EA-55-06

MONTANA FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

ENVIRONMENTAL ASSESSMENT
COTTONWOOD CREEK REHABILITATION

PART I. PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action: Cottonwood Creek, a stream which flows through Montana Fish, Wildlife and Parks (MFWP) owned Beartooth Game Range, Sieben Livestock Company and the Voegle ranch, is approximately 14.5 miles long from headwaters to mouth where it flows into Holter Reservoir. An artificial barrier to upstream fish passage was constructed on Cottonwood Creek in the fall of 2000, isolating 10.5 miles of stream habitat. Cottonwood Creek was treated twice (one month apart) in 2003 with rotenone to remove nonnative fishes. Enough brook trout survived the 2003 treatments to necessitate complete re-treatment of the project area. Failure to achieve complete eradication of brook trout during the 2003 treatments is thought to be attributed to the ineffectiveness of rotenone liquid in an approximate two-mile reach that contains numerous seeps and springs. This proposal will initially conduct *in situ* bioassays through this approximate three-mile reach to test the efficacy of antimycin: Fintrol™ and CFT Legumine™. One issue is that water pH levels are at or slightly above recommended levels (8.2-8.3) for the use of antimycin. However, the monograph for antimycin river and stream use states that application of antimycin under specified environmental conditions (water temperature's between 40 and 80°F and pH values <8.5) is extremely toxic to fish. The advantage of using antimycin is that when applied properly to stream environments it does not repel fish. CFT Legumine™ is a non-synergized 5.0% rotenone formulation manufactured by Prentiss Incorporated; the primary advantage to using this chemical is that it utilizes a special emulsifier and solvent package that reduces the presence of petroleum hydrocarbon solvents such as such as toluene, xylene, benzene and naphthalene. CFT Legumine™ is virtually odor-free, and retains its efficacy without the use of any synergist. Following bioassay results, this proposed action would complete multiple piscicide treatments throughout the 10.5 miles of stream above the barrier using the EPA registered piscicide rotenone: Prenfish™, and the most effective piscicide (antimycin: Fintrol™ or CFT Legumine™) in the approximately three mile reach that is characterized by numerous seeps and springs. Treated water from Cottonwood Creek water will be detoxified using potassium permanganate prior to entering Holter Reservoir.

B. Agency Authority for the Proposed Action: The Montana Fish, Wildlife & Parks (MFWP) "...is hereby authorized to perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects...." under statute 87-1-702. In addition, the overall goal of cutthroat management in Montana as stated in the Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana (MFWP 2006; draft) is: 1) to ensure the long-term, self-sustaining persistence of each subspecies distributed across their historical ranges as identified in recent status reviews (Shepard et al. 2003; Shepard et al. 2005; May et al. 2003), 2) maintain the genetic integrity and unique life history diversity represented by remaining populations, and 3) protect the ecological, recreational, and economic values associated with each subspecies."

The management goal and associated objectives for WCT and YCT in Montana outlined in the aforementioned MOU were developed by the Montana Cutthroat Trout Steering Committee (MCTSC), which includes representatives from American Wildlands, Blackfeet Tribe, Crow Tribe, Confederated Salish and Kootenai Tribes, Federation of Fly-Fishers (FFF), Glacier National Park, Greater Yellowstone Coalition, Montana Chapter of the American Fisheries Society, Montana Department of Natural Resources and Conservation (DNRC), Montana Farm Bureau, Montana Fish, Wildlife and Parks (FWP), Montana Stockgrowers Association, Montana Trout Unlimited, Montana Wildlife Federation, Natural Resource Conservation Service (NRCS), Plum Creek, private landowners, U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), and Yellowstone National Park (YNP). The Montana Cutthroat Trout Technical Committee, which includes fishery scientists and geneticists from state and federal agencies, tribal governments, and universities, assisted in developing this Agreement and meets annually to ensure that scientifically sound conservation strategies are used for its implementation

C. Estimated Commencement Date: Autumn, 2006

Estimated Completion Date: Autumn, 2007
Current Status of Project Design: (% Complete): 70%

D. Name and Location of the Project: *Cottonwood Creek Rehabilitation Project*: *Beartooth Game Range, Sieben Livestock Company Ranch and Voegle Livestock.*

Cottonwood Creek is a small tributary to Holter Reservoir that originates in Cascade County (Section 24, T14N, R2W). Roughly 88% of the stream length is on MFWP's Beartooth Game Range with the remaining 12% on property owned by Sieben Livestock Company Ranch and Voegle Livestock.

