MONTANA FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

Environmental Assessment of the
Construction of a Fish Barrier on Smith Creek (Highwood Mountains), Removal of Non-native Fishes with Rotenone, and Restoration of Native Westslope Cutthroat Trout

PART I: PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action: Native species restoration and isolation

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: June 2010

D. Name and Location of the Project: Construction of a fish barrier on Smith Creek (Highwood Mountains), removal of non-native fishes with rotenone, and restoration of native westslope cutthroat trout.

The project site is located in Choteau County approximately 11 miles from the town site of Highwood, Montana; Latitude/Longitude 47.4825°N, 110.6133°W. The legal description is: Montana, Principal Meridian T20N, R9E Sec20 S½ (Figure 1). The upper and lower reaches of Smith Creek are located on private property. The middle reach of Smith Creek is located on Lewis and Clark National Forest.

E. Project Size (acres affected)

1. Developed/residential – 0 acres
2. Industrial – 0 acres
3. Open space/Woodlands/Recreation – 0 acres
4. Wetlands/Riparian – 1.75 miles of stream
5. Floodplain – 0 acres
6. Irrigated Cropland – 0 acres
7. Dry Cropland – 0 acres
8. Forestry – 0 acres
9. Rangeland – 0 acres

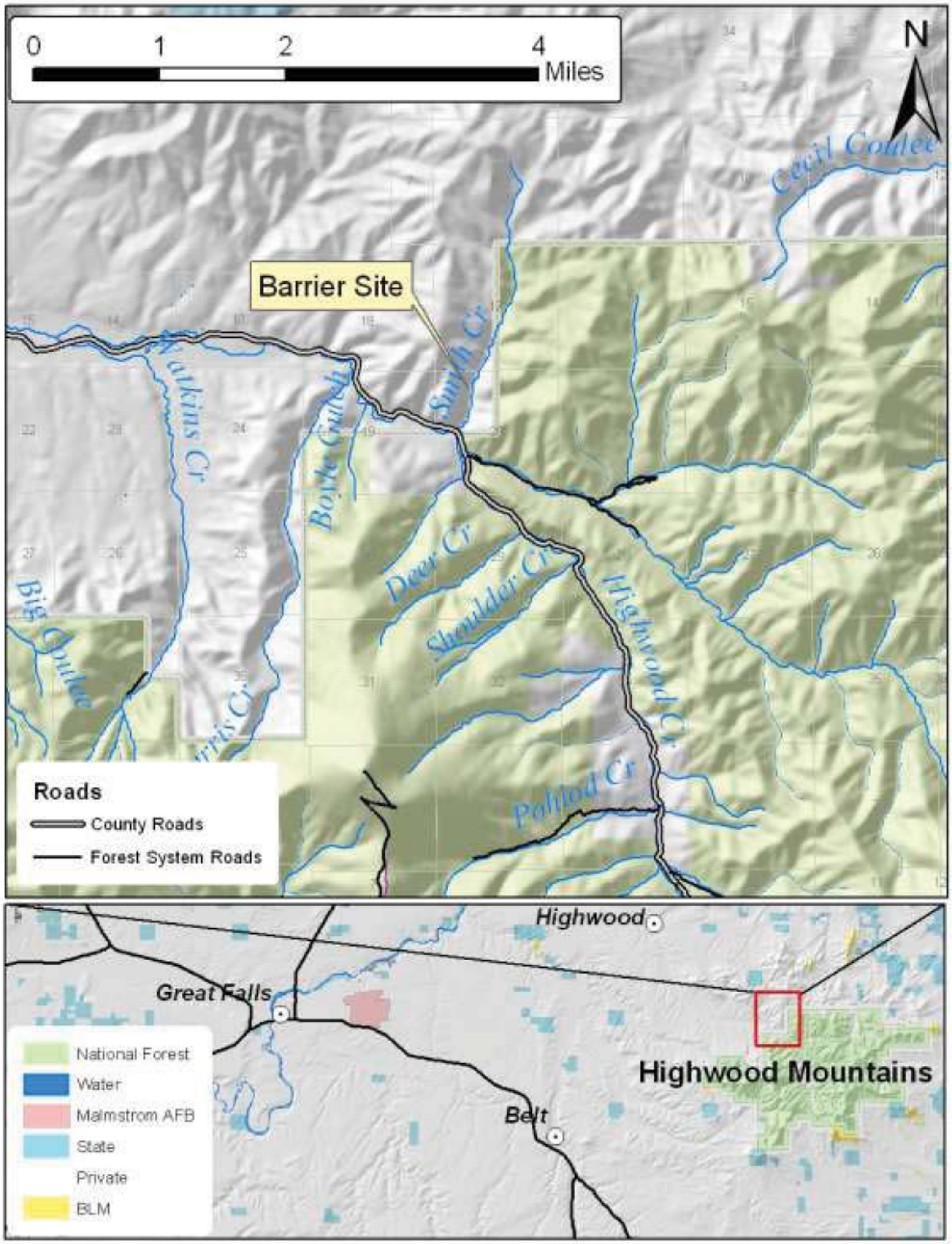

Figure 1. Map of the project area

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

Smith Creek is a tributary to Highwood Creek which drains the north-western aspect of the Highwood Mountains (Figure 1). Approximately 0.75 miles of Smith Creek is located on Lewis and Clark National Forest, the remaining 1 mile is located on private land. In 2000, the private landowner contacted Montana Fish, Wildlife & Parks (FWP) to pursue the possibility of restoring Smith Creek to a native westslope cutthroat trout (WCT) fishery. Restoration of WCT at this site would require construction of a concrete barrier to upstream movement of non-native fishes. Smith Creek currently supports non native brook trout *(Salvelinus fontinalis)* and a few rainbow trout *(Oncorhynchus mykiss)* in its lower reaches.

Smith Creek is a small 2nd order stream of less than 1 cfs summer discharge with no estimates for angling pressure. Angling pressure in Highwood Creek was 829 days in 2007. In 2007, angling satisfaction in Highwood Creek (sample size of 17) was rated as 3.5 out of 5. Highwood Creek downstream of Smith Creek was previously stocked with brook trout (172,879 from 1929 to 1952), brown trout (18,000 in 1938), Yellowstone cutthroat trout (41,000 from 1928 to 1931), and rainbow trout (24,243 from 1949 to 1976).

Historically Highwood Creek would have supported WCT in approximately 55 miles of stream. Currently, less than 2 miles of headwater stream in the Highwood Creek drainage (4% of historical habitat) supports non-hybridized WCT. The westslope cutthroat trout is ranked as imperiled by the State of Montana. Genetically pure WCT occupy about 8% of their historical range in the western United States (Shepard et al. 2003) and less than 4% of their historical range in northcentral Montana within the Missouri River Drainage (Moser et al. 2008). Primary threats to WCT include competition and hybridization with non-native rainbow trout (Leary et al. 1995; Hitt et al. 2003) and competition with brook trout (Dunham et al. 2002; Peterson et al 2004). Projects which restore WCT to previously occupied habitats will be necessary to prevent future extinction of WCT. In addition, efforts to stabilize and increase WCT populations will help prevent a future listing under the Endangered Species Act.

