevent colonization of brook trout and other non-native fish upstream; 2) salvage of remaining WCT and other native species in the stream, 3) removal of brook trout from the stream using the piscicide rotenone in the formulation of CFT Legumine, and 4) monitoring and habitat improvements.

Stage 1: Fish Migration Barrier

Because of the geomorphology of McVey Creek (i.e., wide, flat valley bottom), there are few suitable locations to establish a fish migration barrier. The culvert crossing of Highway 43 over McVey Creek is the most suitable location for a fish barrier because the highway fill acts as a large dike across the floodplain (Figure 2). Also, the culvert is oversized (8 feet) and more than adequate to handle the 100-year flood in McVey Creek. Because of the large size of the culvert and the highway fill across the floodplain, the crossing lends itself to the construction of a drop structure at the inlet of the culvert to prevent fish passage. The DNRC owns and manages the land upstream and downstream of the highway crossing. The proposed structure would be made of treated timber and would create a three foot drop at the culvert inlet (Appendix A). The concept of the barrier design is to function as a three foot jump barrier at low flows and at higher flows when the jump height lessens. The water velocity in the culvert would act as barrier to fish passage. The culvert was installed in the early 1960's, and the proposed wooden barrier structure is intended to last as long as the existing culvert, an additional 20-30 years. Once the culvert is due to be replaced, FWP will work with MDT to install the culvert such that it will function as a permanent fish-passage barrier.

Construction of the fish migration barrier is anticipated to be the major expense in completing the proposed project and, pending funding, it is anticipated that construction would occur Summer 2011. Necessary permits for the construction of the barrier include: USACE 404, FWP 124, DEQ 318, County Floodplain Permit, Encroachment Permit from MDT, and a Land Use Permit from the DNRC, which will be obtained prior to construction. FWP has been coordinating all design and proposed work at the barrier site with MDT and DNRC. A private contracting company would be hired to construct the barrier and will be responsible for following stipulations in all obtained permits.

Stage 2. Fish Salvage

The fish species encountered in McVey Creek from 2008-2009 include WCT, brook trout, longnose sucker, white sucker, and burbot. The stream will be electrofished beginning approximately 1.5 miles downstream of the Forest Service boundary in order to conserve the existing WCT and other native fish in McVey Creek. According to surveys conducted in 2009, this is the farthest downstream point burbot were encountered in the stream. The entire stream upstream of this location to the headwaters of McVey Creek (excluding the unnamed tributary that enters near the Forest Service Boundary) would be electrofished and native fish captured. Fish captured would be held in net cages in tributaries to McVey during brook trout removal, and will serve as the source for reintroduction into McVey Creek after brook trout are removed. .

Once brook trout are removed and the rotenone is no longer present in the stream (likely 48 hours after application), held fish will be released back into the stream. It is unknown whether burbot, longnose, and white suckers will persist once the fish barrier is constructed. It is likely that these populations of fish are fluvial and migrate from the Big Hole River to McVey Creek to spawn and then return to the river. The barrier, once placed, would block these species from access to the stream. All three species are widespread, however, and often locally abundant in the Big Hole, so the loss of this spawning stream should only negligibly impact these species. Approximately 1 mile of stream downstream of the barrier will also be available for migratory fish to use as spawning habitat.

Figure 2. Highway 43 culvert crossing over McVey Creek. Proposed barrier would be located immediately upstream of this culvert.

Stage 3. Brook trout removal

Non-native brook trout would be removed from the stream upstream of the barrier using the piscicide rotenone in the formulation CFT Legumine. Fish removal is anticipated to occur between late summer and mid fall 2011. Rotenone is a commonly used piscicide that is highly targeted at fish and has little or no impact on other aquatic and terrestrial plants and animals,

with the exception of aquatic invertebrates. FWP has a long history of using rotenone to manage fish populations in Montana that spans as far back as 1948. FWP has administered rotenone projects for a variety of reasons, but principally to improve angling quality or for native fish conservation. Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family, such as the jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.), that are found in Australia, southern Asia, and South America. Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found. It has been used in fisheries management in North America since the 1930's. Rotenone has also been used as a natural insecticide for gardening and to control parasites such as lice on domestic livestock (Ling 2002).

Rotenone acts by inhibiting oxygen transfer at the cellular level. It is especially effective at low concentrations with fish because it is readily absorbed into the bloodstream through the thin cell layer of the gills. Mammals, birds and other non-gill breathing organisms do not have this rapid absorption route into the bloodstream. The most common route of exposure to non-gill breathing animals is through ingestion. Rotenone is not well absorbed through the digestive system and is readily broken down by digestive processes, thus terrestrial animals can tolerate exposure to concentrations much higher than those used to kill fish.

The boundaries for this treatment would span from the headwaters of McVey Creek to approximately ½ mile downstream of the fish migration barrier. No rotenone will be applied downstream of the migration barrier, but this reach would be a detoxification zone so it is possible that fish will be killed in this area as well. All fish-bearing waters upstream of the barrier, including tributary streams, would be treated with CFT Legumine which is a 5% by volume formulation of rotenone. It may be possible to reduce the amount of chemical applied to McVey Creek by manipulating water flows with existing water diversions. A diversion point is present in McVey Creek downstream of the Forest Service boundary. After treating the waters upstream of this point, it may be possible to shunt flows down the irrigation ditch and dry up the stream downstream of this location. Remaining standing pools of water downstream of this location could be treated with a backpack sprayer. Spring flows approximately one mile upstream of the Highway 43 crossing rewater the stream in this reach, so this area would have to be treated with similar methods as proposed for the reaches farther upstream. FWP would follow the label recommendations concentration for treating the stream, which is 1 part CFT Legumine to 1 million parts water or 1 part per million (ppm). Spring areas may also be treated with the powder formulation of rotenone *(*Prentox, 7% rotenone) or a sand/powder mix to prevent fish from seeking them as freshwater refuges during the application.

The stream from its headwaters to the constructed barrier would be treated using drip stations which are containers that administer diluted Legumine to the stream at a constant rate. These drip stations would administer Legumine to the stream at a rate of 1 ppm for 4 hours. In addition, backwaters, spring areas and small tributaries will be treated with backpack sprayers according to the CFT Legumine label specifications. The total amount of Legumine to be applied to McVey Creek is unknown; the amount is dependent on the flow rate of the stream and the distance downstream the chemical will remain active after its application (determined by on-site bioassay). Assuming McVey Creek is flowing 1.5 cfs and the chemical remains active for 0.75 miles (i.e., 0.75 mile spacing between drip stations), less than 3 gal of Legumine would be

required to treat the stream from the headwaters to the fish barrier. It is expected that fish killing concentrations of Legumine would be present in the stream for only 24 to 48 hours after application after which time the Legumine will have naturally detoxified and diluted to below fish killing concentrations.

There are three ways in which rotenone can be detoxified: natural oxidation, dilution by freshwater, and introduction of a neutralizing agent such as potassium permanganate. FWP will rely on natural oxidation and dilution to detoxify the rotenone in the stream upstream of the fish barrier. At the fish barrier, however, potassium permanganate would be used to detoxify any Legumine treated waters going past the fish barrier site (see Comment 2a below, p 13). The Legumine label states that a minimum of 20 to30 minutes of contact time between rotenone treated waters and the applied neutralizing agent is necessary to fully detoxify the rotenone. Because the rotenone is not instantly detoxified downstream of the barrier site, a detoxification zone would be established. The detoxification zone is defined as the distance the stream travels 15 to 30 minutes downstream of the fish barrier (in this case likely less than one-half mile). Potassium permanganate is readily oxidized by natural processes in the stream and therefore it is imperative that adequate permanganate be applied to the stream to still be present and active at 15 to 30 minutes of travel time downstream. The determination of the appropriate amount of permanganate to apply to achieve 20 to30 minutes of travel time is derived by an on-site bioassay. Water temperatures less than 50 degrees F require a longer contact time thus increasing travel distance. It is anticipated that the detoxification zone on McVey Creek would extend less than one-half mile downstream of the fish barrier. Stream discharge would be measured prior to detoxification and the potassium permanganate would be applied at the rate specified on the Legumine label (3-5 ppm) and according to the on-site bioassay results. An additional backup detoxification would be established one-half mile downstream of the fish barrier. If full detoxification is not achieved by the primary detoxification station, this secondary station could be activated to fully detoxify any remaining rotenone.