E. Project Size (acres affected)

1. Developed/residential - 0 acres
2. Industrial - 0 acres
3. Open Space/Woodlands/Recreation - 0 acres
4. Wetlands/Riparian – 10.5 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
10. Other

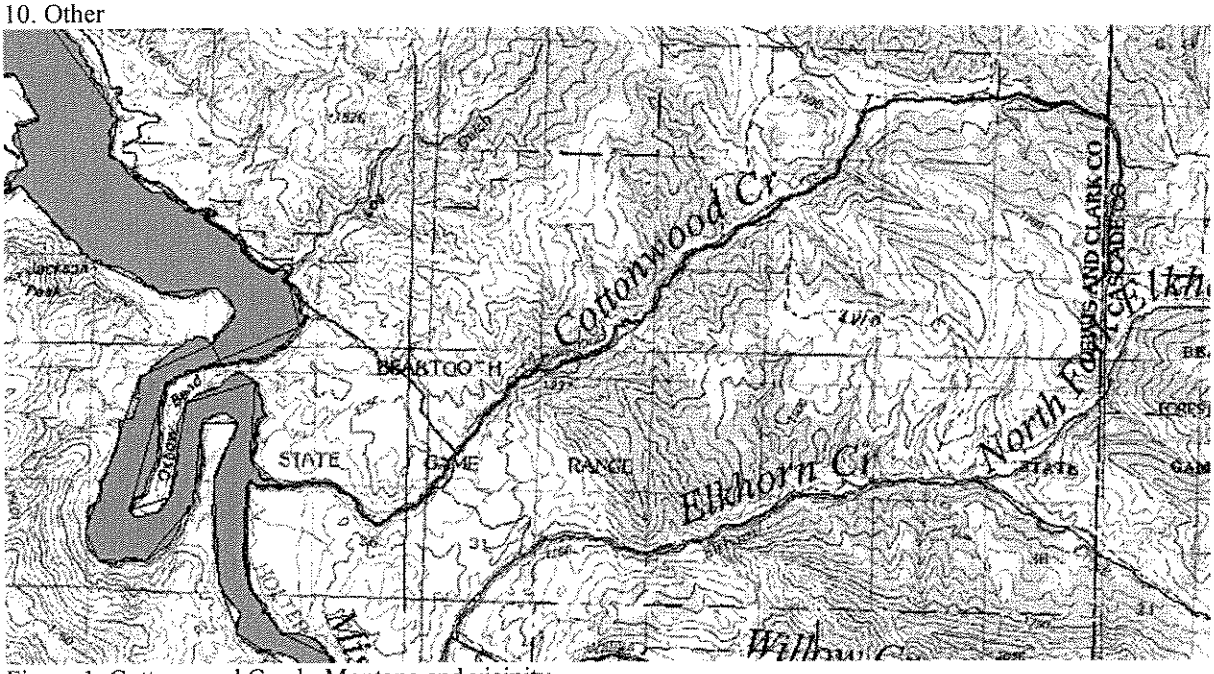

Figure 1. Cottonwood Creek, Montana and vicinity.

The treatment zone is defined as approximately 10.5 miles of stream. Piscicide drip application will start at the first upstream reach of flowing water and will continue downstream with appropriately spaced drip stations (based on bioassay results) to the fish barrier located approximately one mile above the intersection of Cottonwood Creek and the Beartooth Ranch Road. Piscicide with be manually sprayed in areas of nonmoving water as per label instructions. A detoxification zone will include the portion of Cottonwood Creek that relates to 45 minutes of stream travel time below the fish barrier. Sentinel cages will be located at 30 minutes and 45 minutes of stream travel time below the upstream fish barrier to ensure treatment is contained within the treatment boundaries. As an added precautionary measure, a drip station will be set up at the lowest boundary ready to administer KMnO4 if

sentinel fish show signs of distress. Within this detoxification zone there will be some sentinel fish killed during the 30-minute contact time required by the labels to neutralize the piscicide.

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

1. Summary of the Proposed Action:

The proposed action is to chemically rehabilitate Cottonwood Creek with multiple treatments using EPA registered piscicides (rotenone: Prenfish™ and antimycin: Fintrol™ or CFT Legumine™). Treated water will be detoxified with potassium permanganate ($KMnO_4$). The goal of the treatment is to eradicate remaining (since treatment in 2003) nonnative brook above the constructed fish barrier. Then, over the next several years, the stream would be restocked with genetically pure, native westslope cutthroat trout from an existing population in the Missouri River that has been shown to be at high risk of extinction. Some of the application techniques used to apply piscicides will include; drip stations, and manual backpack spraying. Application of $KMnO_4$ will be conducted using drip or auger stations and in limited cases, manual spraying. Multiple application methods are required to effectively treat a variety of habitat types that exist in Cottonwood Creek.

2. Purpose and Need for the Proposed Action:

The westslope cutthroat trout is ranked as S2 (imperiled because of rarity or because of other factors demonstrably making it very vulnerable to extinction throughout its range) by the Natural Heritage Network and 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 3% of their historical range in northcentral Montana within the Missouri River drainage (Moser et al. 2005). Current survey and inventory work has documented about 12 stream miles and 4 populations of pure WCT in the Upper Missouri drainage (Moser et al. 2005). Major threats to WCT include competition and hybridization with non-native rainbow trout (Leary et al. 1995; Hitt et al. 2003), competition with brook trout (Dunham 2002; Peterson et al 2004), and isolation of remaining pure populations above barriers in short headwater sections of stream. These small isolated populations are at risk of extinction from catastrophic events (e.g. fire, drought) and may eventually suffer negative consequences of genetic inbreeding (Wang et al. 2002).