The Candidate Conservation Agreement with Assurances is a cooperative arrangement with the US Fish and Wildlife Service wherein a landowner who allows FWP to restore a WCT population is released from any regulatory restrictions on his or her property should westslope ever be listed as an endangered species. The private landowner on Smith Creek was informed of the CCAA and has signed the agreement. Monies for construction of the fish barrier were then acquired from competitive federal, state, and private granting agencies (National Fish and Wildlife Foundation, Future Fisheries, PPL Montana, and the Montana Trout Foundation).

The proposed action is to remove all of the non-native fish in Smith Creek and its tributaries upstream of a constructed fish barrier using a rotenone based piscicide, likely CFT Legumine™ (5% liquid rotenone), then restock Smith Creek with locally obtained, non-hybridized WCT.

FWP has a long history of using rotenone to manage fish populations in Montana that span as far back as 1948. The department 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, Oceania, 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 1930s. 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, and thus can tolerate exposure to concentrations much higher than that used to kill fish.

Prior to piscicide treatment, an effort is proposed to "rescue" fish from the first quarter to half mile of stream with backpack electrofishers. Rescued fish would be moved to Smith Creek below the fish barrier. The boundaries for the treatment would be from approximately 0.25 mile upstream of the Smith Creek-Highwood Creek confluence to the upstream end of fish habitat in the headwaters of Smith Creek (Figure 1). The waters between these two points would be treated with CFT Legumine (5% liquid rotenone) with toxicant effects limited to the stream length within these boundaries and a short mixing zone directly downstream of the detoxification station. On-site assays would determine the appropriate concentration, drip station spacing, and treatment times. The effective concentration is expected to be consistent with the label recommendations for concentrations for "normal pond use" (i.e. 0.5 to 1 part per million CFT Legumine or 0.025 to 0.050 ppm active rotenone) Streams in central Montana similar to Smith Creek where rotenone has recently been used to restore WCT required no more than 1 ppm CFT Legumine. Liquid rotenone would be applied to the stream using drip stations and are expected to be spaced at no more than 2 hour stream travel time intervals. Each drip station dispenses a precise amount of diluted rotenone into the stream (based on measured stream discharge in cubic feet per second). The application period would also be determined by the bioassays, but would likely be no less than 4 hours. A mixture of powdered rotenone (Prentox 7% rotenone), sand, and gelatin may be applied on a very limited basis in springs and seeps that have the potential to provide refugia for the target fish. When the treatment ends, fresh water from untreated areas upstream would begin to dilute the piscicide concentration and oxidation would continue to break down remaining rotenone in Smith Creek.