Caged fish (westslope cutthroat trout from the Anaconda Hatchery) placed in the stream would be the primary means of determining the presence or absence of rotenone in McVey Creek and the effectiveness of the detoxification station during the treatment. Caged fish would be placed downstream of the detoxification station a distance of 30 minutes travel time. Distress or the lack thereof in these caged fish indicates whether or not the detoxification station is effectively neutralizing the rotenone. Caged fish placed in the creek immediately upstream of the barrier and detoxification station will indicate when rotenone is no longer present in the stream and when detoxification is no longer required. The label states that if sentinel fish in treated stream water show no signs of distress within four hours, the stream water is considered no longer toxic and detoxification can be discontinued. It is anticipated that this would occur in McVey Creek within 48 hours of rotenone application.

Dead fish in the stream would be left on-site in the water. Studies in Washington State indicate that approximately 70% of rotenone-killed fish sink and do not float (Bradbury 1986) and decompose within a week or two. Dead fish stimulate plankton and other invertebrate growth and aid in invertebrate recovery following treatment.

If all the brook trout are not removed during the first treatment in 2011, it may be necessary to implement a second treatment the following year to achieve the desired objective of complete removal of non-native fish. To determine if complete fish removal has been achieved, McVey Creek will be electrofished the spring and summer following treatment (i.e. 2012). If the objectives of the project were not met and non-native fish are found in the stream, a second treatment may be conducted in fall of 2012. In the event that an additional treatment is necessary the following year, landowners, stakeholders and other interested parties would be notified as soon as possible and a supplemental analysis to this EA would be prepared.

To keep the public from being exposed to the rotenone, signs explaining the project will be placed at access points to the project area. Signs will also be placed at stream crossings informing the public of the presence of treated waters.

Stage 4: Monitoring and habitat improvements

Following fish removal and re-establishment of WCT to McVey Creek, the population will be periodically monitored. It is anticipated that the WCT population would quickly expand and fill habitats farther downstream that were previously unoccupied. To facilitate this colonization and to improve flows and fish passage, a fish ladder would be installed at the irrigation diversion located downstream of the Forest Service boundary. This ladder would aid in maintaining flows in the stream downstream of the diversion for fish and for stock water. FWP would also work with private landowners, lessees and the DNRC to reduce grazing impacts on the riparian areas. FWP would also be responsible for the monitoring and maintenance of the fish barrier at the highway crossing.

Funding

Funding for barrier construction is expected to come primarily from the FWP Future Fisheries Improvement Program. Other project expenses listed below will be covered under separate budgets or may have already been purchased. Expected expenses are reviewed in Table 2. This table does not include personnel expenses. No additional funding will be required for personnel services by FWP or USFS. Funding for the barrier construction has not been secured and it is possible that a lack of funds could delay the commencement of this project until 2012.

Table 2. Projected project expenses for McVey Creek westslope cutthroat trout restoration.

Expenses	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST
Barrier design/modeling	1		$1,500.00	$1,500.00
Barrier Construction	1			
Treated Lumber	1		$1,599.33	$1,599.33
Labor	1		$1,841.00	$1,841.00
Materials (seed, bolts, fabric)	1		$969.00	$969.00
Excavator time w/ mobilization	1		$1,494.00	$1,494.00
Riprap	20	cubic yards	$73.45	$1,469.00
Fill	1		$778.00	$778.00
Highway Backfill				
Equipment	1		$2,009.00	$2,009.00
Labor	1		$1,494.00	$1,494.00
Riprap	20	cubic yards	$73.45	$1,469.00
Fill	1		$1,455.00	$1,455.00
Fish Ladder				
Fish ladder	1		$1,500.00	$1,500.00
Installation	1		$2,000.00	$2,000.00
Brook trout removal	1		$500.00	$500.00
		Project Total		$20,077.33

PART II. ALTERNATIVES

Alternative 1 – No action

The "No Action" alternative would allow status quo management to continue. WCT in McVey Creek would continue to be threatened by the presence of non-native brook trout. It is very likely that given the trend in WCT abundance and distribution, the species would be extirpated in the drainage in the near term (i.e., less than 50 years). The loss of this native fish population would be a large set-back for WCT conservation in the Big Hole. McVey Creek is one of only a few remaining non-hybridized populations of WCT. This alternative would not fulfill the State's obligation to protect all genetically pure WCT populations (FWP 2007).

Alternative 2 – Proposed Action: Restoration of westslope cutthroat trout in McVey Creek through the construction of a fish migration barrier, salvage of the existing WCT, removal of brook trout using rotenone and releasing salvage fish back into the stream.

This alternative would involve constructing a fish migration barrier 0.75 miles upstream of the mouth of the stream and chemically removing brook trout from the drainage upstream of the fish

barrier. The piscicide proposed for use is rotenone in the formulation of CFT Legumine (5% rotenone). The rotenone would be detoxified within one half mile downstream of the fish migration barrier using potassium permanganate. Prior to fish removal, WCT and other native fish would be salvaged from the stream and held in a secure location. Once fish removal is achieved and rotenone is no longer present in the water, salvaged fish will be released back into the stream. Additionally, a fish ladder would be constructed on an irrigation diversion located immediately downstream of the Forest Service boundary in order to pass fish around the site and to maintain instream flows. This alternative offers the highest probability of achieving the goal of conserving westslope cutthroat trout in McVey Creek, and it will greatly increase miles of secured habitat occupied by the species within the Big Hole drainage. Once the population in McVey Creek is secure, it could also serve as an egg donor source for westslope cutthroat trout restoration in other streams.

Alternative 3 –Construct a fish migration barrier and mechanically remove brook trout from the McVey Creek drainage.

This alternative would involve construction of a fish migration barrier, identical to Alternative 2 (preferred alternative), but would use electrofishing to remove brook trout. Multiple-pass electrofishing has been used to eradicate unwanted trout, primarily nonnative brook trout, from several small streams in north central Montana (Big Coulee, Middle Fork Little Belt, and Cottonwood creeks) and in southwest Montana (Muskrat, Whites and Staubach creeks). The project reaches in these efforts were less than 3 miles in length and required up to 25 electrofishing removal passes over several years to eradicate the unwanted species. Eradication of brook trout from McVey Creek with electrofishing would be difficult because of the length of stream involved (> 6 miles), small size of the stream and tributaries, and the complexity of the habitat, particularly in the National Forest. Recent efforts in the early 1990's and from 2005 to 2007 were not successful at achieving a significant reduction in brook trout numbers in the stream. A four to five year commitment would be required to achieve complete removal of brook trout from McVey Creek with electrofishing. This would also require three to four crews of six to 10 people for several weeks each year. Such an effort would be impractical and cost-prohibitive. It is also unclear, given the length of the stream and the complexity of the habitat, whether 100% removal of brook trout could be achieved. For these reasons, this alternative was eliminated from further consideration.

Alternative 4: Construct a fish migration barrier and use angling to eliminate brook trout from McVey Creek.