Projects which restore WCT to historically occupied habitats are necessary to ensure the continued survival of WCT in the Upper Missouri River drainage and elsewhere. In addition, Montana's efforts to stabilize and buoy WCT populations will allow the state to maintain management authority of this species and may prevent future listing of WCT under the Endangered Species Act. This proposed action would restore a WCT population to 10.5 miles of Cottonwood Creek, which will nearly double the number of stream miles occupied by pure WCT in the Upper Missouri drainage. We estimate this reach of stream will support the 2,500 minimum WCT population size recommended by Hilderbrand and Kershner (2000) for long term persistence and it drains more than the 5.6 square miles (minimum watershed size) area recommended as a coarse filter for translocations by Harig and Fausch (2002).

3. Benefits of the Project:

The purpose of this project is to increase the habitat occupied by genetically pure westslope cutthroat trout in the Missouri River basin. If successful, this project would create a westslope cutthroat trout population and lower the risk of extinction of this species in the Upper Missouri drainage. Additionally, this project would help achieve the goal and objectives listed in the Conservation Agreement for the restoration of westslope cutthroat trout both statewide and in the Upper Missouri River drainage. Threats that warrant consideration of westslope cutthroat trout as an Endangered Species should be significantly reduced or eliminated through implementation of these and similar restoration efforts. Social benefits of efforts like this include the opportunity for future generations of Montanans to use and enjoy this unique native fish species.

G. Other Local, State, or Federal agencies with overlapping jurisdiction

Montana Department of Environmental Quality is responsible for exempting surface water quality standards for pesticide use (Section 308 of the Montana Water quality Act, MCA 75-5-308).

Montana Department of Agriculture is responsible for regulating the use of pesticides within the state of Montana. (applicators licensed by this agency will be conducting the operation).

H. Agencies Consulted During the Preparation of the EA

Montana Fish, Wildlife & Parks – Helena, Great Falls.

Montana Department of Environmental Quality is responsible for exempting surface water quality standards for pesticide use (Section 308 of the Montana Water quality Act, MCA 75-5-308).

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?		X				
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce productivity or fertility?		X				
c. Destruction, covering or modification of any unique geologic or physical features?		X				
d. Changes in siltation, deposition or erosion patterns that may modify the channel of a river or stream or the bed or shore of a lake?		X				
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

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		NO	2a
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of floodwater or other flows?		X				
d. Changes in the amount of surface water in any water body or creation of a new water body?		X				
e. Exposure of people or property to water related hazards such as flooding?		X				
f. Changes in the quality of groundwater?		X				2f
g. Changes in the quantity of groundwater?		X				

h. Increase in risk of contamination of surface or groundwater?			X		YES	See 2a and 2f
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	5c
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		NO	see 2a

Comment 2a: The proposed project involves application of EPA registered piscicides to Cottonwood Creek to remove non-native fish. Antimycin will be introduced to Cottonwood Creek at a concentration not to exceed 20 ppb and a rotenone formulation at a concentration of 0.25 to a maximum of 5.0 ppm (5% formulation of Prenfish™/CFT Legumine™), as well as potassium permanganate (KMnO4) at a concentration required to effectively deactivate antimycin and rotenone as well as bind with stream organic compounds. Piscicides kill fish through biochemical processes at the cellular level, which make it impossible for the fish to use oxygen absorbed in the blood and needed in the release of energy during respiration (Oberg 1967a, 1967b).

Antimycin is a compound isolated from the bacterium *Streptomyces griseus.* Antimycin was discovered in 1945 and found to be highly toxic to fish in 1963. Antimycin was first registered as a piscicide in 1964. Antimycin breaks down rapidly in the environment, normally persisting less than 7 days (Walker et al. 1964; Marking and Dawson 1975; Schnick 1974a). Moreover, its breakdown products are non-toxic (Herr et al. 1967). The label for Fintrol™, the current commercial formulation of antimycin, states that once diluted in water, Fintrol™ must be used within eight hours to ensure its potency, and that treated waters may usually be restocked within one week following treatment. Fintrol™ is generally applied using backpack sprayers and drip buckets.