During treatment, rotenone passing downstream of the lower bounds of the treatment area would be detoxified with the addition of potassium permanganate to the stream. Potassium permanganate requires 15 to 30 minutes of contact time to fully detoxify the rotenone. The zone directly downstream of where potassium permanganate is applied remains toxic depending on the rate of mixing and deactivation of rotenone. This zone is typically not more than a ¼ mile in length. According to the CFT Legumine label, potassium permanganate should be applied to water at the appropriate concentration to compensate for organic demand of the stream and/or lake bottom so that enough remains to neutralize the rotenone. The discharge of the stream would be measured prior to treatment and the potassium permanganate would be applied at the rate specified on the CFT Legumine label. In addition, on-site assays would be conducted in this stream prior to the treatment to determine the appropriate amount of potassium permanganate necessary to neutralize the rotenone.

Caged fish would be used to measure the toxicity of the water in Smith Creek to ensure the objectives have been met. After the application, we would use caged fish to evaluate when the waters are no longer toxic to fish and when fish can be restocked. The CFT Legumine label specifies that once caged fish show no signs of distress within 4 hours, the stream water is considered no longer toxic, and detoxification can be discontinued.

Previous treatments have shown that dead fish rapidly decay and are difficult to find even after a few days post treatment. However, accumulations of dead fish would be collected and buried on site. These impacts would be mitigated by electrofishing removal and transfer of fish in the first quarter to half mile of stream to Smith Creek below the barrier.

If the objectives of the project were not met from the first treatment, additional treatments may be conducted to fulfill the objectives of the project. Effectiveness of the first treatment would be ascertained through electrofishing surveys of the treated section of Smith Creek.

Smith Creek would be restocked with WCT when all non-native fishes are removed. Live fish (juveniles and adults) and eyed eggs hatched in on-site incubators would be obtained from a non-hybridized population of WCT located in the Highwood Mountains. Transfers would follow all FWP policies for wild fish transfers, including: consultation with the FWP Fish Health Committee, completion of a wild fish transfer request, disease testing, and genetic testing. In addition, a separate EA would be developed prior to transfer of WCT into Smith Creek.

PART II. 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?					Yes	1a
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		Yes	1d
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

Comment 1a, 1b, 1d: If the proposed action is implemented, a fish barrier would be constructed at the downstream end of the treatment area. Construction activities would be limited to the immediate barrier construction area (within 200-300 meters; Figure 1). Heavy equipment necessary for construction would access the proposed barrier site on a private road. All permits necessary to work in and around Smith Creek would be obtained, including: Montana Stream Protection Act (SPA 124), Short-Term Water Quality Standard for Turbidity (318 Authorization), and Federal Clean Water Act (404) permits. Construction Best Management Practices (BMPs) to reduce erosion and sedimentation would be used and would include but may not be limited to the following measures:

- Temporary diversions for storm runoff of Smith Creek flows shall be constructed as specified and as needed to direct flows around the work area. Diversions shall be designed, implemented, and maintained by the contractor in accordance with BMPs to control erosion and sediment release into Smith Creek. BMPs may include, but are not limited to, temporary berms, cofferdams, sediment basins, ditches, silt fencing, straw bales, straw mulch, and erosion control matting.

- The contractor shall plan and execute work to control and minimize surface runoff from cuts, fills, and other disturbed areas. The contractor shall prevent sediment and/or sediment laden water from entering Smith Creek to the extent practicable.

- All dewatering flows collected from open sumps or trenches or excavations shall be routed through sediment retention structure(s) prior to discharge to Smith Creek.

- BMP measures shall be installed along the margin of Smith Creek prior to any earthwork which could release sediment to Smith Creek. The BMPs shall remain until vegetation is established. Disturbed areas would be mulched and seeded with a native plant seed mixture.

Cumulative Impacts: Impacts from construction of a fish barrier would be limited to the construction period and a short recovery period afterward. We do not expect the barrier to require maintenance or for the barrier to create other/future unforeseen impacts to land resources. Nor do we foresee any other activities in the basin that would add to impacts of the proposed action. A separate barrier and treatment project is planned for North Fork Highwood Creek approximately 4 miles upstream of the proposed project (separate EA). Construction of both these projects will likely occur during the same time period to save costs of construction mobilization. Because of the distance between these projects, no aspect of the impacts would be cumulative in nature. Moreover, completing both these projects under the same time frame will limit the increased presence of construction personnel to one time period rather than consecutive years.