FWP has the authority under commission rule to modify angling regulations for the purpose of removing unwanted fish from a lake or stream. This method, however, does not guarantee complete fish removal. There are a number of reasons why this method would more than likely not work in McVey Creek. First, McVey Creek is a small stream and currently receives little or no fishing pressure. Attracting anglers to the stream to harvest brook trout would be very difficult because of the remoteness of the site, small size of the stream, and small size of fish. Recreational angling has been shown to reduce the average size of fish and population abundance, but rarely has it been solely responsible for eliminating a fish population. Using angling techniques alone in the stream would not result in removal of brook trout and would not

achieve the objective of conserving non-hybridized cutthroat trout. For these reasons this method of fish removal was considered unreliable at achieving the objective of complete fish removal and was eliminated from further analysis.

PART III. ENVIRONMENTAL REVIEW

A. PHYSICAL ENVIRONMENT

1. LAND RESOURCES Will the proposed action result in:	IMPACT 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		Yes	1b
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			1d.
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

Comment 1b. The small impoundment created by the construction of the fish migration barrier will likely lead to deposition of stream sediments upstream. This will cover existing soils on the stream banks and the streambed itself with sediments. The impact to existing soils should be minimal due to the small size of the impoundment (< 0.25 acres). It is further expected that as sediments accumulate upstream of the fish barrier, they will become vegetated similar to the conditions of the existing stream banks.
Comment 1d. See response to comment 1b.

2. WATER Will 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		YES	2a
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of flood water or other flows?			X		No	2c
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				2f
g. Changes in the quantity of groundwater?		X				
h. Increase in risk of contamination of surface or groundwater?			X		YES	see 2a,f
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		Yes	See 2j
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				
l. Will the project affect a designated floodplain?		X				
m. Will the project result in any discharge that will affect federal or state water quality regulations? (Also see 2a)			X		YES	2m

Comment 2a: The proposed project is designed to intentionally introduce a piscicide to surface water to remove unwanted fish. The impacts would be short term and minor. CFT Legumine 5% liquid rotenone is an EPA registered piscicide and is safe to use for removal of unwanted fish, when handled and applied according to the product label. The concentration of rotenone to be used is 1 part formulation to one million parts of water (ppm).

To reduce the impact of the piscicide on water quality, a detoxification station will be established immediately downstream of the fish barrier. There are three ways in which rotenone can be detoxified once applied. The most common method is to allow natural breakdown to occur. Rotenone is a compound that is susceptible to natural breakdown (detoxification) through a

variety of mechanisms such as water chemistry, water temperature, exposure to organic substances, exposure to air, and sunlight intensity (Ware 2002, ODFW 2002, Loeb and Engsrtom-Heg 1970, Engstrom-Heg 1972, Gilderhus et al. 1986). Rotenone persistence studies by Gilderhus et al. (1986) and Dawson et al. (1991) found that in cool water temperatures of 32 to 46°F the half-life ranged from 3.5 to 5.2 days. Gilderhus et al. (1986) reported that 30% mortality was experienced in rainbow trout exposed to degrading concentrations of actual rotenone (0.004 ppm) in 46°F pond water 14 days after a treatment. By day 18 the concentrations were sub lethal to trout. The second method for detoxification involves basic dilution by fresh water. This may be accomplished by fresh ground water or surface water flowing into a lake or stream. The final method of detoxification involves the application of an oxidizing agent like potassium permanganate. This dry crystalline substance is mixed with stream or lake water to produce a concentration of liquid sufficient to detoxify the rotenone. Detoxification is accomplished after about 15 to 30 minutes of exposure time between the two compounds (Prentiss Inc. 1998, 2007). We expect the stream will naturally detoxify down to the fish migration barrier. We expect this to occur within 24 to 48 hours after application of Legumine because of natural breakdown processes and dilution from freshwater sources. At the fish barrier, potassium permanganate will be used to detoxify the rotenone present in the stream and prevent fish killing concentrations of rotenone from traveling more than one half mile downstream.

Dead fish would result from this project. Bradbury (1986) reported that 9 of 11 water bodies in Washington treated with rotenone experienced an algae bloom shortly after treatment. This is attributed to the input of phosphorus to the water as a result of decaying fish. Bradbury further notes that approximately 70% of the phosphorus content of the fish stock would be released into the water through bacterial decay. This action may be beneficial because it would stimulate algae production and would start the stream toward production of food for fish. Any changes or impacts to water quality resulting from decaying fish would be short term and minor.

During barrier construction and construction of the fish ladder, it is likely that minimal amounts of turbidity will be generated. Barrier installation will require excavation of the streambed and banks. The amount of turbidity generated should be minimal because work will be done in low water conditions and will be completed in one to two days. Actual excavation time will likely be less than half a day. Placement of the fish ladder will also be less than one day. A 318 permit from MT DEQ will be obtained prior to construction activities that may cause an increase in turbidity.

Comment 2c. The presence of the fish migration barrier will impound water upstream of the barrier approximately 150 feet. This impoundment will increase flood elevation upstream of the structure approximately three feet. Hydraulic analysis of the structure and adjoining eight foot culvert indicate that construction of the fish migration barrier will not impact the ability of the culvert to handle flood flows up to the one hundred year flood event. Increasing flood elevation upstream of the barrier should be a minor impact because of the natural wide, flat floodplain upstream of Highway 43. There are no houses or other permanent structures in this area upstream of the barrier that could be impacted by increased flood elevations. There should be no affect on flood elevations downstream of the structure. FWP anticipates that over time, the pool upstream of the barrier will fill with natural stream sediments.

Comment 2f: No contamination of groundwater is anticipated to result from this project. Rotenone binds readily to sediments and is broken down by soil and in water (Skaar 2001, Engstrom-Heg 1971, 1976, Ware 2002). Rotenone moves only one inch in most soil types; the only exception would be sandy soils where movement is about three inches (Hisata 2002). Studies were done in California placing wells in aquifers adjacent to and downstream of rotenone applications showing no rotenone, rotenolone, or any of the other organic compounds in the formulated products (CDFG 1994). Case studies in Montana have concluded that rotenone movement through groundwater does not occur. For example, at Tetrault Lake, Montana, neither rotenone nor inert ingredients were detected in a nearby domestic well which was sampled two and four weeks after applying 90 ppb rotenone to the lake. This well was chosen because it was down gradient from the lake and also drew water from the same aquifer that fed and drained the lake. A Kalispell-area pond was treated with Prenfish 5% rotenone in 1998. Water from a well, located 65 feet from the pond, was analyzed and no evidence of rotenone was detected. In 2001, another Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well, located 200 feet from that pond, was tested 4 times over a 21-day period and showed no sign of contamination. In 2005, FWP treated a small pond near Thompson Falls with Prenfish to remove pumpkinseeds and bass. A well located 30 yards from the pond was tested, and neither Prenfish nor inert ingredients were found in the well. In Soda Butte Creek near Cooke City, Montana, a well at a Forest service campground located 50 feet from a treated stream was tested immediately following treatment with Prenfish and again 10 months later, and no traces of rotenone were found (Olsen 2006). Because rotenone is known to bind readily with stream and lake substrates, we do not anticipate any contamination of ground water as a result of this project.

Comment 2j: The Legumine label states "….Do not use water treated with rotenone to irrigate crops or release within one half mile upstream of a potable water or irrigation water intake in a standing body of water such as a lake, pond or reservoir…" There are two irrigation water diversion sites located within the proposed treatment area. Both irrigate lands located west of Highway 43. FWP has coordinated and will continue to coordinate the treatment with the irrigators to ensure that treated waters are not used for irrigation. Irrigation water in this area is used to water pasture grass and is not used for food crops. The timing of the treatment in late summer (late August or early September) will mitigate the need for irrigation water because most of the diversions on McVey Creek are closed by that time of the year. Therefore, the impacts to irrigation should be short-term and minor.