Rotenone is a naturally occurring substance derived from the roots of several tropical and sub-tropical plants in the bean family, Leguminosae, including jewel vine or Flame tree (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) and hoary pea (*Tephrosia* spp.) (Finlayson et al. 2000). This proposed action would use liquid formulation (Prenfish™) that is extracted from the roots for drip stations and backpack sprayers. Rotenone (Prenfish™) also breaks down rapidly, though less rapidly than antimycin. The label for Prenfish™ states that rotenone will detoxify under natural conditions within one week to one month depending on temperature, alkalinity, etc. The time for natural degradation (neutralization) of rotenone is controlled primarily by temperature. Rotenone acts and degrades faster in warmer water (Horton 1997). In California, studies have shown that rotenone completely degrades within 1-8 weeks within the temperature range of 50-68F (10-20C) (CDFG 1994; Siepmann and Finlayson 1999). The aforementioned studies monitored breakdown of rotenone in standing waters. In running waters, rotenone breaks down more rapidly because of hydrolysis (breakdown through reaction with water) and photolysis (breakdown by sunlight). In addition, rotenone dissipates in flowing water quickly as a result of dilution (Cheng et al. 1972; Biosherics 1982; Finlayson et al. 2000).

To help ensure that aquatic life and water quality downstream of Cottonwood Creek will not be affected piscicides will be detoxified with potassium permanganate at the fish barrier (located 4 miles upstream from the confluence with Holter Reservoir). Potassium permanganate has long been used for various applications in fish culture including as a control for external parasites (Lay 1971), and for detoxification of antimycin (Marking and Bills 1975) and rotenone (Lawrence 1956). However, potassium permanganate itself is toxic to fish if concentrations are too high. The toxicity of potassium permanganate to fish is dependent on the particular chemistry of the water in question. Surface waters have a potassium permanganate demand based on the amount of organic materials in the water. Successful use of potassium permanganate to detoxify antimycin and rotenone is based on balancing

the amount of potassium permanganate with the natural chemical demand of the water and the chemical demand caused by antimycin or rotenone.

To determine the optimal concentration (from one to six parts per million) of potassium permanganate, bioassays will be performed with hatchery WCT in Cottonwood Creek prior to treatment with toxicants. These bioassays will be used to determine the amount of potassium permanganate needed to overcome the water's potassium permanganate demand and neutralize the fish toxicants. On-site tests will be conducted to ensure the optimal performance of KMnO4 while reducing impacts to the environment. When the optimal concentration has been determined, a detoxification station will be set up to dispense this concentration of potassium permanganate at the fish barrier. An additional detoxification station will be set up at approximately 45 minutes of stream travel time to ensure that no piscicide escapes the treatment area. Water will be detoxified until sentinel fish upstream of the station survive for 24 hours in the case of antimycin (*from* Fintrol™ label) or show no signs of stress after four hours in the case of rotenone (*from* Prenfish™ label).

The concentration of rotenone (1-5 ppm of a 5% rotenone formulation, or 0.05-0.25 ppm pure rotenone) which will be used in this project will not be harmful to plants, most invertebrate populations, adult amphibians, reptiles, birds, or mammals, including humans, from exposure to treated water, drinking of treated water, or ingestion of treated fish. Substantial research has been conducted to determine the human health threats of rotenone. From this research it has been concluded that rotenone does not cause birth defects (Hazleton Raltech Laboratories 1982), reproductive dysfunction (Spencer and Sing 1982), gene mutation (Biotech Research 1981; Goethem et al. 1981; NAS 1983), or cancer (USEPA 1981; Tisdel 1985). Bioassays on mammals indicate that at the proposed concentrations, antimycin and rotenone will have no effect on mammals, including humans that drink the treated water (Schnick 1974a; Schnick 1974b; Herr et al. 1974). The hazard associated with the short-term exposure to drinking water containing rotenone is very small because of the low concentration of rotenone used in the treatment and the rapid breakdown and dilution of rotenone. Estimates of a single lethal dose to humans are 300-500 mg of rotenone per kilogram (2.2 pounds) of body weight (Gleason et al. 1969). For example, a 160 pound (72.6 kilogram) person would have to drink over 23,000 gallons (87,000 liters) of water treated at 0.25 mg of rotenone per liter of water at one sitting; 0.25 mg of rotenone per liter of water is the highest allowable treatment rate for fish management.

There are no Federal or Montana numeric water quality standards for rotenone. However, Montana Department of Environmental Quality (DEQ) used the EPA method of calculating the safe level for life long (70 years) consumption of water (2 L/day) to be 0.140-ppm rotenone (0.140mg/L). Thus, the proposed treatment level of 0.05-ppm active rotenone is 2.8 times lower than the level deemed acceptable for daily consumption for 70 years.

There are no Federal or Montana numeric water quality standards for antimycin. However, DEQ (2004) used the EPA method for calculating the safe level for sub-chronic (daily oral exposure for 10% of average human lifespan) consumption of water (2 L/day) to be 10 ppb (10 ug/L) antimycin. An antimycin concentration of 10 ppb is slightly higher than the level (8 ppb) to be used in this project. Antimycin degrades rapidly and concentrations will fall below the 8 ppb level within one week of application. Moreover, when exposed to direct sunlight and turbulent stream conditions found in this project-antimycin will break down much more rapidly (potentially hours).