2. <u>WATER</u> **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			X		Yes	2a

but not limited to temperature, dissolved oxygen or turbidity?						
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				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 2f
i. Effects on any existing water right or reservation?		X				See 2c
j. Effects on other water users as a result of any alteration in surface or groundwater quality?		X				2j
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				See 2c
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 pesticide to surface water to remove unwanted fish. The impacts would be short term and minor. Prentox (7% powder) and CFT Legumine (5% liquid) rotenone are EPA registered pesticides and are safe to use for removal of unwanted fish. The concentration of CFT Legumine (5% liquid) proposed is 0.5 to 1 part per million, but could be adjusted within the label allowed limits based upon the results of on-site assays. Prentox (7% powder) may be used in a sand and gelatin mix to treat springs and seeps within the treatment area.

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 Engstrom-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^{o}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^{o}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 at the downstream end of the treatment. 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 15-30 minutes of exposure time between the two compounds (Prentiss Inc. 2007). We would expect the treated stream above the barrier to naturally detoxify within 48 hours of the treatment. The treated stream would rapidly detoxify though addition of fresh water from untreated upstream sources and through the aforementioned physical and chemical breakdown processes. Inert ingredients (e.g. carriers) in CFT Legumine volatilize rapidly in the environment by both photolysis and hydrolysis and therefore do not pose a threat to the environment at the levels proposed for fish eradication. If large numbers of dead fish accumulate they would be removed and buried on upland habitat near collection sites. Previous treatments have shown that fish rapidly decay and are difficult to find even after a few days post treatment.

Comment 2c: A barrier to upstream movement of non-native fishes would be constructed prior to piscicide treatment. The gradient of the stream at the proposed barrier location is high enough to prevent a significant impoundment of water. Loss of water to evaporation because of the barrier would be negligible and would not affect downstream water users. The barrier is designed to provide passage of flood flows estimated to have a recurrence interval of 100 years.

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). In California, studies where wells were placed in aquifers adjacent to and downstream of rotenone applications have never detected 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. In 1998, a Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well, located 65 feet from the pond, was analyzed and no sign 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 four 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 (Don Skaar, personal communications)

Comment 2j: The CFT Legumine label states "….Do not use water treated with rotenone to irrigate crops or release within 1/2 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 3 groundwater wells for domestic use approximately 1 mile downstream on Highwood Creek. All these sites are more than the ½ mile distance specified on the CFT Legumine label (also see comment 2f). The area to be treated is only accessible through a private road or hiking off trail through national forest lands. Potential access points will be posted with signs warning not to drink water from Smith Creek or Highwood Creek during and shortly after the treatment period.

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.

Cumulative Impacts: The proposed action of piscicide treatment and the connected action of barrier construction would have a short term impact on water quality and invertebrate abundance (piscicides and increased turbidity, respectively) and potentially a longer term impact on species community composition of primary and secondary producers in Smith Creek. These impacts would attenuate through time and would not impact the productivity of fisheries resources after restocking. We do not expect the proposed action to result in other actions that would create cumulative impacts to water resources in Smith Creek. Nor do we foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to water resources related to construction of the barrier and treatment of Smith Creek with piscicides.

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			3a
b. Creation of objectionable odors?			X		Yes	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 regs?		X				

Comment 3a: A gasoline generator would be used to run a power auger at the lower end of the treatment area to dispense powdered potassium permanganate (detoxifying agent). The generator would produce some exhaust fumes that would dissipate rapidly. During construction of the barrier, the use of heavy equipment and generators would impact air quality in the vicinity of the construction project. These impacts would be limited to the periods of construction and the immediate construction area.

Comment 3b: CFT Legumine does not contain the same level of aromatic petroleum solvents (toluene, xylene, benzene and naphthalene) of other rotenone formulations (i.e. Prenfish) and as a consequence does not have the same odor concerns and has less inhalation risks.

Previous treatments have shown dead fish decay rapidly and are difficult to find even after a few days post treatment. However, any accumulations of noxious smelling dead fish would be collected and buried on site. These impacts would be mitigated by pre-project electrofishing removal and transfer of fish from the first quarter to half mile of stream to Smith Creek below the barrier.

During construction of the barrier, heavy equipment and generators could create odors that could be considered objectionable to some people. These impacts would be limited to the immediate construction area during the period of construction.

Cumulative Impacts: Impacts to air quality from the proposed actions of piscicide treatment and barrier construction would be short term and minor. We do not expect the proposed action to result in other actions that would create cumulative impacts to air quality in Smith Creek. Nor do we foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to air quality related to construction of the barrier and treatment of Smith Creek with piscicides.

