MONTANA FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

ENVIRONMENTAL ASSESSMENT
LAKE CREEK AND CRATER LAKE WESTSLOPE CUTTHROAT TROUT RESTORATION

PART I. PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action: Montana Fish, Wildlife & Parks propose construction of a fish barrier and the use of piscicides to restore westslope cutthroat trout to Lake Creek and Crater Lake.

B. Agency Authority for the Proposed Action: Agency Authority for the Proposed Action: 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.

C. Estimated Commencement Date: August, 2009

Estimated Completion Date: October, 2012

Current Status of Project: Funding has been obtained for design and construction of a permanent fish barrier at the outlet of Crater Lake. Construction would occur summer of 2009 or summer 2010.

D. Name and Location of the Project: Lake Creek and Crater Lake Westslope Cutthroat Trout Restoration, Lewis and Clark National Forest. Lake Creek enters the North Fork of the Smith River just downstream of Lake Sutherlin (Meagher County). The portion of stream and lake to be treated with piscicides is predominantly on Lewis and Clark National Forest between 46.68°N, -110.79°W (downstream end-barrier location) and 46.70°N, -110.80°W (upstream end). A small portion of Crater Lake just upstream of the barrier site is located on State Lands (Figure 1). The nearest private land is approximately one mile downstream from the lower end of the project area.

E. Project Size (acres affected).

a. **Developed/Residential –** 0 acres
b. **Industrial** – 0 acres
c. **Open space/Woodlands/Recreation** – 0 acres
d. **Wetlands/Riparian** – The portion of Lake Creek to be treated is approximately 1.0 miles in length. Crater Lake is approximately 1.5 acres in surface area.
e. **Floodplain** – 0 acres
f. **Irrigated Cropland** – 0 acres
g. **Dry Cropland** – 0 acres
h. **Forestry** – 0 acres
i. **Rangeland** – 0 acres