The product label for Prenfish™ (rotenone) requires that water intakes within a mile of the treatment be shut down during treatment and detoxification. The product label for Fintrol™ (antimycin) recommends that treated water not be used for drinking. During treatment, access to the treatment area will be restricted to project personnel. In addition, signs will be posted at areas of entry warning that the treatment is taking place and water should not be used for drinking. Detoxification measures and distance traveled (4 miles) will effectively contain and dilute the compounds before they reach Holter Reservoir. Potassium permanganate (the neutralizing agent) breaks down rapidly in the environment and its toxicity will be reduced or eliminated through oxidation of its organic components with antimycin or rotenone (Finlayson et al. 2000). The level of manganese (BPA 2004) determined to be safe assuming a 70 kg person is drinking 2 L/day of affected water is 0.8 ppm (0.8 mg/L). This level of manganese is equivalent to 2.3-mg/L potassium permanganate. Since our guidance is to maintain 1ppm (1 mg/L) potassium permanganate at the lower end of the detoxification zone, anyone drinking water from Cottonwood Creek below this point would be safe.

CFT Legumine™ was analyzed by the California Fish and Game Department in 2004. This analysis showed that the primary inert ingredients are diethylene glycol ethyl ether (56.9%) and methyl pyrrolidone (9.0%). Other compounds found in much lower levels include naphthalene (350 mg/L or 0.003%) and methyl naphthalene (140 mg/L). The following toxicological and environmental fate information is taken from the TOXNET website database of the National Institute of Health.

Diethylene glycol ethyl ether (DEGEE). With respect to the environmental fate of this compound, volatilization, photolysis, and hydrolyses are all processes that will not be expected to occur to a significant degree in surface waters; biodegradation is the most likely removal mechanism for the compound, and 48-87% degradation would be expected in 20 days. Because the compound is water soluble, it is not likely to bind to sediments or bioconcentrate in fish.

In a lake treated with 2 mg/L CFT Legumine, it would be expected that the concentration of DEGEE would be at a concentration of 1.14 mg/L or 1.14 uL/L. It is estimated that a single lethal dose of the chemical to humans is 1mL/kg, and for a 70 kg adult, the lethal dose would therefore be 70mL. Someone drinking 2 liters of water from the lake (normal daily water intake) would only consume 2.28 uL of the compound, which is 1/30,000th of a fatal dose. The oral LD50 for dogs in the laboratory (oral dose that kills 50% of test animals) has been reported to be 3.0 g/kg; while for rats and mice the LD50 is higher, ranging from 5.5-8.7 g/kg. In the case of 10 kg (22 lb) dogs, it would take 30 g of the compound to kill half the dogs. A dog drinking 1 liter of water from a lake treated with 2 mg/L CFT Legumine would only ingest 2.28 mg of the compound, which is 1/13,000th of the LD50. Therefore, humans or other mammals (represented here by dog, rats and mice) are not expected to be at risk from DEGEE if they accidentally consumed water from a lake being treated with CFT Legumine.

Methyl pyrrolidone. This compound is expected to behave similarly to DEGEE in an aquatic environment. Biodegradation is the pathway most likely to effect its removal from the environment, rather than volatilization, hydrolysis or photolysis. The persistence of this compound in water has not been reported, but it has been found to have a half-life of 4.0, 8.7 and 11.5 days in clay, loam or sand. No information was available on the lethal dose of this compound to humans. Rats and mice have been tested however, and the oral LD50 values reported ranged from 3.9-7.7 g/kg. In a lake treated with 2 mg/L CFT Legumine, the concentration of methyl pyrrolidone is expected to be 180 ug/L. Since the LD50 of methyl pyrrolidone is similar to DEGEE, but the concentration following a lake treatment is expected to be only 1/6th that of DEGEE, it is not expected that acute toxic conditions could arise for mammals accidentally drinking the water following a treatment.

To reduce the potential risks associated with the use of rotenone and antimycin, the following mitigation measures and monitoring efforts will be employed:

1. At least one applicator licensed by the Montana Department of Agriculture will be on site to supervise or administer the project. Non-licensed applicators will assist with the project under the direct technical supervision of the licensed applicator. The project supervisor will be well versed in the state regulatory requirements regarding safe and legal use of the rotenone product and applicator safety.
2. Project personnel will undergo safety training in the use of all chemicals used in this treatment including the actions necessary to deal with spills. Additionally, project personnel will be trained to use the appropriate safety equipment when handling chemicals (air purifying respirators, protective clothing [coveralls, gloves], and eye protection [face shields or splash goggles]).
3. In addition to safety equipment, washing facilities will be available in the event that piscicides come in contact with applicators skin or eyes.
4. Project personnel will be in contact with each other using two-way radios. This will allow coordination of application of piscicides and rapid emergency response in the event that an accident occurs during treatment.
5. Emergency medical treatment contact numbers will be readily available.
6. A detoxification zone will include the portion of Cottonwood Creek that relates to a maximum of 45 minutes of stream travel time below the fish barrier.
7. Sentinel cages will be located at 30 minutes and 45 minutes of stream travel time below the upstream fish barrier to ensure treatment is contained within the treatment boundaries. As an added precautionary measure, a KMnO4 drip station will be ready at the 45 minute station if these sentinel fish show signs of distress. Within this detoxification zone there will be some sentinel fish killed during the 30-minute contact time required by the labels to neutralize the piscicide.
8. Only the amount of rotenone and antimycin that is needed for immediate use will be held near the stream.
9. Prior to the use of piscicides on private land, Sieben and Voegle Livestock will be notified.
10. Signs will be placed at the trailhead into Cottonwood Creek and periodically along the treated reach to notify the public of the project in progress.