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			4e
f. Will the project affect wetlands, or prime and unique farmland?		X				

Comment 4a: During treatment, workers would park near the Smith Creek barrier and walk the stream corridor to their drip stations. There would be some trampling of vegetation along the stream during the placement and monitoring of drip stations and sentinel fish locations; however, the degree of impact to vegetation is not anticipated to affect plant vigor. Rotenone does not have an effect on plants at concentrations used to kill fish. Impacts from trampling vegetation are expected to be short term and minor. During barrier construction there would be localized

impacts to vegetation at the proposed barrier site (see Land Resources). Heavy equipment necessary for construction would access the proposed barrier along a private road. Impacts to the road should be temporary and minor. Impacts during construction would be limited to staging areas and ground adjacent to the barrier (within 200 to 300 meters). After construction, this area would be scarified, mulched, and reseeded with a native plant mix.

Comment 4e: Temporary and localized disturbance to the ground during construction may create an environment conducive to noxious weed recruitment and growth. In addition, machinery and equipment used during the project may inadvertently carry noxious weeds to the project site. Proposed mitigation includes: 1) Washing all equipment and vehicles before entry onto private property; removal of mud, dirt, and plant parts from project equipment before moving into project area; 2) inspection of the project area for noxious weeds annually for three years after the project is completed. If noxious weeds are found in the project area after project completion, manual or biological removal of weeds, including bagging and appropriate disposal would be implemented. Inspections would continue for at least 3 years after weeds are no longer observed.

Cumulative Impacts: Impacts to vegetation from the proposed action and the connected action of barrier construction would be short term and minor. We do not expect the proposed action to result in other actions that would create cumulative impacts to vegetation in Smith Creek. Nor do we foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to vegetation related to construction of the barrier and treatment of Smith Creek with piscicides.

5. <u>FISH/WILDLIFE</u> **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			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				5g
h. Will the project be performed in any area in which T&E species are present, and will		X				

the project affect any T&E species or their habitat? (Also see 5f)						
i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)			X			See 5d

Comment 5b: This project is designed to kill unwanted fish. Historically Highwood Creek would have supported WCT in approximately 55 miles of stream. Currently, less than 2 miles of Highwood Creek (4% of historical habitat) supports non-hybridized WCT. Highwood Creek downstream of Smith Creek was stocked with brook trout (172,879 from 1929 to 1952), brown trout (18,000 in 1938), Yellowstone cutthroat trout (41,000 from 1928 to 1931), and rainbow trout (24,243 from 1949 to 1976). The proposed action is to remove all of the fish in Smith Creek and its tributaries upstream of a proposed fish barrier, then restock Smith Creek with locally obtained WCT. This proposed action would restore WCT to Smith Creek, thus reducing risks of extinction of WCT through replication of the one remaining non-hybridized WCT population in the Highwood Drainage. Smith Creek downstream of the restoration area (approximately 0.25 miles of stream) would continue to be managed as a non-native trout fishery (primarily brook trout).

Comment 5c:
<u>Aquatic Invertebrates:</u>

In general, most studies report that aquatic invertebrates, except zooplankton are much less sensitive to rotenone treatment than fish (Schnick 1974). One study reported that no 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). 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. 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). In northcentral Montana, aquatic invertebrates are routinely collected prior to transfers of WCT to fishless habitat (Petty Creek, N. Fk. Ford Creek, Lonesome Creek, etc.). Most invertebrates collected prior to transfers were commonly found throughout Montana and in no cases were rare or endangered species of invertebrate discovered (Daniel Gustafson *personal communication*). These collections, in high elevation, remote stream reaches, indicate that the probability of eliminating a rare or endangered species in the low elevation, and well connected Smith Creek is very unlikely. Headwater reaches of Smith Creek that do not hold fish would not be treated with fish piscicides and would provide a source of aquatic invertebrate colonists. In addition, recolonization would include aerially dispersing invertebrates from downstream areas of Smith Creek and Highwood Creek (e.g. mayflies, caddisflies). The small size of the treatment (1.75

miles of stream) and the proximity of source areas should aid in rapid recovery of the Smith Creek aquatic community. The aquatic invertebrate community structure in Smith Creek may be temporarily affected by the treatment (i.e. ratio of gilled to non-gilled invertebrates). Natural caused (e.g. fire) and anthropogenic (livestock grazing) disturbances also impact the structure of aquatic invertebrate communities (Wohl and Carline 1996; Mihuc and Minshall 2005; Minshall 2003). Moreover, fire caused changes in trophic dominance may last greater than 15 years because of post fire changes to stream geomorphology and riparian species composition (Minshall 2003). Treatment with piscicides temporarily changes the ratio of certain invertebrate species. This would necessarily have far less of an impact than long term physical changes to the stream/riparian interface. Impacts to the stream channel and the benthic community from barrier construction would be localized and minor.