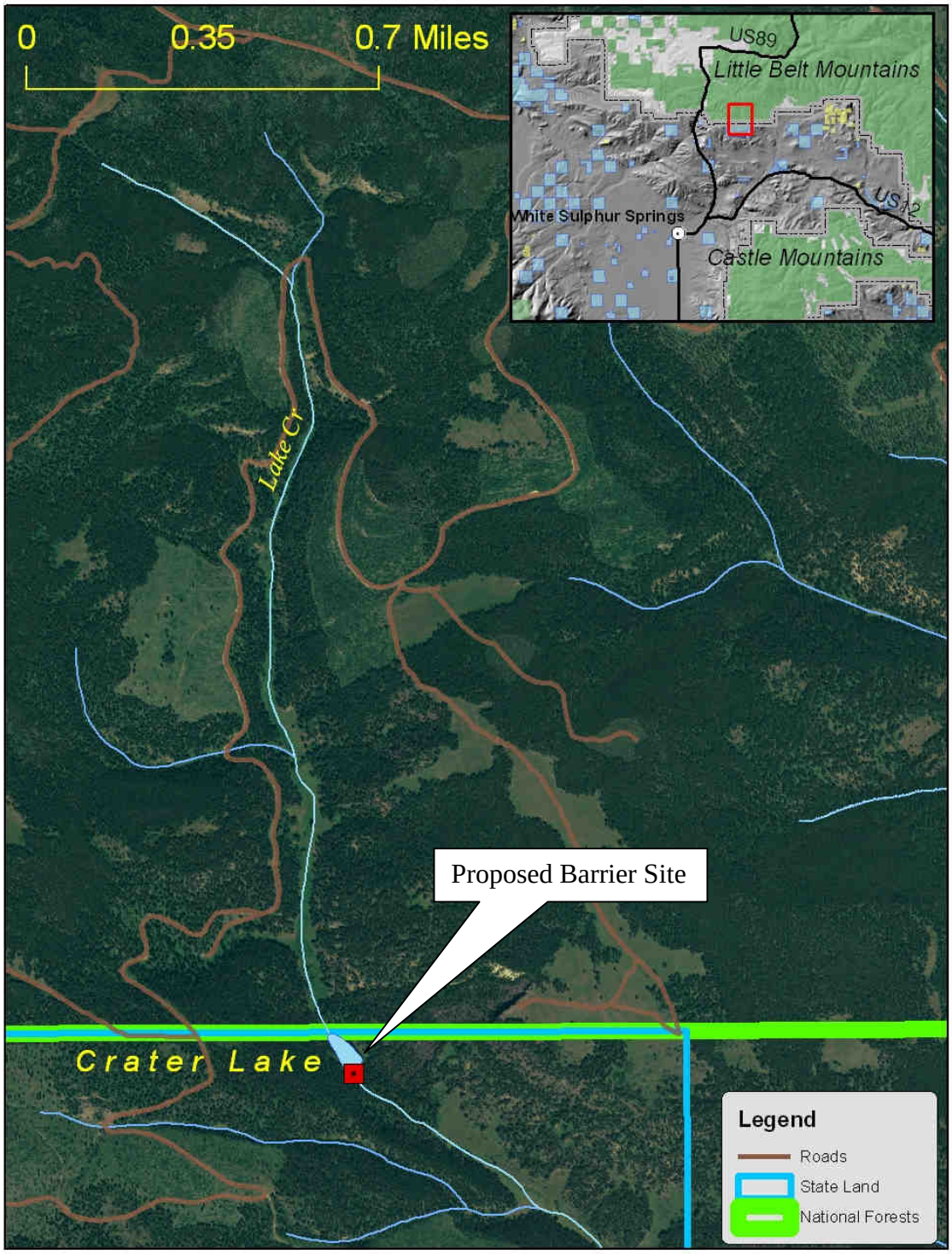

Figure 1. Lake Creek and vicinity.

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

1. Summary of the Proposed Action:

Lake Creek is a small (1.5 miles in length) first order stream that feeds Crater Lake (1.5 acre surface area) on the southern edge of the Little Belt Mountains (Lewis and Clark National Forest). Crater Lake was formed naturally by a rotational slump (landslide) that occurred early in the 20th century. Crater Lake and Lake Creek support a small population of three way hybrid trout (westslope cutthroat trout X rainbow trout X Yellowstone cutthroat trout). Lake Creek was identified as an area for potential restoration of westslope cutthroat trout (WCT) because of its unique habitat and opportunities for barrier construction at the outlet of Crater Lake. Non-native fishes would be removed from Lake Creek and Crater Lake during and after construction of a fish barrier. The majority of Crater Lake and all of upper Lake Creek is located on Lewis and Clark National Forest and the southern end of Crater Lake, including the barrier site, is on state trust land (Figure 1). A special use permit would be obtained from the State Department of Natural Resources and Conservation prior to construction of the fish barrier. After piscicide treatment non-hybridized WCT would be transferred to the newly fishless waters from one of three remaining non-hybridized WCT populations in the Smith Drainage.

In 2000, a feasibility study was prepared for construction of a fish barrier. Since 2000, barrier design has changed several times to minimize cost and reduce impacts to the relatively pristine and unique ecology of the area. Funding has been obtained from Future Fisheries (MFWP) and the State Wildlife Grants Program (SWG) for design and construction of the barrier (construction is slated for the summer of 2009 or 2010). Construction of the fish barrier would involve the placement of pre-cast concrete blocks at the mouth of Crater Lake (Figure 2). Existing roads would be used where possible. Access to the project site would either be from the south (private roads and state land) or by tying in with existing USFS roads. Installation of concrete barrier walls would raise the current level of Crater Lake a small amount (less than two feet). The current water right of 30 acre-feet is for stock use with a priority date of April 15, 1900. The current reservoir level is maintained by a disused beaver dam (Figure 2). Historically, water levels were maintained with a wood crib structure (presently non-functional) just downstream of the beaver dam. During summer, Crater Lake is approximately two feet deep and 1.5 acres in surface area (volume of approximately 4.5 acre-feet). Raising the level of Crater Lake approximately two feet would increase its volume to 9 acre-feet. This increase in surface area and volume is within the historic water right and should have no impact on downstream waters users. In addition, the fish barrier would be designed such that water levels could be dropped to current lake levels if deemed necessary.