Comment 2f: Changes in groundwater quality: The risk that rotenone will enter and be mobile in groundwater is minimal. The ability of rotenone to move through soil is low to slight (Finlayson et al. 2000). Rotenone moves less than one inch in most types of soils, except for sandy soils where the movement is slightly more than three inches. Rotenone is strongly bound to organic matter in soil, so it is unlikely that rotenone would enter the groundwater (Dawson et al. 1991). Furthermore, any rotenone that enters groundwater will continue to be diluted by water already present in the aquifer. Risks associated with antimycin and groundwater would be less than rotenone. Antimycin movement in groundwater is not expected either because it also binds with organic matter, it will be used in lower concentrations than rotenone and it degrades faster than rotenone. Potassium permanganate (the neutralizing agent) breaks down rapidly in the environment and its toxicity will be reduced or eliminated through oxidation of its organic components with antimycin or rotenone (Finlayson et al. 2000).

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		NO	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 3b: Formulated rotenone has aromatic solvents that can be construed as objectionable. Antimycin has acetone as a constituent element. Odors associated with these compounds will dissipate rapidly, and any impacts to air quality will be short term and minor. Also, applicators are required to use NIOSH respirators for both antimycin and rotenone specifically due to these hazards.

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				
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				

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		NO	5b
c. Changes in the diversity or abundance of non-game 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				
f. Adverse effects on any unique, rare, threatened, or endangered species?		X				
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest or other human activity)?		X				
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				
i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)		X				

Comment 5b: This proposed action is intended to result in an increase of native westslope cutthroat trout and a decrease in non-native brook trout in Cottonwood Creek. After this project is completed, brook trout will continue to be dominant species in Cottonwood Creek below the barrier to the mouth of Holter Reservoir. The project's goal is to increase the abundance and security of the westslope cutthroat trout in the drainage, a unique and potentially endangered resource with limited distribution throughout the upper Missouri River drainage. Mottled sculpin are the only non-target fish species that are known to be present in Cottonwood Creek that will potentially be affected by the proposed treatment. Small numbers of mottled sculpin survived the 2003 treatments and have repopulated portions of the treatment area. This is expected to occur following the 2006 treatment. If sculpin are eradicated from the treatment area, sculpin from below the fish barrier will be collected and relocated to the treatment area following review from the MFWP Fish Health Committee.

Comment 5c:

Aquatic Invertebrates. Most studies have found that at proposed application levels, antimycin does not pose a threat to most aquatic invertebrate populations found in streams and standing waters (Walker et al. 1964; Schnick 1974a; Houf and Campbell 1977). The Fintrol™ (antimycin) Use Direction Leaflet states that it causes no apparent harm to plants, aquatic insects or bottom fauna. However, certain invertebrates will probably be affected at the proposed application levels of antimycin, including Cladocera and Copepoda (zooplankton), Amphipoda (scuds), and certain mayflies and caddisflies, although populations of these taxa are only diminished temporarily (Schnick 1974a). Numbers of these invertebrates may decline temporarily after treatment but should rapidly recolonize from upstream and downstream sources. A study in a Wisconsin trout stream did find temporary reductions in aquatic invertebrates including certain caddisflies, a cranefly, a mayfly and a scud (Jacobi and Degan 1977). However, concentrations of antimycin in this stream reached as high as 44 parts per billion, about 4 times higher than the proposed concentration for this project (*from* Bramblett 1998).

In general, most studies report that aquatic invertebrates, except zooplankton are much less sensitive to rotenone treatment than fish (Schnick 1974b). 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 1974b). In a study on the relative tolerance of different types of 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. The authors of this study also suggest that it is probable that in most streams, only mild and temporary damage to aquatic invertebrates would occur in treatments using rotenone at levels ten times higher than the levels proposed for this project (*from* Bramblett 1998).

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 (Jacobi and Deegan 1977; Boulton et al. 1992; Matthaei et al. 1996). Headwater reaches of Cottonwood Creek will not be treated with fish toxicants and will provide a source of aquatic invertebrate colonists. In addition, recolonization will include aerially dispersing invertebrates from downstream areas of Cottonwood Creek (e.g. mayflies, caddisflies).