<u>Mammals, Birds, and Amphibians:</u>

Mammals are generally not affected because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Laboratory tests by Marking (1988) involved feeding a form of rotenone to rats and dogs as part of their diet for periods of six months to two years and observed effects such as diarrhea, decreased food consumption, and weight loss. He reported that despite unusually high treatment concentrations of rotenone in rats and dogs, it did not cause tumors or reproductive problems in mammals. 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 the compound under field conditions is by drinking lake or stream water, 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 (39.5 mg/kg * 0.350 kg = 13.8 mg = 13,800 µg) for similarly sized mammals. When assessing a large mammal, 1000 g is considered to be a default body weight. A 1000 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 (30.4 mg/kg * 1 kg = 30.4 mg = 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, in which rats were injected with rotenone for a period of weeks, reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). However, the results have been challenged on the basis of methodology: (1) that the continuous intravenous injection method used leads to "continuously high levels of the compound in the blood," and (2) second, 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. 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 excruciatingly high concentrations of rotenone. Spencer and Sing (1982) reported that rats that were fed diets laced with 10-1000 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 other members of lower orders of *Galliformes* were quite resistant to rotenone, and four day old chicks were more resistant than adults. Ware (2002) reports that swine are uniquely sensitive to rotenone and it is slightly toxic to wildfowl, but to kill 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 4110 mg/kg, a 1000-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.*

If temporary reductions in aquatic invertebrates occur, insectivorous species such as American dippers may be impacted to the extent that they rely on aquatic invertebrates for food. Aquatic invertebrate communities typically recover rapidly from disturbance and impacted birds and mammals are mobile and would likely emigrate to nearby habitats until full recovery of the aquatic community.

Chandler and Marking (1982) found that clams and snails were between 50 and 150 times more tolerant than fish to Noxfish (5% rotenone formulation), and southern leopard frog tadpoles were between 3 and 10 times more tolerant than fish. Grisak et al. (2007) conducted laboratory studies on long toed salamanders, Rocky Mountain tailed frogs, 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 mg/L) 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.

It is important to note that many toxicity studies involve 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 we would expect the impacts to non-target organisms to range from non-existent to short term and minor.

Comment 5d: Smith Creek would be restocked with WCT when all non-native fishes are removed. Live fish (juveniles and adults) or eyed eggs (in-stream incubators) would be transferred from a non-hybridized population of WCT located in the Highwood Mountains. Transfers would follow all FWP policies for wild fish transfers, including: consultation with the Fish Health Committee, completion of a wild fish transfer request, disease testing, and genetic testing. In addition a separate EA would be developed prior to transfer of WCT into Smith Creek.

Comment 5f: Northern leopard frogs *(Rana pipiens)* (sensitive species) and chorus frogs *(Pseudacris maculata)* have been identified in the main fork of Highwood Creek. In addition, the Highwood Mountains are within the range of Columbia spotted frogs *(Rana luteiventris)* and western toads *(Bufo boreas)*. All of the amphibian species that could be present in the project area prefer to breed in the standing water of ponds, rather than in streams. The areas where rotenone use is proposed in this project are primarily running water. Also, most amphibian larvae (tadpoles) would have already undergone metamorphosis to the less vulnerable adult stage when the proposed stream treatment would occur.

There are no threatened or endangered species in the area. Some sensitive species that may infrequently use the area and could potentially ingest dead fish, include, fishers, bald eagles, and wolverines. None of these species would be affected by ingestion of dead fish (see Comment 5c). Management indicator species that may infrequently use the area and could ingest fish, include, black bear, mountain lion, bobcat, and golden eagle. None of these species would be affected by ingestion of dead fish (see comment 5c).

Comment 5g: The fish barrier would likely take between one to two weeks to complete and may temporarily dislocate or stress wildlife in the immediate area. During construction, noise levels at the immediate barrier area would be elevated. In addition, there would be some transfer of equipment, materials and personnel to the barrier construction site. All construction activities would occur during baseflow (mid to late summer) after most breeding and nesting seasons.

Comment 5i: See comment 5d

Cumulative Impacts: Impacts to fish and wildlife from the proposed action and the connected action of barrier construction would be short term and minor. We do not expect the proposed action to result in other actions that would create cumulative impacts to fish and wildlife resources in Smith Creek. The current fishery would be replaced by a WCT fishery that occupies the same niche and would provide the same ecological functions. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to non-target organisms related to construction of the barrier and treatment of Smith Creek with piscicides.

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			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: The project site is 0.25 miles from the confluence of Smith and Highwood Creek. A county road parallels Highwood Creek near this confluence. During construction (one to two weeks) there would be heavy equipment operating in the immediate area near the proposed barrier on private land. There would also be some movement of equipment, materials, and supplies along the county road prior to and after barrier construction. During piscicide treatment there would be increased use of the private road for staging.

Cumulative Impacts: Increases in noise from the proposed action and the connected action of barrier construction would be short term and minor. We do not expect the proposed action to result in other actions that would create increased noise in the Smith Creek stream corridor. A separate barrier and treatment project is planned for North Fork Highwood Creek approximately 4 miles upstream of the proposed project (separate EA). Construction of both these projects will likely occur during the same time period to save costs of construction mobilization. Because of the distance between these projects impacts would not be cumulative. Moreover, completing both these projects under the same time frame will limit the increased presence of construction personnel to one time period rather than consecutive years.