Non-native fishes in Lake Creek and Crater Lake would be removed using EPA (Environmental Protection Agency) registered piscicides containing rotenone. Prenfish™, CFT Legumine™, and Prentox Cube Powder® all contain rotenone as their active ingredient and perform similarly. All the aforementioned products are listed in this EA but not all products would necessarily be used. Rotenone kills fish by blocking respiration at the cellular level. Rotenone would be applied to the waters of the project area at concentrations of 0.25 to 5 parts per million (ppm) of formulation (as per product label). Actual concentrations used in the treatment would likely be between 0.25 and 1 ppm registered product. Bioassays would be conducted prior to the treatment to determine the actual concentration used. Distance between rotenone drip stations would be based on the results of on-site

bioassays and water velocities in the stream. Backpack sprayers would be used in areas of standing water and in springs and seeps on the stream margins. In addition, powdered rotenone (Prentox Cube Powder®) may be mixed with sand and gelatin and placed in springs and seeps. The piscicide project would occur during summer or early fall of 2009 and 2010. At least two treatments would likely be necessary to ensure complete eradication of non-native fishes. If an additional treatment is necessary, an additional supplemental analysis will be completed. Rotenone degrades quickly in streams and typically persists for less than 14 days. Potassium permanganate (KMnO4) may be applied at a concentration of 1 to 6 ppm as a means to deactivate the rotenone; however, only if the normally dry downstream channel becomes wetted because of rain.

Figure 2. Crater Lake outlet.

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 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. 2006). The Smith River Drainage in Montana currently supports three populations of non-hybridized WCT in a total of less than 6 miles of stream (less than 1% of historical habitat).

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 2002, Peterson et al 2004). Projects which restore WCT to historically occupied habitats are necessary to ensure the continued survival of WCT in the Smith River Drainage and elsewhere. In addition, efforts to stabilize and increase WCT populations would help prevent future listing of WCT under the Endangered Species Act. This proposed action would restore WCT to Lake Creek and Crater Lake, thus reducing risks of extinction through replication of one of the three remaining non-hybridized populations in the Smith Drainage. It is unlikely that this short reach of stream could support the 2,500 minimum WCT population size recommended by Hilderbrand and Kershner (2000) for long term persistence (>100 years) and it drains less than the 5.6 square miles (minimum watershed size) area recommended as a coarse filter for translocations by Harig and Fausch (2002). However, the habitat includes a lake and is better than that found in many WCT streams in northcentral Montana that have held WCT populations for greater than 50 years (Tews et al. 2000).

3. Benefits of the Project:

This project is intended to increase the amount of stream miles occupied by genetically pure WCT (1.5 miles: an increase of approximately 25 percent in the Smith River Drainage). If implemented as proposed, this project would restore a unique pure population of westslope cutthroat trout and lower the overall risk of extinction of westslope cutthroat trout in the Smith River Drainage. This project would also provide a unique opportunity for anglers to fish for native trout in an accessible area of Lewis and Clark National Forest.

In addition, all the goals for WCT management in Montana as stated in the Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout (MFWP 2007) are supported by this project. The Memorandum of Understanding and Conservation Agreement was developed and signed by 5 federal agencies, 3 state agencies, 6 non governmental organizations, the Confederated Salish and Kootenai Tribe, the Montana Farm Bureau, and Montana Stockgrowers Association to reduce the potential for listing of WCT under the Endangered Species Act.

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 would be conducting the operation).

United States Forest Service is a partnering agency with the WCT Conservation Agreement and supports the project.

Montana Department of Natural Resources and Conservation is a partnering agency with the WCT Conservation Agreement and supports the project. The barrier would be constructed on State Trust Land and a special use permit would be obtained prior to construction.

H. Agencies Consulted During the Preparation of the EA

Montana Fish, Wildlife & Parks – Helena, Great Falls
Montana Department of Environmental Quality - Helena
Montana Department of Natural Resources and Conservation - Helena

PART II. ENVIRONMENTAL REVIEW

A. PHYSICAL ENVIRONMENT

1. LAND RESOURCES **Would the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Soil instability or changes in geologic substructure?		X				
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce productivity or fertility?			X		YES	1b
c. Destruction, covering or modification of any unique geologic or physical features?		X				
d. Changes in siltation, deposition or erosion patterns that may modify the channel of a river or stream or the bed or shore of a lake?			X		YES	1d
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

Comment 1b and 1d: Construction BMPs to reduce erosion and sedimentation would be used and would include but may not be limited to the following:

- Temporary diversions for storm runoff or Lake 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 Lake 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 Lake Creek to the extent practicable.