Potassium permanganate has been shown to have short term impacts on aquatic invertebrate populations. In waters treated with KMNO4, aquatic invertebrate densities were more severely impacted than similar treatments using antimycin. However, like antimycin, data collected four months and one year after the project was completed indicated that the aquatic insect community was identical to the pre-treatment community (Moore et al, 2005).

Amphibians:

Amphibian species which may be present on the project area are Columbia spotted frogs (*Rana luteiventris*), boreal toads (*Bufo boreas*), boreal chorus frogs *(Pseudacris maculata*), and tiger salamanders (*Ambystoma tigrinum).*

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 piscicide use is proposed in this project are primarily running water. Also, most amphibian larvae (tadpoles) will have already undergone metamorphosis to the less vulnerable adult stage by late summer when the proposed stream treatment will occur.

Reports in the literature indicate that antimycin has no effect on amphibians at the proposed concentrations of 8 to 10 ppb (Walker 1964; Schnick 1974a). For example, tiger salamanders survived exposure at 80 ppb for 96 hours, while bullfrog tadpoles survived 20 ppb, but perished when exposed to 40 ppb for 24 hours (Walker 1964). The LC50 (lethal concentration at which 50% of tested organisms die) for leopard frogs was from 48 to 59 ppb in water of varying hardness (Schnick 1974a). Grisak (2003) found no effect levels for adult spotted frogs of 60 ppb Fintrol™ (antimycin) and for long-toed salamander larvae of 15 ppb Fintrol™.

Rotenone can be toxic to some gill-breathing larval amphibians, but is not harmful to adults (Schnick 1974b), except tiger salamanders (Schnick 1974b). Grisak (2003) found a no effect level for adult spotted frogs of 4.5 ppm Prenfish™ (rotenone). A no effect level was found for long toed salamander adults of <3.5 ppm Prenfish™ (rotenone).

Reptiles: Western terrestrial garter snake (*Thamnophis elegans*) and western rattlesnake (*Crotalus viridis*) are the only reptiles known to occur in the project area. Both associate with riparian habitats but neither is considered an aquatic organism and will not be affected by this action.

Birds and Mammals: Birds and mammals in the project area may be exposed to antimycin or rotenone through direct exposure, drinking of toxicant-treated water, or by eating fish killed by fish toxicants. Bioassays indicate that, at the proposed concentrations antimycin and rotenone will have no effect on mammals, including humans that drink the treated water (Schnick 1974a, 1974b; Herr et al. 1967). Schnick's (1974a) review included studies that examined direct exposure to water and eating fish killed by antimycin. In addition, she reported on

toxicology studies that calculated the LD50 (dose at which 50% of tested individuals die) with direct feeding of antimycin to birds and mammals. LD50's for birds and mammals were in the range of parts per million, which is at least one thousand times higher than the proposed concentrations on this project. However, the product label for the commercial form of antimycin (Fintrol™), recommends that treated water not be used for drinking. Studies conducted to set tolerances for rotenone use in irrigation waters, livestock areas, and recreational swimming areas suggest that the proposed concentrations of rotenone in this project would have no effect on mammals (including humans) that drink the treated water. Moreover, rotenone was used for many years to control grubs on the backs of dairy and beef cattle. The product label for a commercial form of rotenone (Prenfish™) prohibits its release within ½ mile upstream of a potable or irrigation water intake.

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				
b. Exposure of people to severe 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				

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			7c
d. Adverse effects on or relocation of residences?		X				

Comment 7c: Treatments will be timed so that livestock grazing allotments adjacent to the proposed treatment area are unoccupied. If this is not possible, every effort will be made to work with allotees to minimize exposure of livestock to treated waters (e.g. temporary movement to adjacent pastures, etc.)

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		X				

emergency evacuation plan or create a need for a new plan?						
c. Creation of any human health hazard or potential hazard?			X		YES	see 8a
d. Will any chemical toxicants be used?			X		YES	see 8a

Comment 8a: This project is designed to introduce pesticides into the water for the purpose of killing fish. Application of the piscicide will be in accordance with product label and only the volume of chemical required for complete fish removal will be allowed near the stream. Additionally, spill kits will be on hand (as required by the product MSDS and Dept of AG)

There is a minor risk of a health hazard for project personnel associated with eye or skin contact with undiluted Fintrol™, the commercial formulation of antimycin. There is also a minor risk of a health hazard for project personnel associated with eye or skin contact with the commercial formulation of rotenone (Prenfish™). There is a significant health hazard for project personnel associated with inhalation or swallowing of undiluted rotenone. Personnel will be trained in the proper use of piscicides by a licensed pesticide applicator. Personnel will wear the proper Personal Protective Equipment (e.g. respirators, goggles) and follow all procedures specified on Piscicide Use Labels and Material Safety Data Sheets (MSDS).