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		X				7a

productivity or profitability of the existing land use of an area?						
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		Yes	7c
d. Adverse effects on or relocation of residences?		X				

Comment 7a: The proposed action would eventually result in a change from a brook trout fishery to a WCT fishery. A change to management of Smith Creek as a WCT fishery would not lead to imposition of additional requirements for land users or reduction in the use of Smith Creek for livestock. Forest stream bank alteration and riparian area standards would be the same for either brook trout or WCT and if implemented correctly would protect either fishery and the basic ecological functioning of Smith Creek. In addition, the Candidate Conservation Agreement with Assurances would ensure that private landowners can continue with current land use practices in the event WCT are ever listed as an endangered species. Current regulations specify catch and release only for stream dwelling cutthroat trout in the Highwood Mountains. Because of the relatively small size of the new WCT population these harvest regulations would likely be maintained. A reduction in harvest will impact very few people because of the lack of public access to Smith Creek.

Comment 7c: The treatment and barrier construction would be implemented after spring runoff (approximately mid June) to mid November. Access to Smith Creek for hunting is very limited because of the paucity of access to national forest lands. At proposed treatment levels, stream water would not be toxic to wildlife or livestock. However, to limit any potential conflict, the treatment would be planned when livestock are pastured elsewhere or livestock would be temporarily moved to adjacent pastures during the treatment period.

Cumulative Impacts: Impacts on land use from the proposed action and the connected action of barrier construction would be short term and minor. We do not expect the proposed action to result in other actions that would impact land use in the Smith Creek stream corridor. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts related to land use from the proposed construction of the barrier and treatment of Smith Creek with piscicides.

8. <u>RISK/HEALTH</u> <u>HAZARDS</u> **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			X		Yes	8a

other forms of disruption?						
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 8ac
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 fish toxicant. All applicators would wear safety equipment required by the product labels and MSDS (Material Safety Data) sheets such as respirator, goggles, rubber boots, Tyvek overalls, and Nitrile gloves. All applicators would be trained on the safe handling and application of the piscicide. Personnel responsible for application of the detoxifying agent (potassium permanganate) would also be trained on its safe handling and application. At least one, and most likely several, Montana Department of Agriculture certified pesticide applicators 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.

During construction of the fish barrier, BMP's will be implemented to minimize fuel or oil spills by construction personnel.

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, spill contingency plans, 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 affects 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, but has a low acute toxicity for 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 effects 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 1,000. 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). 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 piscicide labels which prohibit the use near water intakes. 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 from dermal and incidental ingestion, but requires a waiting period of 3 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 likely not be exposed to the treatments because a temporary closure would preclude many from being in the area. Proper warning through news releases, signing the project area, 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 Fennodefo99™ 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 CFT 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 CFT 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 CFT 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 either, 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 CFT 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 CFT Legumine showed it represents about 9% of the formulation (Fisher 2007). The analysis by Fisher (2007) concluded the following regarding the constituent ingredients in CFT 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 CFT 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 CFT Legumine in an oxygen deficient space during normal use. However, to guard against this, proper ventilation and safety equipment would be used according to the label requirements.

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.

Cumulative Impacts: Health hazards from the proposed action and the connected action of barrier construction would be short term and mitigated through use of proper safety equipment, etc. We do not expect the proposed action to result in other actions that would increase the risk of health hazards in the Smith Creek stream corridor. We do not foresee any other activities in the basin that would add to health impacts of the proposed action. As such there are no cumulative impacts related to health hazards from the proposed construction of the barrier and treatment of Smith Creek with piscicides.

9. <u>COMMUNITY IMPACT</u> **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. <u>PUBLIC SERVICES/TAXES/UTILITIES</u> **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,		X				

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: ______________						
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		Yes	See 11c
d. Will any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		X				

Comment 11c: There would be a temporary loss of angling opportunity in upper Smith Creek between the time of fish removal and for several years after fish stocking. Smith Creek upstream of the proposed fish barrier should be fully colonized with WCT within 5 years of project implementation. In most cases cutthroat trout fisheries in streams in Montana are catch and release only. Public use of the Smith Creek fishery is already very limited because of lack of access, its small size, and the much better fishing opportunities available in the mainstem of Highwood Creek.

Cumulative Impacts: Impacts to recreation and aesthetics from the proposed action and the connected action of barrier construction would be short term and minor. We do not expect the proposed action to result in other actions that would impact recreation/aesthetics in the Smith Creek stream corridor. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to recreation/aesthetics from the proposed construction of the barrier and treatment of Smith Creek with piscicides.