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

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

2. WATER **Would the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Discharge into surface water or any alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity?			X		YES	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		NO	2d
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				
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				
l. Would the project affect a designated floodplain?		X				
m. Would the project result in any discharge that would affect federal or state water quality regulations? (Also see 2a)		X				

Comment 2a: Barrier Construction

Construction activities related to construction of the fish barrier would likely result in a minor short term increase in turbidity in Lake Creek. Approximately one half mile of Lake Creek directly downstream of the construction area is dry during the summer. BMPs would be used to minimize sediment inputs into Lake Creek during construction (see Comments 1b and 1d)

Comment 2a: Piscicide Treatment

The proposed project involves application of EPA (Environmental Protection Agency) registered piscicides to Lake Creek and Crater Lake to remove non-native fish. Rotenone would be introduced at a concentration of 0.25 to a maximum of 5.0 ppm (5% formulation of Prenfish™/CFT Legumine™). Actual concentrations would likely be between 0.25 and 1.0 ppm and would be determined through onsite bioassays. Potassium permanganate (KMnO4) may be applied at a concentration of 1 to 6 ppm as a means to deactivate the rotenone; however, only if the normally dry downstream channel becomes wetted because of rain. All piscicides kill 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 cellular respiration (Oberg 1967a, 1967b).

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.), lacepod (*Lonchocarpus* spp.), and hoary pea (*Tephrosia* spp.)(Finlayson et al. 2000). We plan on using a liquid formulation (Prenfish™ or CFT Legumine™) for drip stations and backpack sprayers. The powdered form of rotenone (Prentox; 5% formulation) may be mixed with gelatin and sand and placed in seeps and backwater areas of the stream. The label for Prenfish™, typical of several commercial formulations of rotenone, states that rotenone would detoxify under natural conditions within one week to one month depending on water temperature, alkalinity, etc. The time for natural degradation (neutralization) of rotenone is controlled primarily by temperature, sunlight intensity during the application, and water chemistry at the site. 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 would break down more rapidly because of hydrolysis (breakdown through reaction with water) and photolysis (breakdown by sunlight; Cheng et al. 1972).

Lake Creek below the barrier site (approximately1/2 mile of stream) is completely dewatered after spring run-off. In the unlikely event that Lake Creek is flowing during piscicide treatment, rotenone would be neutralized with potassium permanganate shortly after it passes the man-made falls barrier (located 3.25 miles upstream from the confluence with Sheep Creek). 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 rotenone (Lawrence 1956). In addition, nearly every piscicide project in Montana currently includes the use of potassium permanganate as a neutralizing agent. 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 rotenone is based on balancing the

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

To determine the optimal concentration (from one to six parts per million) of potassium permanganate, on-site bioassays would be performed with resident trout and water in Lake Creek. These on-site bioassays would be used to determine the amount of potassium permanganate needed to overcome the water's potassium permanganate demand, neutralize the piscicides, and not kill fish. Water would not be considered detoxified until sentinel fish downstream of the station show no signs of stress after four hours exposure to treated waters (from Prenfish™ label).

The concentration of rotenone (0.25-5 ppm of a 5% rotenone formulation, or 0.025-0.25 ppm active rotenone) which would be used in this project would 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, rotenone would have no effect on mammals, including humans that drink the treated water (Schnick 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 active 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; i.e. 5 ppm Prenfish™ or CFT Legumine™).

There are no Federal or Montana numeric water quality standards for rotenone. However, BPA (Bonneville Power Administration; 2004) 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 (0.140 mg/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.

The product label for Prenfish™ (rotenone) requires that water intakes within a mile of the treatment be shut down during treatment and detoxification. During treatment, access to the treatment area would be restricted to project personnel only. In addition, signs would be posted at areas of entry warning that the treatment is taking place and water should not be used for drinking. Detoxification measures or the presence of a dry stream channel would effectively neutralize or contain the compounds before they reach portions of Lake Creek on private property. Potassium permanganate (the neutralizing agent) breaks down rapidly (within hours) in the environment and its toxicity would be reduced or eliminated through oxidation of its organic components with 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 Lake Creek below this point would be safe.