Comment 2m: FWP would apply for an exemption of surface water quality standards for the purpose of applying a pesticide from Montana DEQ under section 308 of the Montana Water Quality Act and Section 318 for the temporary generation of turbidity.

3. AIR Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Emission of air pollutants or deterioration of ambient air quality? (also see 13 (c))			X			
b. Creation of objectionable odors?		X				3b
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. Will the project result in any discharge which will conflict with federal or state air quality regulations?		X				

Comment 3a: Emissions will be generated as a result of operating vehicles and equipment during barrier construction and fish removal. These impacts should be minor and temporary as barrier construction is anticipated to last only one to two days and fish removal is anticipated to last only one to two weeks.

4. VEGETATION Will 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				
d. Reduction in acreage or productivity of any agricultural land?		X				
e. Establishment or spread of noxious weeds?		X				
f. Will the project affect wetlands, or prime and unique farmland?		X				

Comment 4a: There would be some disturbance of vegetation along the stream during the treatment. Rotenone does not have an effect on plants at concentrations used to kill fish. Vegetation disturbances are expected to be short term and minor. Vegetation will also be disturbed during barrier and fish ladder construction. These impacts should be minor because the size of the footprint of both structures. Impacts will be mitigated by reseeding disturbed reas with native grass seed mix.

5. FISH/WILDLIFE Will the proposed action result in:	IMPACT Unknown	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 nongame species?			X		yes	5c
d. Introduction of new species into an area?			X			
e. Creation of a barrier to the migration or movement of animals?			X		No	5e
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			5g
h. Will the project be performed in any area in which T&E species are present, and will the project affect any T&E species or their habitat? (Also see 5f)			X		Yes	See 5f
i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)			X			5i

Comment 5b: This project is designed to eradicate non-native brook trout in McVey Creek upstream of the proposed fish migration barrier. However, these impacts are minor and temporary because the WCT and other native fish from the stream would be salvaged and restocked, and would eventually repopulate the stream. There will be no proposed changes in the fishing regulations as a result of this proposed project. Rotenone, when applied at fish killing concentration, has no impact on terrestrial wildlife including birds and mammals that consume dead fish.

Comment 5c: Nongame, non-target species that would be impacted include some aquatic insects. Columbia spotted frogs and western toads have been documented in McVey Creek but because of the timing of the project, impacts are anticipated to be minimal. Metamorphosed amphibians that breathe air are not affected by rotenone at fish killing concentrations; however, non-metamorphosed tadpoles that respire through their skin and/or gills are affected. The timing of this project should mitigate any impacts to spotted frogs and western toads because most will have metamorphosed by late summer when the rotenone treatment phase of this project is being proposed.

Aquatic Invertebrates:

Numerous studies indicate that rotenone has temporary or minimal effects on aquatic invertebrates. The most noted impacts are temporary and often substantial reduction in invertebrate abundance and diversity. In a study of the impacts of a rotenone treatment in Soda Butte Creek in south-central Montana, aquatic invertebrates of nearly all taxa declined dramatically immediately after rotenone treatment. Only one year later, nearly all taxa were fully recovered and at greater abundance than pre-treatment (Olsen and Frazer 2006). One study reported that no long-term, significant reduction in aquatic invertebrates was observed due to the effects of rotenone which was applied at levels twice as high as the levels proposed for this project (Houf and Campbell 1977). Chandler and Marking (1982) found that clams and snails were between 50 and 150 times more tolerant than fish to Noxfish (5% rotenone formulation). In all cases, the reduction of aquatic invertebrates was temporary, and most treatments used a higher concentration of rotenone than proposed for this project (Schnick 1974). In a study on the relative tolerance of different aquatic invertebrates to rotenone, Engstrom-Heg et al. (1978) reported that the long-term impacts of rotenone are mitigated because those insects that were most sensitive to rotenone also tended to have the highest rate of recolonization. Temporary changes in aquatic invertebrate community structure due to a rotenone treatment could be similar to what is observed after natural (e.g. fire) and anthropogenic (livestock grazing) disturbances (Wohl and Carline 1996, Mihuc and Minshall 2005, Minshall 2003), though the physical impacts and resulting modifications of invertebrate assemblages after these types disturbances can last for a much longer period than a piscicide treatment.

Because of their short life cycles (Anderson and Wallace 1984), good dispersal ability (Pennack 1989), and generally high reproductive potential (Anderson and Wallace 1984), aquatic invertebrates are capable of rapid recovery from disturbance (Boulton et al. 1992, Matthaei et al. 1996). Headwater reaches of tributaries to McVey Creek that do not hold fish would not be treated with rotenone and would provide a source of aquatic invertebrate colonists that would drift downstream. Recolonization would additionally include aerially dispersing invertebrates from downstream areas (e.g. mayflies, caddisflies, dipterans, stoneflies).

The possibility of eliminating a rare or endangered species of aquatic invertebrate in McVey Creek by treating with rotenone is very unlikely. In southwestern Montana as part of a MEPA process, aquatic invertebrates are routinely collected prior to WCT restoration projects in mountains streams (e.g., Eureka, Little Tepee, Little Tizer, Elkhorn, Crazy, Whitehorse, Soda Butte creeks). In all cases, these collections have shown aquatic invertebrate assemblages typical of headwater streams in southwestern Montana, and in no cases have threatened or endangered species been discovered. There are no known threatened or endangered invertebrates in areas surrounding McVey Creek. FWP expects that McVey Creek contains the same type of aquatic invertebrate assemblage as found in other nearby streams, and the possibility of eliminating a rare or endangered species is minimal.

Based on these studies, FWP would expect the aquatic invertebrate species composition and abundance in McVey Creek to return to pre-treatment diversity and abundance within one to two years after treatment. Therefore, the impacts to aquatic invertebrate communities should be short-term and minor.

Birds and Mammals:

Mammals are generally not affected by rotenone at fish killing concentrations; they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Studies of risk for terrestrial animals found that a 22-pound dog would have to drink 7,915 gallons of treated lake water within 24 hours, or eat 660,000 pounds of rotenone-killed fish to receive a lethal dose (CDFG 1994). The State of Washington reported that a half pound mammal would need to consume 12.5 mg. of pure rotenone to receive a lethal dose (Bradbury 1986). Considering the only conceivable way an animal can consume rotenone under field conditions is by drinking lake or stream water or consuming dead fish, a half pound animal would need to drink 33 gallons of water treated at 2 ppm.

The EPA (2007) made the following conclusion for small mammals and large mammals:

> *When estimating daily food intake, an intermediate-sized 350 g mammal will consume about 18.8 g of food. Using data previously cited from the common carp with a body weight of 88 grams, a small mammal would only consume 21% (18.8/88) of the total carp body mass. According to the data for common carp, total body residues of rotenone in carp amounted to 1.08 µg/g. A 350-g mammal consuming 18.8 grams represents an equivalent dose of 20.3 µg of rotenone; this value is well below the median lethal dose of rotenone (13,800 µg) for similarly sized mammals. When assessing a large mammal, 1000 g is considered to be a default body weight. A 1,000 g mammal will consume about 34 g of food. If the animal fed exclusively on carp killed by rotenone, the equivalent dose would be 34 g *1.08 µg/g or 37 µg of rotenone. This value is below the estimated median lethal equivalent concentration adjusted for body weight (30,400 µg). Although fish are often collected and buried to the extent possible following a rotenone treatment, even if fish were available for consumption by mammals scavenging along the shoreline for dead or dying fish, it is unlikely that piscivorous mammals will consume enough fish to result in observable acute toxicity.*

One study using rats injected with rotenone for a period of weeks reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). The results, however, have been challenged based upon the following errors in experimental methodology: (1) that the continuous intravenous injection method used to treat the rats leads to "continuously high levels of the compound in the blood," and (2), that dimethyl sulfoxide (DMSO) was used to enhance tissue penetration (normal routes of exposure actually slow introduction of chemicals into the bloodstream). Finally, injecting rotenone into the body is not a normal way of assimilating the compound under field applications as proposed in McVey Creek. Similar studies (Marking 1988) have found no Parkinson-like results. Extensive research has demonstrated that rotenone does not cause birth defects (HRI 1982), gene mutations (Van Geothem et al. 1981, BRL 1982) or cancer (Marking 1988). Rotenone was found to have no direct role in fetal development of rats that were fed extremely high concentrations of rotenone. Spencer and Sing (1982) reported that rats that were fed diets laced with 10 to 1,000 ppm rotenone over a 10-day period did not suffer any reproductive dysfunction. Typical concentrations of actual rotenone used in fishery management range from 0.025 to 0.50 ppm and are far below that administered during most toxicology studies.