Project personnel will be provided with MSDS for piscicides and neutralizing agents used in this project. Eyewash bottles will be available for personnel operating drip stations and working with chemicals. All applicators will have handheld radios. Risks to applicators are substantially greater than risks to the general public because of the necessity of handling the compounds at full strength.

A commercial formulation of rotenone similar to that proposed for use in this project contains volatile organic compounds (xylene, trichlorethylene (TCE), toluene, and trimethylbenzene), and semi-volatile organic compounds (naphthalene, 1-methyl naphthalene and 2-methyl naphthalene). The organic compounds disappear before rotenone dissipates, typically within 1-3 weeks (Finlayson et al. 2000). The volatile organic compounds don't accumulate in the sediment; naphthalene and methyl naphthalene accumulate temporarily in the sediments (CDFG 1994; Siepmann and Finlayson 1999). TCE (a carcinogen) concentrations are expected to be within drinking water standard levels immediately following treatment. None of these constituents will be present at levels that can be expected to have any effect on animal life.

Fintrol™ (antimycin) contains acetone, diethyl phthalate, and nonoxynol-9. Acetone vaporizes or is broken down by soil and stream water microorganisms. Diethyl phthalate is also broken down by soil and stream water microorganisms. Nonoxynol-9 is a commonly used detergent and spermicide. The volume of Fintrol™ product used is very low and once diluted for application and diluted by running water poses little risk to humans.

Other potential effects of antimycin and rotenone including effects of diluted product and long-term impacts are discussed in Section 2a of this EA.

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			

Comment 12d: This project will help preserve westslope cutthroat trout, the State Fish of Montana and the only trout native to the upper Missouri River.

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			13e
f. Is the project expected to have organized opposition or generate substantial public controversy? (Also see 13e)			X			See 13e
g. List any federal or state permits required.						13g

Comment 13e: We do not expect this project to generate substantial controversy. This project was formally proposed with public notification and a decision notice signed in 2001 and 2002. Following the 30-day public comment period, only one letter was received in opposition to the project. Other recently proposed WCT restoration projects, Cherry Creek in the Gallatin National Forest and Staubach Creek in the Elkhorn Mountains, generated substantial controversy over the use of fish toxicants, antimycin and rotenone, to remove non-native trout.

Comment 13g: The following list of permits will be required:

- DEQ 308 – Montana Department of Environmental Quality (authorization for use of a piscicide)
- A Montana Department of Agriculture certified applicator will be present during treatments.

PART III. ALTERNATIVES

Three alternatives were considered during preparation of the Environmental Assessment.

Alternative 1 - No Action.

The "No Action" alternative would leave Cottonwood Creek "as is" with a small but growing brook trout population. This would render the construction of the upstream fish barrier and subsequent rotenone treatments pointless and fail to meet the objective to establish a secure, pure population of westslope cutthroat trout in Cottonwood Creek. With this alternative, Cottonwood Creek would not be utilized to expand distribution of westslope cutthroat trout in the Upper Missouri River drainage.

Alternative 2 - Proposed Action

The proposed action involves the use of EPA registered piscicides that will be strictly administered as per label guidelines for removal of the remaining brook trout (that survived the 2003 treatment) in Cottonwood Creek and establishment of a pure westslope cutthroat population.

The predicted consequences of Alternative 2 include:

- Provide a limited, but unique recreational fishing experience for users of the Beartooth Game Range to catch and release pure westslope cutthroat trout.
- Supply a genetic reserve for and increase the total miles of stream occupied by westslope cutthroat trout in the Upper Missouri River drainage (an increase of approximately 100%)

Alternative 3 - Mechanical Removal

Efforts to remove the few remaining brook trout that survived the treatments in 2003 have been unsuccessful. A total of eight brook trout have been collected since the initial chemical treatment in 2003. These fish have been collected during intense electrofishing efforts in 2004 and 2005. There is no reason to believe that expanded efforts using electrofishing equipment would eliminate non-native fish from a stream the size and complexity of Cottonwood Creek.

PART IV. ENVIRONMENTAL ASSESSMENT CONCLUSION SECTION

A) Is an EIS required? No

This environmental review demonstrates that the impacts of this proposed project are not significant. The proposed action would benefit westslope cutthroat trout in the Upper Missouri River drainage with minimal impact on the physical, biological, or the human environment. Fishing opportunities for Montana anglers would be slightly reduced over the short term until a fishery was re-established.

B) Public Involvement.

This EA will be posted on the State Bulletin Board and mailed directly to potentially interested persons. Public notification of the proposed action was completed via Region 4's standard press release package to Montana newspapers and other media outlets. We also published a Legal Notice in the Great Falls Tribune and Helena Independent Record. Notices about the availability of the EA were mailed to individuals who have expressed an interest in the area or in fish management of the Region 4 waters. Any interested citizen will be encouraged to contact FWP to discuss the proposal.

C) Duration of the comment period?

The comment period is 30 days. Public comment will be accepted through August 30, 2006

D) Name, title, address, and telephone number of the Person Responsible for Preparing the EA Document.

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