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

1. A pre-treatment bioassay would be conducted to determine the lowest effective concentration and proper spacing of drip stations.
2. Project personnel trained to safely use rotenone and potassium permanganate including the actions necessary to deal with spills. Personnel would use the proper Personal Protective Equipment (PPE), wear rubber gloves, safety goggles, respirators, and would follow directions on product labels.
3. Only the amount of rotenone that is needed for immediate use would be held near the stream.
4. Prior to the use of the chemicals, USFS personnel would be notified and signs would be posted at access areas. Signs would include information on the project, the chemicals to be used, and precautions.
5. Sentinel fish would be used within the project area to determine and monitor the effectiveness of the treatment and the effectiveness of the neutralization.

Comment 2d: Installation of concrete barrier walls would raise the current level of Crater Lake a small amount (less than two feet). The current water right of 30 acre-feet is for stock use with a priority date of April 15, 1900. The current reservoir level is maintained by a disused beaver dam. Historic water levels were maintained with a wood crib structure (non-functional) just downstream of the beaver dam. During summer, Crater Lake is approximately two feet deep and 1.5 acres in surface area. Thus, Crater Lake has a volume of approximately 4.5 acre-feet. Raising the level of Crater Lake approximately two feet would increase its volume to 9 acre-feet. This increase in surface area and volume is within the historic water right and should have no impact on downstream waters users. In addition, the fish barrier would be designed such that water levels could be dropped to current lake levels if deemed necessary.

Comment 2f: The risk that rotenone would 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 would continue to be diluted by water already present in the aquifer. The chance for exposure to rotenone from groundwater in this application is minimal since there are no domestic wells which draw water from Lake Creek near the treatment area. In addition, sampling by MFWP personnel in domestic wells closely associated with lake treatments have failed to find rotenone or any inert products of rotenone formulations (Don Skaar, MFWP; personal communication). Potassium permanganate (the neutralizing agent) breaks down rapidly in the environment and its toxicity would be reduced or eliminated through oxidation of its organic components with rotenone (Finlayson et al. 2000).

3. AIR Would 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. Would the project result in any discharge, which would conflict with federal or state air quality regulations?		X				

Comment 3b: Formulated rotenone has aromatic solvents that can be construed as objectionable. Odors associated with these compounds would dissipate rapidly, and any impacts to air quality would be short term and minor. Also, applicators are required to use NIOSH respirators for rotenone specifically due to these hazards.

4. VEGETATION Would the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Changes in the diversity, productivity or abundance of plant species (including trees, shrubs, grass, crops, and aquatic plants)?		X				
b. Alteration of a plant community?			X		YES	4a
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. Would the project affect wetlands, or prime and unique farmland?		X				

Comment 4a: Some trampling of vegetation may occur along the stream corridor during piscicide treatment as workers move about in the project area. Impacts would be minor and short term. Staging areas and areas of barrier construction would be disturbed. BMPs would be used to minimize disturbance of vegetation. Disturbed areas would be mulched and seeded after construction of barriers is complete.

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) wash all equipment and vehicles before entering national forest system lands. Remove mud, dirt, and plant parts from project equipment before moving it into project area, 2) inspect the project area for noxious weeds annually for three (3) years after the project is completed. If noxious weeds are found in the project area after project completion, manually or biologically treat the weeds, bag and dispose of them appropriately. Continue inspections for at least 3 years after weeds are no longer observed. There are no effects other than those outlined and as such, there are no cumulative effects to fisheries for this alternative.

5. FISH/WILDLIFE **Would 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 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			5e
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. Would the project be performed in any area in which T&E species are present, and would the project affect any T&E species or their habitat? (Also see 5f)		X				

i. Would the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)		X				

Comment 5b: This project involves killing non-native hybrid trout in Lake Creek. After completion of the project, non-hybridized WCT would be transferred to Lake Creek and Crater Lake from one of three remaining populations in the Smith Drainage (separate EA would follow). The bulk of recolonization, through natural reproduction after the transfers, would likely occur within 5 years of treatment. Abundance of trout in Crater Lake would be increased by raising the level of Crater Lake approximately two feet.

Comment 5c:
Aquatic Invertebrates: 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). Headwater reaches of Lake Creek that do no 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 Lake Creek (e.g. mayflies, caddisflies).