Similar results determined that birds required levels of rotenone at least 1,000 to 10,000-times greater than is required for lethality in fish (Skaar 2001). Cutkomp (1943) reported that chickens, pheasants and members of lower orders of *Galliformes* were quite resistant to rotenone, and four day old chicks were more resistant than adults. Ware (2002) reported that swine are uniquely sensitive to rotenone, and wildfowl find it slightly toxic, but lethal levels for Japanese quail required 4,500 to 7,000 times more than is used to kill fish.

The EPA (2007) made the following conclusion for birds:

> *Since rotenone is applied directly to water, there is little likelihood that terrestrial forage items for birds will contain rotenone residues from this use. While it is possible that some piscivorous birds may feed opportunistically on dead or dying fish located on the surface of treated waters, protocols for piscicidal use typically recommend that dead fish be collected and buried, rendering the fish less available for consumption (see Section IV). In addition, many of the dead fish will sink and not be available for consumption by birds. However, whole body residues in fish killed with rotenone ranged from 0.22 µg/g in yellow perch (Perca flavescens) to 1.08 µg/g in common carp (Cyprinus carpio; Jarvinen and Ankley 1998). For a 68 g yellow perch and an 88 g carp, this represents totals of 15 µg and 95 µg rotenone per fish, respectively. Based on the avian subacute dietary LC_{50} of 4,110 mg/kg, a 1,000-g bird would have to consume 274,000 perch or 43,000 small carp. Thus, it is unlikely that piscivorous birds will consume enough fish to result in a lethal dose.*

<u>Amphibians and Reptiles</u>:

Potential amphibians and reptiles found within the McVey Creek treatment area include: long-toed salamanders (*Ambystoma macrodactylum*), spotted frogs (*Rana pretiosa*), western toads *(Bufo boreas)* (amphibians), and western terrestrial garter (*Thamnophis elegans*), common garter (*T. sirtalis*) and rubber boa (*Charina bottae*) snakes (reptiles). Rotenone can be toxic to gill-breathing larval amphibians, though air breathing adults are less sensitive. Chandler and Marking (1982) found that Southern Leopard frog tadpoles were between three and ten times more tolerant than fish to Noxfish (5% rotenone formulation). Grisak et al. (2007) conducted laboratory studies on long-toed salamanders, Rocky Mountain tailed frogs (*Ascaphus truei*), and Columbia spotted frogs and concluded that the adults of these species would not suffer an acute response to Prenfish at trout killing concentrations (0.5-1 ppm), but the larvae would likely be affected. These authors recommended implementing rotenone treatments at times when the larvae are not present, such as the fall, to reduce the chance of exposure to rotenone-treated water and potential impacts to larval amphibians. The McVey Creek treatment would be scheduled for late August or September (prior to brook trout spawning), which would reduce but not eliminate potential impacts to larval amphibians. Any reduction in amphibian abundance is expected to be short term because of the low sensitivity of adults to rotenone and because most larval amphibians would have metamorphosed by late August when the treatment is planned. A reduced abundance of aquatic invertebrates may temporally impact larval amphibians that prey on these species, though the aquatic invertebrate community would recover rapidly. Reptiles

(air-breathing) would not be directly impacted by rotenone treatment, though snakes are known to consume trout which would be temporarily reduced by the proposed piscicide treatment. It is important to note that many toxicity studies involved subjecting laboratory specimens to unusually high concentrations of rotenone or conducting tests on animals that would not normally be exposed to rotenone during use in fisheries management.

Based on this information FWP would expect the impacts to non-target organisms in McVey Creek to range from non-existent to short term and minor.

Comment 5e. One of the proposed actions is to construct a fish migration barrier in McVey Creek. This structure would preclude fish from migrating from lower McVey Creek to the upper reaches of the stream. This structure, however, is necessary to ensure the long-term persistence of westslope cutthroat trout and to ensure that brook trout and other non-native species do not recolonize the treatment area. The location of the barrier is near the confluence of the Big Hole River and this reach of the Big Hole is an important area for Arctic grayling. Grayling have been known to use nearby similar-sized tributary streams for spawning and rearing (i.e., York Gulch). No grayling, however, have been documented in McVey Creek in the past two years. Grayling would still have access to the lower three-quarters mile of stream for spawning and rearing. If grayling use of the stream is documented and it is determined that upstream expansion in McVey Creek is warranted, it may become necessary to relocate the fish barrier farther upstream. Other fluvial fish such as burbot, longnose sucker, and white sucker which are present in McVey Creek will also be blocked from accessing spawning and rearing areas by the fish barrier. Unlike the grayling, these species are widespread and locally abundant in the Big Hole; therefore, impeding these species from access to upper reaches of McVey Creek is only considered a minor impact.

Comment 5f: Dead fish would result from this project. It is possible that osprey or eagles would eat rotenone-killed fish. Bald eagles have been observed along the nearby Big Hole River. Conducting this project in the fall would not impact bald eagle nesting, and there would be no impacts to bald eagles that consume rotenone-killed fish. See comment 5c for impacts to birds.

The project area is within potential grizzly bear habitat, but there are no known grizzly bears currently inhabiting this area. This project should have little or no impact on grizzly bears because the bears are not dependent on fish for food. There would be no impact on grizzly bears that consume fish killed by rotenone or consume treated waters (See comment 5c for impacts to mammals). The project would not have an impact on grizzly bears.

The project site is within the range of the gray wolf and lynx. Wolves and lynx are known to be present near the project area. They may use this area at times, but they are not dependant on the stream for fish. The impacts to these species may include temporary displacement during the treatment when personnel and equipment are present in the drainage. However, there should be no impacts from consuming treated waters or fish killed by rotenone for the same reasons as previously noted. Therefore, impacts to lynx and wolves should be minor and temporary. See comment 5c for impacts to mammals.

Westslope cutthroat trout, including some populations of slightly hybridized WCT, are considered a sensitive species. The intent of the proposed project is to protect and restore the

existing WCT population by capturing and holding the fish during the chemical treatment then releasing the fish back into the stream. Because electrofishing is not 100% efficient at capturing fish, it is likely that not all WCT will be captured prior to introducing Legumine to the stream, and it is possible that some WCT will be inadvertently killed. This impact is considered minor because it is anticipated that 90% or greater of the WCT present will be captured prior to treatment and because these same fish will be restored to the stream once the project is complete.

Comment 5g. There is the potential for displacement of some animals during the implementation of this project (see Comment 5f). Mule deer, elk and other big game species may be temporarily displaced as crews are present in the drainage performing the proposed work. However, these impacts should only be minor and temporary. The total treatment should be completed within two weeks. Barrier construction should also be completed within a one- to two-day time window. Motorized access is currently present throughout most of the drainage, and FWP presence will likely represent only a small and temporary increase in human activity.