12. <u>CULTURAL/HISTORICAL RESOURCES</u> **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				12a
b. Physical change that would affect unique cultural values?		X				
c. Effects on existing religious or sacred uses of a site or area?		X				12c
d. Will the project affect historic or cultural resources?		X				

Comment 12a: A cultural/historical survey including consideration of archaeological resources and Native American culture has been completed at the project site. No potentially impacted cultural resources were identified near the proposed area of construction. The proposed action of piscicide treatment would have no impact on any potential cultural sites in the Smith Creek watershed.

Comment 12c: The project site is located within the aboriginal range of several Native American tribes. Cultural officers for tribes which would have interest in this project will be consulted prior to the completion of any decision making process.

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?		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		X				13d

environmental impacts will be proposed?						
e. Generate substantial debate or controversy about the nature of the impacts that would be created?	X	X			Yes	13e
f. Is the project expected to have organized opposition or generate substantial public controversy? (Also see 13e)	X	X				13f
g. List any federal or state permits required.						13g

Comment 13d: This project does not establish a precedent or likelihood that additional projects with significant environmental projects would be proposed. An additional WCT restoration project is planned for North Fork Highwood Creek; approximately 4 miles upstream from this proposed project. The North Fork Highwood Creek project is far enough away to not be considered linked to this project. Though both projects have the same objective (WCT restoration) their initiation was based on opportunity rather than a comprehensive plan. The level of success of one project would have no influence on the level of success of the other project. We are not planning any additional rotenone WCT restoration projects in the Highwood Drainage. Rotenone restoration projects are limited to sites that already have good barriers or locations where a barrier could be built; i.e. bedrock, incised channels, etc.

Comments 13e and f: The use of pesticides can generate controversy from some people. Public outreach and information programs can educate the public on the use of pesticides. It is not known if this project would have organized opposition.

Comment 13g: The following permits would be required for the piscicide treatment and the proposed fish barrier:

DEQ 308 - Department of Environmental Quality (authorization for short term exemption of surface water quality standards for the purpose of applying a fish toxicant). In addition, the following permits would be necessary prior to construction of the fish barrier:
SPA 124 Permit - Montana Stream Protection Act,
318 Authorization - Short-Term Water Quality Standard for Turbidity,
404 Permit - Federal Clean Water Act.

The department consulted with the private landowner and Lewis and Clark National Forest during the planning and development phases of this project. No special use permit is required.

PART III. ALTERNATIVES

Alternative 1 – No Action

The no action alternative would maintain the present species diversity in Smith Creek. Smith Creek would continue to support a brook trout population and a limited presence of rainbow trout. Replication of an existing non-hybridized WCT population in the Highwood Drainage would not occur. The risk of WCT extinction in the Highwood Drainage would not decrease.

Alternative 2 – Proposed Action

The proposed action includes removing existing non-native fish in upper Smith Creek with rotenone and restocking with locally obtained non-hybridized westslope cutthroat trout.

The predicted benefits of Alternative 2 include:

- Increase in total miles of non-hybridized WCT inhabited stream in the Highwood Drainage from 1.5 to 3.5 miles (the North Fork Highwood Creek project, a separate action, would increase the miles of WCT in the Highwood Creek drainage by an additional 3.5 miles; 7 miles total).
- Replication of an existing population of non-hybridized WCT in the Highwood Drainage.
- Reduction in the risk of potential listing under the Endangered Species Act.
- This project would increase the total miles of stream on private property holding pure WCT; this precedent along with its protections (Candidate Conservation Agreement with Assurances) may result in other landowners participating in the future.

Alternative 3 – Mechanical removal

Electrofishing has been used to remove unwanted fish from streams with some success in northcentral Montana (Big Coulee Creek, Middle Fork Little Belt Creek, and Cottonwood Creek; Moser 2008). To remove fish in small streams electrofishing efforts may require repeated shocking of all habitats for an extended period of time. As an example, brook trout were selectively removed from Big Coulee Creek, a small stream (1.5 miles in length) in the Highwood Mountains. This effort has required multiple pass backpack electrofishing (two crews over 1 to 2 weeks per year) for 6 years. Electrofishing removal projects are also generally limited to streams where westslope cutthroat are sympatric with non-native non-hybridizing species such as brook trout or brown trout (Smith Creek has some rainbow trout). If mechanical removal was to occur in Smith Creek and a few rainbow trout were inadvertently not removed they would likely hybridize with restored WCT and negate the primary goal of restoration. If a few brook trout were missed during electrofishing removal, additional removals could potentially be attempted, but would require many more years of effort. For these reasons the mechanical removal alternative was eliminated from further consideration.

Prepared by: David Moser Date: _3/4/2010___

Submit written comments to: Montana Fish, Wildlife & Parks
c/o Smith Creek EA Comments
4600 Giant Springs Rd.
Great Falls, MT 59405

Comment period is 30 days. Comments must be received by _5:00 PM April 15, 2010.

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