Amphibians: Lake Creek supports a robust population of Columbia spotted frogs (*Rana luteiventris*). Other amphibian species which may be present in the project area are boreal toads (*Bufo boreas*), boreal chorus frogs *(Pseudacris maculata*), and tiger salamanders (*Ambystoma tigrinum).*

Rotenone can be toxic to some gill-breathing larval amphibians, but is generally not harmful to adult amphibians (Schnick 1974). Grisak et al. (2007) found a no effect level for adult spotted frogs of 4.5 ppm Prenfish™ (rotenone). However, 50% of long toed salamander adults died after 96-h exposure to <3.5 ppm Prenfish™ (rotenone). The project area would be surveyed for amphibians prior to the treatment. After treatment the same areas would be surveyed and in the very unlikely event that amphibians are eliminated from the treated area of stream, efforts would be made to re-introduce them from nearby populations. Most amphibian larvae (tadpoles) would have already undergone metamorphosis to the less vulnerable adult stage when the proposed stream treatment would occur.

Reptiles: Western terrestrial garter snake (*Thamnophis elegans*) is the only reptile known to occur in the project area, but it is not aquatic and would not likely be affected by this action.

Birds and Mammals: Birds and mammals in the project area may be exposed to rotenone through direct exposure, drinking of piscicide-treated water, or by eating fish killed by piscicides. Bioassays on mammals indicate that at the proposed concentrations, rotenone would have no effect on mammals that drink the treated water (Schnick 1974). In addition, large and small mammals that eat fish killed during the project would be exposed to a thousandth of the median lethal dose (EPA 2007). 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. Because fish populations in Lake Creek and Crater Lake would be reduced for at least 5 years, there would be temporary impacts on any fish-eating birds and mammals present in the project area, such as great blue heron, merganser, osprey, and mink. Also, 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.

Comment 5e: Movement of fish into Crater Lake from downstream sources is currently very limited. A significant portion of Lake Creek below Crater Lake is dry during summer and winter. In addition, a disused beaver dam and remnant crib dam act as a partial barrier to upstream movement of salmonids. The proposed fish barrier is being constructed to ensure that no non-native fishes move upstream after piscicide treatment and restoration to non-hybridized native WCT.

B.HUMAN ENVIRONMENT

6. NOISE/ELECTRICAL EFFECTS **Would the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Increases in existing noise levels?		X				
b. Exposure of people to 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 **Would the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Alteration of or interference with the productivity or profitability of		X				

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

Comment 7c: Pastures adjacent to Lake Creek and Crater Lake are not grazed by livestock and there is no plan to graze them in the future. Crater Lake and Lake Creek are used by hunters and fisherman. The proposed actions would have a short term impact on recreational fishing.

8. RISK/HEALTH HAZARDS **Would the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?			X		YES	8a
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?		X				
c. Creation of any human health hazard or potential hazard?			X		YES	see 8a
d. Would any chemical toxicants be used?			X		YES	see 8a

Comment 8a: There is a minor risk of spilling rotenone or potassium permanganate directly into the stream. Rotenone and potassium permanganate are normally diluted in water prior to dripping into the stream at a constant rate by using a device that maintains a constant head pressure, called a "drip station" (an electrically operated auger may also be used to dispense dry permanganate into the stream). If undiluted rotenone or potassium permanganate is spilled, or if a drip station tips into the stream, a higher concentration of piscicide in the stream would result. This increase in concentration of piscicide would be short term and would dissipate rapidly. Short-term increases in concentration of piscicide should not affect rates of application of potassium permanganate downstream of the man-made barrier. Moreover, sentinel fish downstream of the detoxification station would be monitored and permanganate levels adjusted as necessary. Both product labels list measures for cleaning spills

such as absorbent materials and containers for spill clean-up. Personnel would comply with the labels for spill contingency.

There is a minor risk of a health hazard for project personnel associated with eye or skin contact with the commercial formulation of rotenone (Prenfish™, CFT Legumine™). There is a significant health hazard for project personnel associated with inhalation or swallowing of undiluted rotenone. Personnel would be trained in the proper use of piscicides by a licensed pesticide applicator. Personnel would 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 would be provided with MSDS for piscicides and neutralizing agents used in this project. Eyewash bottles would be available for personnel operating drip stations and working with chemicals. All applicators would 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.