B. HUMAN ENVIRONMENT

6. NOISE/ELECTRICAL EFFECTS Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Increases in existing noise levels?			X		Yes	6a
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				

Comment 6a: Noise levels will increase temporarily as 4x4 trucks and ATV's will be used for the treatment, and heavy equipment to construct the fish barrier and ladder. These impacts should be minor and temporary as the construction of the barrier is scheduled to last only three days and the treatment phase of the project is scheduled to last only two weeks. There are no occupied structures within one half mile of the fish barrier.

7. LAND USE Will 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				

8. RISK/HEALTH HAZARDS Will 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		YES	8a
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?			X		YES	8b
c. Creation of any human health hazard or potential hazard?			X		YES	see 8a,c
d. Will any chemical toxicants be used?			X		YES	see 8a

Comment 8a: The principal risk of human exposure to hazardous materials from this project would be limited to the applicators of the CFT Legumine. All applicators would wear safety equipment required by the product label and MSDS sheets. Such safety equipment may include respirator, goggles, rubber boots, Tyvek overalls, and Nitrile gloves. All applicators would be trained on the safe handling and application of the piscicide. At least one Montana Department of Agriculture certified pesticide applicator would supervise and administer the project. Materials would be transported, handled, applied, and stored according to the label specifications to reduce the probability of human exposure or spill.

Comment 8b: FWP requires a treatment plan for rotenone projects. This plan addresses many aspects of safety for people who are on the implementation team such as establishing a clear chain of command, training, delegation and assignment of responsibility, clear lines of communication between members, a spill contingency plan, first aid, emergency responder information, personal protective equipment, monitoring and quality control, among others. Implementing this project should not have any impact on existing emergency plans. Because an

implementation plan has been developed by FWP, the risk of emergency response is minimal and any effects to existing emergency responders would be short term and minor.

Comment 8c: The EPA (2007) conducted an analysis of the human health risks for rotenone and concluded it has a high acute toxicity for both oral and inhalation routes of exposure, but has a low acute toxicity for a dermal route of exposure. It is not an eye or skin irritant nor a skin sensitizer. The EPA could not provide a quantitative assessment of potentially critical effect on neurotoxicity risks to rotenone users, so a number of uncertainty factors were assigned to the rating values. They are: an additional 10x database uncertainty factor - in addition to the inter-species (10x) uncertainty factor and intra-species (10x) uncertainty factor – has been applied to protect against potential human health effects and the target margin of exposure (MOE) is 1000. The following table summarizes the EPA toxicological endpoints of rotenone (from EPA 2007):

Exposure Scenario	Dose Used in Risk Assessment, Uncertainty Factor (UF)	Level of Concern for Risk Assessment	Study and Toxicological Effects
Acute Dietary (females 13-49)	NOAEL = 15 mg/kg/day UF = 1000 aRfD = 15 mg/kg/day = 0.015 mg/kg/day 1000	Acute PAD = 0.015 mg/kg/day	Developmental toxicity study in mouse (MRID 00141707, 00145049) LOAEL = 24 mg/kg/day based on increased resorptions
Acute Dietary (all populations)	An appropriate endpoint attributable to a single dose was not identified in the available studies, including the developmental toxicity studies.		
Chronic Dietary (all populations)	NOAEL = 0.375 mg/kg/day UF = 1000 cRfD = 0.375 mg/kg/day = 0.0004 mg/kg/day 1000	Chronic PAD = 0.0004 mg/kg/day	Chronic/oncogenicity study in rat (MRID 00156739, 41657101) LOAEL = 1.9 mg/kg/day based on decreased body weight and food consumption in both males and females
Incidental Oral Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0.5 mg/kg/day	Residential MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2.4/3.0 mg/kg/day [M/F] based on decreased parental (male and female) body weight and body weight gain
Dermal Short-, Intermediate-, and Long-Term	NOAEL = 0.5 mg/kg/day 10% dermal absorption factor	Residential MOE = 1000 Worker MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2.4/3.0 mg/kg/day
Inhalation Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0.5 mg/kg/day 100% inhalation absorption factor	Residential MOE = 1000 Worker MOE = 1000	[M/F] based on decreased parental (male and female) body weight and body weight gain
Cancer (oral, dermal, inhalation)	Classification; No evidence of carcinogenicity		

UF = uncertainty factor, NOAEL = no observed adverse effect level, LOAEL = lowest observed adverse effect level, aPAD = acute population adjusted dose, cPAD = chronic population adjusted does, RfD = reference dose, MOE = margin of exposure, NA = Not Applicable

Rotenolenoids are common degradation products found in the parent plant material used to make piscicidal forms of rotenone. The EPA (2007) concluded these degradation products are no more toxic than the active ingredient.

The EPA analysis of acute dietary risk for both food and drinking water concluded:

"…When rotenone is used in fish management applications, food exposure may occur when individuals catch and eat fish that either survived the treatment or were added to the water body (restocked) prior to complete degradation. Although exposure from this route is unlikely for the general U.S. population, some people might consume fish following a rotenone application. EPA used maximum residue values from a bioaccumulation study to estimate acute risk from consuming fish from treated water bodies. This estimate is considered conservative because the bioaccumulation study measured total residues in edible portions of fish including certain non-edible portions (skin, scales, and fins) where concentrations may be higher than edible portions (tissue), and the Agency assumed that 100% of fish consumption could come from rotenone exposed fish. In addition, fish are able to detect rotenone's presence in water and, when possible, attempt to avoid the chemical by moving from the treatment area. Thus, for partial kill uses, surviving fish are likely those that have intentionally minimized exposure.

Acute exposure estimates for drinking water considered surface water only because rotenone is only applied directly to surface water and is not expected to reach groundwater. The estimated drinking water concentration (EDWC) used in dietary exposure estimates was 200 ppb, the solubility limit of rotenone. The drinking water risk assessment is conservative because it assumes water is consumed immediately after treatment with no degradation and no water treatment prior to consumption.
Acute dietary exposure estimates result in dietary risk below the Agency's level of concern. Generally, EPA is concerned when risk estimates exceed 100% of the acute population adjusted dose (aPAD). The exposure for the "females 13-49 years old" subgroup (0.1117 mg/kg/day) utilized 74% of the aPAD (0.015 mg/kg/day) at the 95th percentile (see Table 5). It is appropriate to consider the 95th percentile because the analysis is deterministic and unrefined. Measures implemented as a result of this RED will further minimize potential dietary exposure (see Section IV)..."

As for evaluating the human chronic risk from exposure to rotenone treated water, the EPA acknowledges the four principle reasons for concluding there is a low risk: First, the rapid natural degradation of rotenone; second, using active detoxification measures by applicators such as potassium permanganate; next, properly following pisticide labels which prohibit the use near water intakes; and finally, proper signing, public notification or area closures which limit public exposure to rotenone treated water.

As for recreational exposure, the EPA concludes no risk to adults who enter treated water following the application by dermal and incidental ingestion but requires a waiting period of three days after a treatment before toddlers swim in treated water. The aggregate risk to human health from food, water, and swimming does not exceed the EPA level of concern (EPA 2007). Recreationists in the area would not likely be exposed to the treatments because signs would be in place to warn recreationists that the stream and lakes are being treated with rotenone and closed to entry. Proper warning through news releases, signing the project area, temporary road closure, and administrative personnel in the project area should be adequate to keep unintended recreationists from being exposed to any treated waters.

Fisher (2007) conducted an analysis of the inert constituent ingredients found in the rotenone formulation of CFT Legumine for the California Department of Fish and Game. These inert ingredients are principally found in the emulsifying agent Fennodefo[99] which helps make the generally insoluble rotenone more soluble in water. The constituents were considered because of their known hazard status and not because of their concentrations in the Legumine formulation. Solvents such as xylene, trichloroethylene (TCE) and tetrachloroethylene are residue left over from the process of extracting rotenone from the root and can be found in some lots of Legumine. However, inconsistent detectability and low occurrence in other formulations that used the same extraction process were below the levels for human health and ecological risk. Solvents such as toluene, n-butylbenzene, 1,2,4 trimethylbenzene and naphthalene are present in Legumine, and when used in other applications can be an inhalation risk. However, because of their low concentrations in this formulation, the human health risk is low. The remaining constituents, the fatty acid esters, resin acids, glycols, substituted benzenes, and 1-hexanol were likewise present but analyzed, calculated or estimated to be below the human health risk levels when used in a typical fish eradication project.

Methyl pyrrolidone is also found in Legumine. It is known to have good solvency properties and is used to dissolve a wide range of compounds including resins (rotenone). Analysis of Methyl pyrrolidone in Legumine showed it represents about 9% of the formulation (Fisher 2007). The analysis concluded regarding the constituent ingredients in Legumine:

> "…None of the constituents identified are considered persistent in the environment nor will they bioaccumulate. The trace benzenes identified in the solvent mixture of CFT Legumine™ will exhibit limited volatility and will rapidly degrade through photolytic and biological degradation mechanisms. The PEGs are highly soluble, have very low volatility, and are rapidly biodegraded within a matter of days. The fatty acids in the fatty acid ester mixture (Fennodefo99™) do not exhibit significant volatility, are virtually insoluble, and are readily biodegraded, although likely over a slightly longer period of time than the PEGs in the mixture. None of the new compounds identified exhibit persistence or are known to bioaccumulate. Under conditions that would favor groundwater exchange the highly soluble PEGs could feasibly transmit to groundwater, but the concentrations in the reservoir, and the rapid biodegradation of these constituents makes this scenario extremely unlikely. Based upon a review of the physical chemistry of the chemicals identified, we conclude that they are rapidly biodegraded, hydrolyzed and/or otherwise photolytically oxidized, and that the chemicals pose no additional risk to human health or ecological receptors from those identified in the earlier analysis. None of the constituents identified appear to be at concentrations that suggest human health risks through water or ingestion exposure scenarios, and no relevant regulatory criteria are exceeded in estimated exposure concentrations…"

The Legumine MSDS states "…when working with an undiluted product in a confined space, use a non-powered air purifying respirator…and… air-purifying respirators do not protect workers in oxygen-deficient atmospheres…" It is not likely that workers would be handling Legumine in an oxygen deficient space during normal use. Proper ventilation and safety equipment would be used according to the label requirements, however, to guard against any chance of inhalation.

The advantage of CFT Legumine over Prenfish is that it has less petroleum hydrocarbon solvents such as toluene, xylene, benzene and naphthalene. By comparison, Prenfish has a strong chemical odor. CFT Legumine is virtually odor-free and performs almost identically to Prenfish.

In their description of how South American Indians prepare and apply *Timbó*, a rotenone parent plant, Teixeira, et al. (1984) reported that the Indians extensively handled the plants during a mastication process, and then swam in lagoons to distribute the plant pulp. No harmful effects were reported. It is important to note that the primitive method of applying rotenone from root does not involve a calculated target concentration, metering devices or involve human health risk precautions as those involved with fisheries management programs.

9. COMMUNITY IMPACT **Will 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				

10. PUBLIC SERVICES/TAXES/UTILITIES Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Will 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. Will the proposed action have an effect upon the local or state tax base and revenues?		X				
c. Will 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. Will the proposed action result in increased used of any energy source?		X				
e. Define projected revenue sources		X				
f. Define projected maintenance costs		X				

11. AESTHETICS/RECREATION Will the proposed action result in:	IMPACT Unknown	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				
d. Will any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		X				

12. CULTURAL/HISTORICAL RESOURCES Will 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. Will the project affect historic or cultural resources?		X				

13. SUMMARY EVALUATION OF SIGNIFICANCE Will 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 will 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			13f
g. List any federal or state permits required.						13g

Comments 13e and f: The use of piscicide can generate controversy from some people. Public outreach and information programs can educate the public on the use of piscicides. It is not known if this project would have organized opposition. Initial scoping of private landowners in the drainage, grazing lessees, local sporting groups (George Grant Chapter Trout Unlimited, Anaconda Sportsmen, Skyline Sportsmen) and other agencies indicated overall support and/or lack of opposition to the proposed project.

Comment 13g: The following permit would be required:

MDEQ 308 - Department of Environmental Quality (authorization for short term exemption of surface water quality standards for the purpose of applying a fish toxicant),
Section 404 Permit from the Army Corps of Engineers,
MDEQ 318 Permit from Montana DEQ for temporary exemption of water quality standards for the purpose of constructing the fish barrier,
Floodplain Permit from Beaverhead County for construction of the barrier,
124 Permit from Montana Fish, Wildlife and Parks will be required for the construction of the fish barrier and fish ladder.
Land Use Permit from DNRC to allow construction of the barrier.

PART IV. ENVIRONMENTAL IMPACT STATEMENT REQUIRED?

After considering the potential impacts of the proposed action and possible mitigation measures, FWP has determined that an Environmental Impact Statement is not warranted. The impacts of WCT restoration as described in this document are minor and/or temporary, and mitigation for many of the impacts is possible. The primary impacts as a result of this project are temporary reductions in aquatic invertebrate abundance as a result of toxic effects of rotenone and the blocking of fish passage to other native fish species. Impacts to aquatic invertebrates have been shown to be short term (one to two years) and minor, and invertebrate communities are very resilient to impacts of rotenone. The impact to impeding fish passage for native species such as white suckers, longnose suckers, burbot, and potentially, grayling, will result in the loss of potential habitat for these fluvial fish. Impacts to suckers and burbot are considered minor because both species are widespread in the Big Hole drainage and locally abundant. The benefit to native WCT, a species in need of conservation, will counter the potential negative impacts to other native fishes. The loss of access to the upper reaches of a small spawning stream, such as McVey Creek, will be an insignificant impact on the populations of these species. Arctic grayling have not been documented in McVey Creek; however, the species is present in the Big Hole at the confluence and has been demonstrated to use streams similar to McVey Creek as spawning area. Because Arctic grayling is a species of concern and in need of conservation, the loss of a potential spawning and rearing stream could be of concern. Once the barrier is constructed, approximately three quarters of a mile of McVey downstream will still be accessible to fish migrating from the Big Hole River to spawn. If grayling are documented using this habitat and it is determined that upstream expansion of their habitat is warranted, it is possible that the fish migration barrier would be moved upstream.

Prepared by: Jim Olsen, Fisheries Biologist_____ Date: ___24 March 2011_____

Submit written comments to: Montana Fish, Wildlife & Parks
c/o McVey Creek EA comments
1820 Meadowlark Lane
Butte, MT 59701

Comment period is _____ days. Comments must be received by _24 April___

Public meeting will be held in Butte, MT on April 13, 2011 at the Beaverhead-Deerlodge National Forest Office, 420 Barrett Street, and in Dillon, MT, on April 14, 2011, at the Butte FWP office, 1820 Meadowlark Lane. Both meeting will begin at 7:00 p.m.