Rotenone formulations typically contain 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 sediments (CDFG 1994; Siepmann and Finlayson 1999). TCE (a carcinogen) concentrations are expected to be within drinking water standard levels immediately following treatment. CFT Legumine contains Methylpyrrolidone. Methylpyrrolidone's are commonly used in many household products including fuel system cleaners, paints, and herbicides for domestic use. Accumulation of chemical residues from these household uses in urban areas would likely pose a far greater risk to wildlife resources and the human population than a one time application of chemical at extremely dilute concentrations. None of these constituents would be present at levels that can be expected to have any effect on animal life. Other potential effects of rotenone including effects of diluted product and long-term impacts are discussed in Section 2a of this EA.

9. COMMUNITY IMPACT **Would the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Alteration of the location, distribution, density, or growth rate of the human population of an area?		X				
b. Alteration of the social structure of a community?		X				
c. Alteration of the level or distribution of employment or community or personal income?		X				
d. Changes in industrial or commercial activity?		X				
e. Increased traffic hazards or		X				

effects on existing transportation facilities or patterns of movement of people and goods?						

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

11. AESTHETICS/RECREATION Would 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		NO	
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. Would any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		X				

Comment 11a: A pre-cast concrete fish barrier would be installed at the mouth of Crater Lake.

12. CULTURAL/HISTORICAL RESOURCES Would the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Destruction or alteration of any site, structure or object of prehistoric historic or paleontological importance?		X				
b. Physical change that would affect unique cultural values?		X				
c. Effects on existing religious or sacred uses of a site or area?		X				12c.
d. Would the project affect historic or cultural resources?			X			12d

Comment 12c and 12d: Prior to any construction work a cultural resources survey would be completed. A survey completed in the early 1980's did not reveal any significant historical sites or artifacts. If significant cultural resource sites are identified, avoidance measures would be prescribed by an archaeologist to mitigate direct effects of barrier construction. This project would 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 Would the proposed action, considered as a whole:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Have impacts that are individually limited, but cumulatively considerable? (A project or program may result in impacts on two or more separate resources, which create a significant effect when considered together or in total.)		X				
b. Involve potential risks or adverse effects which are uncertain but extremely hazardous if they were to occur?		X				
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard or formal plan?		X				
d. Establish a precedent or likelihood that future actions with significant environmental impacts would be proposed?		X				
e. Generate substantial debate or controversy about the nature of the impacts that would be created?			X			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. However, to mitigate the potential controversy associated with the use of piscicides or any other aspect of this project, MFWP would inform the interested public and discuss the proposed project with nearby landowners prior making a decision.

Comment 13g: Montana Stream Protection Act (SPA 124 Permit), Short-Term Water Quality Standard for Turbidity (318 Authorization), Federal Clean Water Act (404 Permit), Montana Water Quality Act (308 Permit for piscicide use).

PART III. ALTERNATIVES

Three alternatives were considered during preparation of the Environmental Assessment.

Alternative 1 – No Action

Under this alternative, status quo management would continue. Lake Creek and Crater Lake would continue to support a hybridized population WCT. Replication of an existing non-hybridized WCT population in the Smith Drainage would not occur. The risk of WCT extinction in the Smith River Drainage would not decrease.

Alternative 2 – Proposed Action

The proposed action includes removing the existing non-native fish in upper Lake Creek and Crater Lake.

The predicted benefits of Alternative 2 include:

- Increase in total miles of non-hybridized WCT inhabited stream in the Smith River Drainage from 6 to 7.5 miles (25% increase in the Smith Drainage).
- Replication of an existing population of non-hybridized WCT in the Smith Drainage.
- Reduction in the risk of potential listing under the Endangered Species Act.
- This project would also provide a unique opportunity for anglers to fish for native trout in an accessible area of Lewis and Clark National Forest.

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). Streams in which brook trout have been selectively removed to protect WCT have been far less complex than Lake Creek/Crater Lake. In general these efforts have been limited to simple 1st to 2nd order streams where brook trout are out-competing non-hybridized WCT. 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 with non-native non-hybridizing species such as brook trout or brown trout (Lake Creek holds hybridized WCT). If even a few hybrids were missed during removals they would likely hybridize with restored WCT negating the primary goal of restoration; preservation of the species.

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 Smith River Drainage with minimal impact on the physical, biological, or the human environment.

B) Public Involvement.

This EA will be posted on the MFWP internet site (http://fwp.mt.gov/publicnotices/) and mailed directly to interested persons. Any interested citizen would be encouraged to contact MFWP to discuss the proposal.

C) Duration of the comment period?

The comment period is 30 days. Public comment would be accepted through July 1, 2009.

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

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