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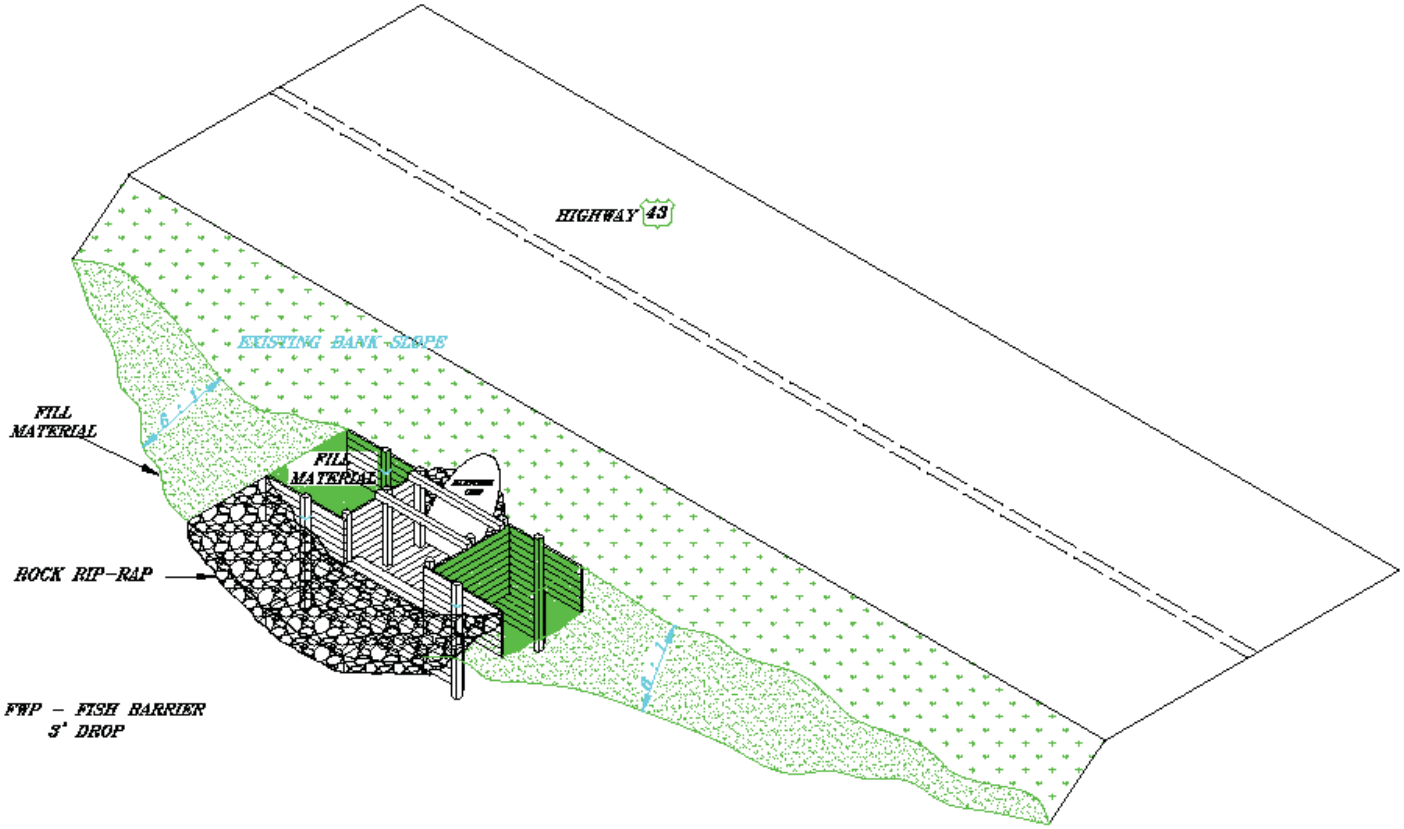
Appendix A: Design drawings for proposed Fish Barrier on McVey Creek near Wisdom Montana.



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ISOMETRIC VIEW
McVEY CREEK FISH BARRIER
MONTANA FISH WILDLIFE & PARKS

BEAVERHEAD COUNTY MONTANA

JE MILLER & SONS CONTRACTING - DILLON, MONTANA

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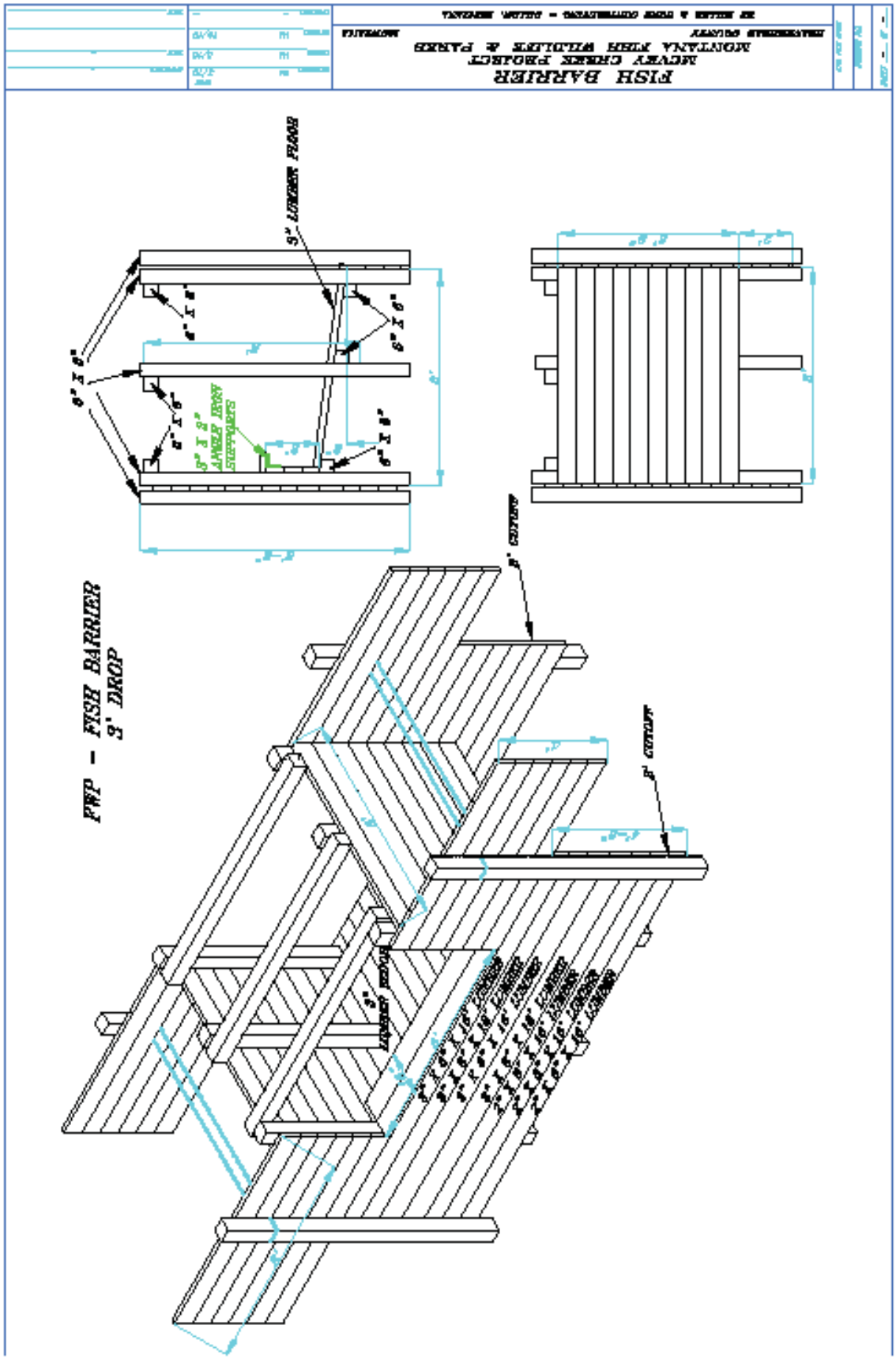
FISH BARRIER
ACTIVE CHECK PROJECT
MONTANA FISH WILDLIFE & PARKS
FWP - FISH BARRIER
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3" LONGER FLOOR
3" CUTOUT
3" CUTOUT
3" LONGER FLOOR
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